# HISTORY OF SOYBEANS AND SOYFOODS

# IN SOUTHEAST ASIA

# (13th Century to 2010):

# EXTENSIVELY ANNOTATED

# BIBLIOGRAPHY AND SOURCEBOOK

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**Brunei, Cambodia, Indonesia, Laos, Malaysia,**

**Myanmar (formerly Burma), Philippines,**

**Singapore, Thailand, Timor-Leste, Vietnam**

**Compiled**

**by**

**William Shurtleff & Akiko Aoyagi**

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History of soy in Thailand
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History of soy in Vietnam
History of soy in Dutch East Indies
History of soy in the Dutch East Indies
History of soy in Malaya
History of soy in Siam
History of soy in Netherlands Indies

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# DEDICATION AND ACKNOWLEDGMENTS

This book is dedicated to Mr. Hermana for his lifelong, very effective work with soyfoods in Indonesia. And to KOPTI, the tempe and tofu co-operative in Indonesia.

Part of the enjoyment of writing a book lies in meeting people from around the world who share a common interest, and in learning from them what is often the knowledge or skills acquired during a lifetime of devoted research or practice. We wish to give deepest thanks...

Of the many libraries and librarians who have been of great help to our research over the years, several stand out:

University of California at Berkeley: John Creaser, Lois Farrell, Norma Kobzina, Ingrid Radkey.

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■Finally our deepest thanks to Tony Cooper of San Ramon, California, who has kept our computers up and running since Sept. 1983. Without Tony this series of books on the Web would not have been possible.

This book, no doubt and alas, has its share of errors. These, of course, are solely the responsibility of William Shurtleff.

# INTRODUCTION

## Brief Chronology of Soy in Southeast Asia

**902 AD – Indonesia**: Tofu is mentioned in the Watukura A / Watu Kura A inscription. However soybeans are not mentioned (Antoinette M. Jones, PhD thesis, 1976. University of London).

**12th or 13th century – Indonesia and Southeast Asia:** Soybeans *(kadele)* are first mentioned in the Sri Tanjung manuscript (*Serat Sri Tanjung*) in a story set in East Java (Prijono 1938, discovered by Mary Astuti 1999, p. 4-5).

**1637 – Thailand**: Soybean products (soy sauce) are first ordered for use in Thailand, by Dutch East India Company officers (Vliet 1637). Soy Sauce was also in Ayutha, Thailand by 1657 (Yamawaki 1992).

**1652 – Vietnam**: Soybean products (soy sauce) are first ordered for use in Hanoi, Vietnam, by Dutch East India Company officers (Yamawaki 1992).

**1657 – Cambodia**: Soybean products (soy sauce) are first ordered for use 250 km northwest of Phnom Penh, Cambodia, by Dutch East India Company officers (Indijck 1657).

**1659 – Indonesia**: Soybean products (soy sauce) are first ordered for use in Jakarta, Indonesia, by Dutch East India Company officers (Yamawaki 1992). By 1693 soy sauce is in Amboina, Banda, and Ternate, in the Moluccas, and Sulawesi Island (Celebes), Indonesia.

**1665 – Philippines**: Chinese in the Philippines are said to make tofu from soybeans – which, by inference, must be cultivated there (Fernández Navarrete 1665).

**1668 Dec. – Indonesia**: Soy sauce is being imported into Batavia (Jakarta, in today's Indonesia) from Deshima island in Nagasaki Bay, Japan, by officers of the Dutch East India Company (Maetsuyker 1668).

**1670-1696 – Indonesia**: Georgius E. Rumphius, in *Herbarium Amboinense* [The Flora of Amboina], Vol. 5, gives a detailed description, in Latin and Dutch, of the soybean on the island of Amboina (in the Moluccas in today's Indonesia). He says the Latin name is "Cadelium." The Malay, Javanese and Balinese is Katjang Kadelee. Black in color, they are used to make noodles and tahu (tofu). A superb, large illustration (pl. 140) shows a soybean plant with leaves, pods, and roots (but no nodules).His work is not published until about 60 years after it was written (Rumphius 1747).

**1676 June – Malaysia**: Soybean products (soy sauce) are first ordered from Japan for use in Malacca, by Dutch East India Company officers (J. van Hoorn 1676).

**1777 – Vietnam**: Soybean cultivation is first reported in the *Van-dai Loai-ngu (Encyclopedia of Vietnam)*, by Le Quy Don (discovered by Tran Van Lai 1993, p. 143).

**1790 – Vietnam**: Soybean cultivation reported again (Jao de Loureiro 1790, in Latin). He calls it Dolichos Soja, Dau nanh. Hoam téu [huang-tou = yellow bean]. He also mentions soy sauce and tofu *(Tau hu)*.

**1815 – Indonesia**: Tempe is being made in Central Java (*Serat Centhini* manuscript, in Codex Orientalis 1814 of the Leiden University Library. Vol. 1, p. 295, discovered by Shurtleff and Aoyagi, *The Book of Tempeh*, 2nd ed., p. 145).

**1826 – Singapore**: Soybean products (soy sauce) are first reported to be in Singapore, being imported by ship from England (Crawfurd 1830). But there must be much earlier dates reported in native language documents.

**1879 – Myanmar (formerly Burma)**: Earliest document seen that mentions soybean cultivation in Myanmar (Pickering 1879, in English; he says "*S. hispida* was observed by Mason in Burmah"). But there must be much earlier dates reported in native language documents.

**1882 Sept – Malaysia**: Earliest document seen that mentions soybean cultivation in Malacca (in today's Malaysia (Mene 1882, in French). But there must be much earlier dates reported in native language documents.

**1882 Sept – Philippines**: Earliest document seen that mentions soybean cultivation in the Philippines (Mene 1882, in French). But there must be much earlier dates reported in native language documents.

**1882 Sept – Thailand**: Earliest document seen that mentions soybean cultivation in Thailand (Mene 1882, in French). But there must be much earlier dates reported in native language documents.

**1907 – Laos**: Earliest document seen that mentions soybean cultivation in Laos (Gagnepain 1907, in French). But there

must be much earlier dates reported in native language documents.

**1911 – Cambodia**: Earliest document seen that mentions soybean cultivation in Cambodia (Bontoux 1911, in French). But there must be much earlier dates reported in native language documents.

**1913 – Indonesia**: The Netherland Indies [Dutch-East Indies] is importing 2.0 million bushels a year of soybeans (Burtis 1950, p. 68). Note: 36.75 bushels = 1 metric ton.

**1918 July – Singapore**: Earliest document seen that mentions soybean cultivation in the Straits Settlements (in today's Singapore) (*Garden's Bulletin*, Straits Settlements 1918 July 4, p. 4). But there must be much earlier dates reported in native language documents.

**1922 – Indonesia** is now importing a record 4.2 million bushels a year of soybeans. But this figure slowly begins to decrease, falling to 3.6 million bushels by 1930, then to only 0.3 million bushels by 1935 (Burtis 1950, p. 68).

**1932 – Indonesia**: The increasing consumption of soybeans is causing steadily increasing imports; the imports and shortage of soybeans grown locally is now a serious concern (Paerels 1932).

**1934 – Indonesia**: China (mostly Manchuria) is exporting large amounts of yellow soy beans to "Netherlands India" [the Dutch East Indies] (China Year Book, 1934, p. 129).

**1935 – Singapore**: Yeo Hiap Seng launches Light House brand Soy Sauce, Soybean Jiang, and Fermented Tofu – early packaged soy products.

**1937-1941 – Indonesia**: Exports of soybeans range from 200,000 to 400,000 bushels per year during this period before World War II. During the war (1942-1947) soybean exports stop, but they resume again (200,000 bushels per year) in 1948 (Burtis 1950, p. 68).

**1939 – Thailand**: Leaders change the country's name from Siam to Prathet Thai, or Thailand, meaning "land of the free." This was a nationalist gesture, implying the unity of all the Thai-speaking peoples.

**1949 Dec. 27 – Indonesia**: The Dutch formally recognize Indonesia's independence and sovereignty. The former Netherlands Indies or Dutch East Indies is renamed Indonesia.

**1963 – Malaysia**: The Federation of Malaya expands and changes its name to Malaysia.

**1964 May – Indonesia**: "Tempeh fermentation: Package and tray fermentation," by Martinelli and Hesseltine is published in the journal *Food Technology* (p. 167-71). It describes how to make tempeh in perforated polyethylene bags. This discovery and "new technology" is soon transferred to tempeh makers in Indonesia, where it becomes widely used. Growing interest in and publications about tempeh by Western scientists and nutritionists begin to enhance its image and increase its consumption in Indonesia. Before long more Indonesian scientists and nutritionists are studying tempeh.

**1970 – Southeast Asia**: *Pacific and Southeast Asian Cooking*, by Rafael Steinberg and the editors of Time-Life Books is published. Outstanding text, and filled with lovely color photographs and authentic recipes.

**1970s early – Indonesia**: Imports of soybeans start to grow dramatically. In 1968-72 Indonesia exported on average 5,000 tonnes (metric tons) of soybeans a year. Then, in the early 1970s, the country switched to being importer. In 1973-77 Indonesia imported on average a modest 14,000 tonnes of soybeans a year, increasing dramatically to 211,000 tonnes in 1978-82, and 359,000 tonnes a year in 1983-87.

Soybean consumption in Indonesia also increased dramatically (more than 3-fold) during this 20-year period from 372,000 tonnes per year on average in 1968-72 to 1,152,000 tonnes in 1983-87 (Saleh and Sumarno 1993, p. 57).

**1975 Aug. – Brunei**: Soybeans are first cultivated, experimentally (C.N. Williams 1978).

**1976 – Indonesia**: *The Present Status of Soybean in Indonesia*, by Winarno et al. is published. This remarkable report (xxiii + 128 pages), based on a nationwide survey, contains a wealth of detailed information and statistics on all aspects of soybeans and soyfoods in Indonesia. Unfortunately, there are no statistics on soybean imports or exports.

**1979 – Indonesia**: KOPTI is founded - The Tempeh & Tofu Processors Cooperative.

**1982 Jan. – Timor-Leste (East Timor)**: Soybean products (soy sauce) are first reported (B.J.B. Wood 1982). Soybeans as such have not yet been reported.

**1991 Dec. – Indonesia**: "Soybean utilization, processing, and production policy in Indonesia," by Pierre Rondot et al.

is published in *Palawija News* (Bogor, p. 1-6). An excellent article with many statistics. For example: In Java, annual soybean consumption per capita varies from 11 to 16 kilograms compared with one to six kilograms in other areas of Indonesia. Java, which produces 47% of Indonesia's soybean, is also its greatest consumer.

"Average soybean consumption for the whole of Indonesia increased from 3.42 kg/cap/year in 1969 to 5.78 kg/cap/year in 1985. Consumption per capita of processed soybean is higher in urban areas than in rural areas."

In 1987, according to SYGAP survey data, Indonesians consumed 749,600 tonnes of tempeh (86 gm/week), 714,700 tonnes of tofu (82 gm/week), and 48,200,000 liters of kecap (ketjap; Indonesian soy sauce).

**2003 – Southeast Asia snapshot**: The limited soybean production in the 10 ASEAN member countries benefits from varying degrees of governmental protection. Yet they are large
importers, with nearly 3.5 million tonnes (metric tons) of soybean meal and 3 million tonnes of soybeans.

Indonesia produces about 800,000 tonnes/year of soybeans and imports 1.4 to 1.5 million tonnes.

Thailand produces 600,000 to 700,000 tonnes/year of soybeans. In 2002 Thailand imported 1.3 million tonnes of soybeans and 1.9 million tonnes of soybean meal.

The Philippines has very little soybean production, but the country's 3 crushers import about 350,000 tonnes of soybeans. Another 1.25 million tonnes of meal are imported.

Vietnam also has small local production, but the country's booming feed industry imported 600,000 tonnes of soybean meal in 2002. Vietnam is the only country in the region experiencing double-digit growth in grain demand. The government has announced plans to promote more vegetable oil production and consumption, and Vietnam's first modern soybean crushing plant is now under construction. A huge new grain port is being built in South Vietnam, 70 km east of Ho Chi Minh City. The import terminal will be able to handle panamax-sized vessels.

Traditionally the USA has been the largest supplier to the region, but Brazil, Argentina and China are now taking increasing shares of that market (David McKee in *World Grain*, Aug. 2003, p. 30-42).

**Present status of soybeans in Southeast Asia**:

**Imports of soybean meal**: The world's top four soybean meal importers (in million metric tons): (1). E.U.-27 (European Union 27 nations) 22.150. (2) Indonesia 2.45. (3). Vietnam 2.30. (4). Thailand 2.10 (Chris Lyddon in *World Grain*, Nov. 2009, p. 28-36). Note: The Southeast Asian countries have large and rapidly growing feed (especially poultry) industries but most do not have soybean crushing plants.

**Soybean production** in Southeast Asia has decreased slightly from 1.581 million metric tons (MMT) in 2000/2001 to 1.461 MMT in 2009/10. Of this total, Indonesia produces 800,000 metric tons (MT), Vietnam 300,000 MT, Thailand 170,000 MT, and Philippines 1,000 MT.

**Imports of whole soybeans** to Southeast Asia has remained largely unchanged from 4.084 MMT in 2001/02 to 4.025 MMT in 2009/10. The countries with the largest soybean imports in 2009/10 are (in MMT): Thailand 1.85. Indonesia 1.60. Malaysia 0.61. Vietnam 0.22. Philippines 0.125 and Singapore 0.02.

**Imports of soybean oil** to Southeast Asia has remained largely unchanged from 297,000 metric tons (MT) in 2001/02 to 320,000 MT in 2009/10. The countries with the largest imports of soybean oil in 2009/10 are (in 1,000 MT): Vietnam 135. Malaysia 128. Singapore 38. Indonesia 15. Philippines 3. Thailand 1.

Source: USDA Foreign Agricultural Service, psdonline (online database). May 2010.

## ABOUT THIS BOOK

This is the most comprehensive book ever published about the history of soybeans and soyfoods in Southeast Asia. It has been compiled, one record at a time, over a period of 34 years, in an attempt to document the history of soy in this region. It is also the single most current and useful source of information on this subject.

This is one of more than 50 books compiled by William Shurtleff and Akiko Aoyagi, and published by the Soyinfo Center. It is based on historical principles, listing all known documents and commercial products in chronological order. It features detailed information on:

- 62 different document types, both published and unpublished.
- 2,808 published documents - extensively annotated bibliography. Every known publication on the subject in every language.
- 146 original Soyinfo Center interviews and overviews never before published.
- 217 unpublished archival documents
- 151 commercial soy products.

Thus, it is a powerful tool for understanding the development of this subject from its earliest beginnings to the present.

Each bibliographic record in this book contains (in addition to the typical author, date, title, volume and pages information) the author's address, number of references cited, original title of all non-English language publications together with an English translation of the title, month and issue of publication, and the first author's first name (if given). For most books, we state if it is illustrated, whether or not it has an index, and the height in centimeters.

For commercial soy products (CSP), each record includes (if possible) the product name, date of introduction, manufacturer's name, address and phone number, and (in many cases) ingredients, weight, packaging and price, storage requirements, nutritional composition, and a description of the label. Sources of additional information on each product (such as advertisements, articles, patents, etc.) are also given.

A complete subject/geographical index is also included.

# ABBREVIATIONS USED IN THIS BOOK

A&M = Agricultural and Mechanical
Agric. = Agricultural or Agriculture
Agric. Exp. Station = Agricultural Experiment Station
ARS = Agricultural Research Service
ASA = American Soybean Association
Assoc. = Association, Associate
Asst. = Assistant
Aug. = August
Ave. = Avenue
Blvd. = Boulevard
bu = bushel(s)
ca. = about (circa)
cc = cubic centimeter(s)
Chap. = Chapter
cm = centimeter(s)
Co. = company
Corp. = Corporation
Dec. = December
Dep. or Dept. = Department
Depts. = Departments
Div. = Division
Dr. = Drive
E. = East
ed. = edition or editor
e.g. = for example
Exp. = Experiment
Feb. = February
fl oz = fluid ounce(s)
ft = foot or feet
gm = gram(s)
ha = hectare(s)
i.e. = in other words
Inc. = Incorporated
incl. = including
Illust. = Illustrated or Illustration(s)
Inst. = Institute
J. = Journal
J. of the American Oil Chemists' Soc. = Journal of the American Oil Chemists' Society
Jan. = January
kg = kilogram(s)
km = kilometer(s)
Lab. = Laboratory
Labs. = Laboratories
lb = pound(s)
Ltd. = Limited
mcg = microgram(s)
mg = milligram(s)
ml = milliliter(s)
mm = millimeter(s)
N. = North
No. = number or North
Nov. = November
Oct. = October
oz = ounce(s)
p. = page(s)
P.O. Box = Post Office Box
Prof. = Professor
psi = pounds per square inch
R&D = Research and Development
Rd. = Road
Rev. = Revised
RPM = revolutions per minute
S. = South
SANA = Soyfoods Association of North America
Sept. = September
St. = Street
tonnes = metric tons
trans. = translator(s)
Univ. = University
USB = United Soybean Board
USDA = United States Department of Agriculture
Vol. = volume
V.P. = Vice President
vs. = versus
W. = West
°C = degrees Celsius (Centigrade)
°F = degrees Fahrenheit
> = greater than, more than
< = less than

# HOW TO MAKE THE BEST USE OF THIS DIGITAL BOOK

**Most Important Thing**: The **KEY** to using this book is to **SEARCH IT** using the powerful built-in search engine, as follows:

**On the toolhar at the top of every page, on the far right end is a rectangular white hox with the word "Find" in it.**

**Click the down-pointing arrow to the right of that box to get a menu.**

**Click "Open Full Acrobat Search."**

**On the left side of your screen a "Search" hox will open up.**

**When asked: "What word or phrase would you like to search for?" type that word or phrase in the hox. For example: Zavitz or Nohle Bean. No need to use quotation marks. Then click "Search."**

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**Chronological Order**: Tbe publications and products in this book are listed witb the earliest first and the most recent last. Within each year, references are sorted alphabetically by author. If you are interested in only current information, you might want to start reading at the back, just before the indexes.

**A Reference Book:** Like an encyclopedia or any other reference book, this work is meant to be searched first - to find exactly the information you are looking for - and then to be read.

**How to Use the Index**: A subject and country index is located at the back of this book. It will help you to go directly to the specific information that interests you. Browse through it briefly to familiarize yourself with its contents and format.

Each record in the book has been assigned a sequential number, starting with 1 for the first/earliest reference. It is this number, not the page number, to which the indexes refer. A publication will typically be listed in each index in more than one place, and major documents may have 30-40 subject index entries. Thus a publication about the nutritional value of tofu and soymilk in India would be indexed under at least four headings in the subject and country index: Nutrition, Tofu, Soymilk, and Asia, South: India.

Note the extensive use of cross references to help you: e.g. "Bean curd. See Tofu."

**Countries and States/Provinces**: Every record contains a country keyword. Most USA and Canadian records also contain a state or province keyword, indexed at "U.S. States" or "Canadian Provinces and Territories" respectively. All countries are indexed under their region or continent. Thus for Egypt, look under Africa: Egypt, and not under Egypt. For Brazil, see the entry at Latin America, South America: Brazil. For India, see Asia, South: India. For Australia see Oceania: Australia.

**Most Important Documents**: Look in the Index under "Important Documents -."

**Organizations**: Many of the larger, more innovative, or pioneering soy-related companies appear in the subject index – companies like ADM / Archer Daniels Midland Co., AGP, Cargill, Dupont, Kikkoman, Monsanto, Tofutti, etc. Worldwide, we index many major soybean crushers, tofu makers, soymilk and soymilk equipment manufacturers, soyfoods companies with various products, Seventh-day Adventist food companies, soy protein makers (including pioneers), soy sauce manufacturers, soy ice cream, tempeh, soynut, soy flour companies, etc.

Other key organizations include Society for Acclimatization (from 1855 in France), American Soybean Association, National Oilseed/Soybean Processors Association, Research & Development Centers (Peoria, Cornell), Meals for Millions Foundation, and International Soybean Programs (INTSOY, AVRDC, IITA, International Inst. of Agriculture, and United Nations). Pioneer soy protein companies include Borden, Drackett, Glidden, Griffith Labs., Gunther, Laucks, Protein Technologies International, and Rich Products.

**Soyfoods**: Look under the most common name: Tofu, Miso, Soymilk, Soy Ice Cream, Soy Cheese, Soy Yogurt, Soy Flour, Green Vegetable Soybeans, or Whole Dry Soybeans. But note: Soy Proteins: Isolates, Soy Proteins: Textured Products, etc.

**Industrial (Non-Food) Uses of Soybeans**: Look under "Industrial Uses ..." for more 17 subject headings.

**Pioneers - Individuals**: Laszlo Berczeller, Henry Ford, Friedrich Haberlandt, A.A. Horvath, Englebert Kaempfer, Mildred Lager, William Morse, etc. Soy-Related Movements: Soyfoods Movement, Vegetarianism, Healtb and Dietary Reform Movements (esp. 1830-1930s), Health Foods Movement (1920s-1960s), Animal Welfare/ Rights.

These are indexed under the person's last name or movement name.

**Nutrition**: All subjects related to soybean nutrition (protein quality, minerals, antinutritional factors, etc.) are indexed under Nutrition, in one or more of 14 subcategories.

**Soybean Production**: All subjects related to growing, marketing, and trading soybeans are indexed under Soybean Production. E.g. Soybean Production: Nitrogen Fixation, or Soybean Production: Plant Protection, or Soybean Production: Variety Development.

**Other Special Index Headings**: Browsing through the subject index will show you many more interesting subject headings, such as Industry and Market Statistics, Information (incl. computers, databases, libraries), Standards, Bibliographies (works containing more than 50 references), and History (soy related).

**Commercial Soy Products**: All Soyinfo Center sourcebooks that focus on a specific soyfood (tofu, soymilk, tempeh, miso, etc.) or geographical area (Africa, Japan) contain extensive information about every known commercial soyfood product - a unique feature. We list the product name, manufacturer's name, address, and phone number, year and month of introduction, ingredients, weight-packaging-price, how stored, nutritional analysis, and documentation on sources of additional information on that product.

**SoyaScan Notes**: This is a term we have created exclusively for use with this database. A SoyaScan Notes Interview contains all the important material in short interviews conducted and transcribed by William Shurtleff. This material has not been published in any other source. Longer interviews are designated as such, and listed as unpublished manuscripts. A transcript of each can be ordered from Soyinfo Center Library. A SoyaScan Notes Summary is a summary by William Shurtleff of existing information on one subject.

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2. An asterisk after eng (eng*) means that Soyinfo Center has done a partial or complete translation into English of that document.

3. An asterisk in a listing of the number of references [23* ref] means that most of these references are **not** about soybeans or soyfoods.

**Documents Owned by Soyinfo Center.** Lack of an * at the end of a reference indicates that the Soyinfo Center Library owns all or part of that document. We own roughly three fourths of the documents listed. Photocopies of hard-to-find documents or those without copyright protection can be ordered for a fee. Please contact us for details.

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**Customized Database Searches**: This book was printed from SoyaScan, a large computerized database produced by the Soyinfo Center. Customized/personalized reports are "The Perfect Book," containing exactly the information you need on any subject you can define, and they are now just a phone call away. For example: Current statistics on tofu and soymilk production and sales in England, France, and Germany. Or soybean varietal development and genetic research in Third World countries before 1970. Or details on all tofu cheesecakes and dressings ever made. You name it, we've got it. For fast results, call us now!

**BIBLIO**: The software program used to produce this book and the SoyaScan database, and to computerize the Soyinfo Center Library is named BIBLIO. Based on Advanced Revelation, it was developed by Soyinfo Center, Tony Cooper and John Ladd.

**History of Soybeans and Soyfoods**: Many of our digital books have a corresponding chapter in our forthcoming scholarly work titled History of Soybeans and Soyfoods (4 volumes). Manuscript chapters from that book are now available, free of charge, on our website, www.soyinfocenter.com.

**About the Soyinfo Center.** An overview of our publications, computerized databases, services, and history is given on our website.

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SOUTHEAST ASIA


Southeast Asia


Java, Madura, and Bali

Georg Eberhard Rumphius (1627-1702)

# HISTORY OF SOY IN SOUTHEAST ASIA

1. [Watukura A inscription]. 902 AD. Java. Unpublished manuscript. [Jav]*

• ***Summary:*** A.M. Jones (1976 unpublished thesis), on p. 41 gives a list of inscriptions from the period 901-929 A.D. from Central and East Java. The Watukura A (Watu Kura) inscription is dated A.D. 902. The place it was found is unknown. It is a copperplate, now in a private collection in Copenhagen, Denmark. A transcription with translation can be found in v. Naerssen, *Oud Javaansche Orkonden in Daensche en Duitsche verzamelingen [Ancient Javanese Documents in Danish and German Collections]* (p. 82-105).

In Jones' section on foods, page 90 states: "There is no mention of the soya bean (Glycine max. Merr.) or of *tempe* but the bean must have been known and cultivated as we find mention of *tahu* [tofu] eaten at a feast in the Watukura A inscription. This name certainly points to Chinese influence* and the process of making *tahu,* beancurd cakes shaped into squares and made from soya beans and still widely eaten in Java today, may have been learned from the Chinese, either resident or visiting. In any case the *tahu* itself must have been made in Java; it could hardly have been imported as it does not carry" [i.e., is perishable]. * For footnotes, see Jones 1976.

Note: This is the earliest document seen (May 2010) concerning soybean products (tofu) in Indonesia; soybeans as such have not yet been reported. Address: Java.

2. Serat Sri Tanjung [Sri Tanjung manuscript]. 1350. East Java. Unpublished manuscript. [Jav]*

• ***Summary:*** In a story from the 12th or 13th century, set in East Java, soybeans *(kadele)* are mentioned in this ancient manuscript.

Note 1. This is the earliest document seen (June 2010) concerning soybeans in Indonesia or Southeast Asia. This document contains the earliest date seen (12th or 13t century) for soybeans in Indonesia or Southeast Asia. The source of these soybeans may well have been China.

Note 2. This early reference to soybeans was discovered by Mary Astuti of Indonesia. For details see Astuti 1999 (p. 4-5). Address: East Java.

3. González de Mendoza, Juan; Loyola, Martin Ignacio de. 1588. The historie of the great and mightie kingdome of China, and the situation thereof: Togither with the great riches, huge cities, politike gouernement, and rare inuentions in the same. Translated out of Spanish by R. Parke. London: Printed by I. Wolfe for Edward White... [8] + 410 p. 20 cm. *

• ***Summary:*** States that in the year 1585 three Chinese merchants visited Mexico and brought with them curious things: "The desire of gain hath caused them to traueile to Mexico, whither came the yeare past in anno 1585 three merchants of China, with verie curious things, and neuer staied till they came into Spaine and into other kingdomes further off."

Note 1. Prof. Ted Hymowitz believes that, because of this new information, soybeans were probably introduced to the New World by at least 1585. The first Spanish galleon to make a round trip from Acapulco to Manila was in 1565. Thus, it is not too far fetched to think that impressed Chinese seamen or Chinese merchants returned to the New World bearing soybeans.

Note 2. Juan González de Mendoza lived 1545-1618; Martin Ignacio de Loyola died in 1606.

Note 3. The translator (R. Park) states in his dedication: "Made and set fourth by the Author of this Book, as well as by that which he hath seene, as also by the true relation that he had of the religious and barefoot Fryers of the order of St. Francis, who traualled the same the yeare 1584."

4. Vliet, Jeremias van. 1637. [Re: Request for provisions]. Letter to Nicolaes Coeckenbacker, head of Dutch office at Firando [Hirado Island, near Nagasaki, Kyushu, southern Japan], June 11. p. 555-65 See p. 565. Handwritten, with signature. [Dut]

• ***Summary:*** This request includes: 10 pots of sugarloaf, 50 candlesticks dismantled into parts, 50 lacquered plates with legs and gilded flowers, 10 Kegs Murasaki to hawk among the Moors *(10 Balien Moersackjen om onder de Mooren te venten).* Note 1. Murasaki (literally "purple") is an ancient poetic synonym for soy sauce.

Bibliographic reference in Dutch: NA, VOC 1125, overgekomen brieven en papieren (11-6-1637) 555vo-565vo. The letter is a contemporary hand-written copy, written in a letter-book for the administration on Deshima.

Location: Nationaal Archief, Den Haag, De Archieven van de Nederlandse Factorij Japan (NFJ); toegangsnummer 1.04.21; inventaris nummer 1125 [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch Factory in Japan (NFJ); access number 1.04.21; record number 1125].

Note 2. This is the earliest Dutch-language document seen (May 2009) that uses the word "Moersackjen" [murasaki] to refer to soy sauce.

Note 3. The Dutch word for "murasaki" also appears in at least two other letters written requesting provisions during the late 1630s, but in each case "murasaki" seems to be a solid, ordered in units of pieces or bales (such as indigo), as follows: (1) 1638 May 5. NFJ 277, p. 319. Letter

from the prince of Tonkin to the president of the VOC settlement at Firando. "8 pieces of murasaki or violet *(8 stucx mourasacquij ofte violeth).* (2) 1638 July 15. NFJ 277, p. 472. Letter from Henrick Nachtegael in Siam to the honourable mister president Nicolaes Couckenbacker at Firando. "Twenty bales of murasaki to sell and use as a present *(Twintich baelen moersacquij om te vercoopen ende te verschencken).*

Note 3. Assuming "Moersackjen" refers to soy sauce: This is the earliest document seen (May 2010) concerning soybean products (soy sauce) in Siam. This document contains the earliest date seen for soybean products in Siam (1637); soybeans as such have not yet been reported. Address: In India at the office in Siam *(India op het comptoir Siam).*

5. Craijers, E. Hendrick; Westerwolt, Volckerus; Momme, Hendrick. 1651. [Re: Request for silver]. Letter to Pieter Sterthenius, president of the Deshima factory [Nagasaki, Kyushu, southern Japan], June 30. p. 48-52. See p. 52. Handwritten, with signature. [Dut]
• ***Summary:*** This request for silver includes: 10 bales of flour, 4 bales of buckwheat, 6 kegs of sake *(sackje),* 8 kegs of soy [sauce] *(balien [taru] sooje),* 24 little hams, 4 jars of hard bread,... 8 kegs of pickled vegetables *(kônomoro [kô-no-mono]),* 4 books of paper, 6 kegs of soy [sauce] *(moersackien [murasaki];* a poetic synonym for soy sauce), 12 boxes of marmalade.

Bibliographic reference in Dutch: NA, NFJ 284, ontvangen brieven (30-6-1651). On microfilm.

Location: Nationaal Archief, Den Haag, De Archieven van de Nederlandse Factorij Japan (NFJ); toegangsnummer 1.04.21; inventaris nummer 284 [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch Factory in Japan (NFJ); access number 1.04.21; record number 284].

Note 1. This is the earliest Dutch-language document seen (June 2007) that uses the word "sooje" to refer to soy sauce.

Note 2. About the recipient: In *Pieter van Dam's Beschryvinghe van de Oostindische Compagnie,* by F.W. Stapel is an entry for Pieter Sterthenius. He was Council of Justice in Batavia and thereafter in 1651 for one year president of the Dutch merchant settlement in Japan. From 1655 to 1658 he was director of Bengal. In 1658 he went back home to the Netherlands as commander of the return fleet. This letter is a contemporary handwritten copy, in a letter-book for the administration on Deshima. It was sent on the ship *Coninck van Polen.* Address: Supreme merchant and head of the settlement at Siam *(Oppercoopman en opperhooft des comptoirs Siam).*

6. Creijers, Henrick; Westerwolt, Volckerus; Rijck, Jan van. 1652. [Re: Request for Japanese silver to keep the commerce going]. Letter to Adriaen van der Burch, director of commerce at the Deshima factory [Nagasaki, Kyushu, southern Japan], July 3. p. 73-77. See p. 77. Handwritten, with signature. [Dut]
• ***Summary:*** This request for silver and provisions includes: Two stones to grind wheat, 20 bales of wheat,... 3 bales of buckwheat, 10 kegs of sake *(balien sackij),* 8 kegs of soy [sauce] *(balien soij),* 2 pots sugarloaf, 6 kegs of pickled vegetables *(kônomoro [kô-no-mono]),* 12 *sonwats vissen (sonquat* = Japanese New Year), 20 boxes of marmalade, 6 bales umeboshi *(omebus;* salted or pickled plums).

Bibliographic reference in Dutch: NA, NFJ 285, ontvangen brieven (3-7-1652) 73-77. On microfilm.

Location: Nationaal Archief, Den Haag, De Archieven van de Nederlandse Factorij Japan (NFJ); toegangsnummer 1.04.21; inventaris nummer 285 [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch Factory in Japan (NFJ); access number 1.04.21; record number 285].

Note 1. This is the earliest Dutch-language document seen (June 2007) that uses the word "soij" to refer to soy sauce.

Note 2. Henrick Creijers = Hendrick Craijers.

Note 3. This is the earliest document seen (May 2010) that clearly mentions soybean products (soy sauce) in Siam. This document contains the earliest clear date seen for soybean products in Siam (1652); soybeans as such have not yet been reported. Address: Siam.

7. Keijser, Jacob; Grevenraet, Joannes; Brummel, Luder; Baron, Henrick. 1652. [Re: Request for provisions for the settlement]. Letter to Adriaen van der Burch, director of commerce at the Deshima factory [Nagasaki, Kyushu, southern Japan], Aug. 14. p. 93-100. See p. 98-99. Handwritten, with signature. [Dut]
• ***Summary:*** This request includes: 80 to 90 kegs of good sake *(balijen goede sackij).* 50 piculs of wheat meal. 150 bales of white rice for the settlement and the ships. 70 bales of little beans *(boontjens)* for the settlement and the ships. 40 bales of peanuts *(cadjangh)* for the settlement and the ships. 10 bales of barley for the settlement and the ships. 16 pots of round rusk. 4 pots with sugarloaf. 25 piculs of smoked hams. 2 kegs of mustard seed. 4 kegs of miso *(misio).* preserved with pickled vegetables *(connemonne [kô-no-mono]).* 15 kegs soy [sauce] *(soije)* and 16 pieces of dried katsuo *(caetchio [katsuobushi]).* 2 pots with various Japanese candied fruits to treat native leaders. As much rice as they need before they are back in Japan, because wheat is expensive in Tonkin.

Bibliographic reference in Dutch: NA. NFJ 285, ontvangen brieven (14-8-1652) 93-100. On microfilm.

Location: Nationaal Archief, Den Haag, De Archieven van de Nederlandse Factorij Japan (NFJ); toegangsnummer 1.04.21; inventaris nummer 285 [National Archives. Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch Factory in Japan (NFJ); access number 1.04.21; record number 284].

Note 1. Henrick Creijers = Hendrick Craijers. Note 2. 1 picul is about 125 pounds, the amount a man can carry with a yoke.

Note 3. This is the earliest Dutch-language document seen (March 2009) that mentions miso, which it calls "misio."

Note 4. This is the earliest document seen (May 2010Y) concerning soybean products (soy sauce) in Tonkin [in today's Vietnam]. This document contains the earliest date seen for soybean products in Tonkin [in today's Vietnam] (1952); soybeans as such have not yet been reported. Address: Written on the ship Taiwan moored on the river of Tonkin [in today's north Vietnam] before the bar.

8. In't Comptoir Nagasaekij [In the office of Nagasaki]. 1652. Letter to Tonkin [today's Hanoi, Vietnam], Oct. 27. Unpaginated. Handwritten, with signature. [Dut]

• ***Summary:*** Shipped and loaded in the yacht *(jacht) Taijouan* [Tayoan / Taiwan] sailing from this place with a Bill of Lading of the skipper Hendrick Volckmans and the second merchant Abraham Stuijlingh directly to Tonkin *(Tonckijn)* in consignment send to the merchant Jacob Keijser head of the Company's trade.

The list of provisions sent includes: "25 smoked hams of 8 *maas* a piece–f 20:—:—. 6 bales mustard seed of 15 *maas* a piece–f -9:—:—. 4 kegs of pickled vegetables *(kô-no-mono, Connemon)* of 12½ *maas* a piece–f -5:—:—. 50 little kegs *(kleene balijtjens)* of Soy [sauce] *(Zoije)* of 2 *maas* a piece–f 10:—6:—. 2 kegs of sardines *(Serdeijn)* of 8 *maas* a keg–f -1:-6:—. 16 pots of round Dutch rusk costs total–f 70:-2:-4. 80 catties (1 cattij = 625 gm) candied fruit in 6 pots costs–f 16:-9:—. 4 pots of sugarloaf costs f 19:-6:-8.

Bibliographic reference in Dutch: NA, NFJ 851, Journal (27-10-1652).

Location: Nationaal Archief, Den Haag, De Archieven van de Nederlandse Factorij Japan (NFJ); toegangsnummer 1.04.21; inventaris nummer 851. Boekhoudkundig journaal [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch Factory in Japan (NFJ); access number 1.04.21; record number 851. Journal of bookkeeping].

Note 1. This is the earliest Dutch-language document seen (June 2007) that uses the term "Zoije" to refer to soy sauce. Address: Deshima, Nagasaki, Japan.

9. Indijck, Hendricq; Kettingh, Pieter; Stouthart, Adrien. 1657. [Re: Order for provisions]. Letter to the Deshima factory [Nagasaki, Kyushu, southern Japan], July 8. p. 5-9 See p. 9. Handwritten, with signature. [Dut]

• ***Summary:*** "For the provision of this settlement [Cambodia] we request... 20 kegs sake *(sackie)*, with drinking utensils / accessories, a little soy [sauce] *(wat soija),* and vegetable pickles (connemonne [kô-no-mono]) to treat the Japanese and other merchants from time to time."

Bibliographic reference in Dutch: NA, NFJ 288, ontvangen brieven (8-7-1657) 41. On microfilm.

Location: Nationaal Archief, Den Haag, De Archieven van de Nederlandse Factorij Japan (NFJ); toegangsnummer 1.04.21; inventaris nummer 288 [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch Factory in Japan (NFJ); access number 1.04.21; record number 288].

Note 1. This is the earliest document seen (May 2010) concerning soybean products (soy sauce) in Cambodia; soybeans as such have not yet been reported.

Note 2. About the sender: In *Pieter van Dam's Beschryvinghe van de Oostindische Compagnie*, by F.W. Stapel is an entry for Hendricq Indijck. He was supreme merchant in Cambodia and after that he became, three times, head of the trading post in Japan. In Cambodia he was succeeded by Pieter Kettingh. This letter is a contemporary handwritten copy, in a letter-book for the administration on Deshima. The letter was received on 10 Aug. 1657 by the yacht *(jacht) Erasmus*. Address: Head *(Opperhofd)*, Dutch factory in Cambodia.

10. Rijck, Jan van. 1660. [Re: Order of provisions for private use]. Letter to Joan Boucheljon, president and head of the trade and other business, Nagasaki [Deshima, in Kyushu, southern Japan], June 29. Unpaginated. Handwritten, with signature. [Dut]

• ***Summary:*** The provisions ordered include: 200 catties (1 catty = 625 gm or 1.3 lb) uncut tobacco, 50 catties cuttle-fish *(Zeekath),* 200 pieces *Cantjo (Cantio),* 3 kegs of pickled vegetables *(connemon [kô-no-mono]),* 3 kegs soy [sauce] *(soije),* 20 kegs of sake *(sackie),* 30 bales of wheat, 6 Japanese coats with double linings, 6 smoked hams, 6 smoked *songuadts / songuat* fishes, 4 copper candle holders.

Bibliographic reference in Dutch: NA, NFJ 291, ontvangen brieven (29-6-1660). On microfilm.

About the recipient: E. Joan Boucheljon is mentioned as Jan Boucheljon in *Pieter van Dam's Beschryvinghe van de Oostindische Compagnie*, by F.W. Stapel. In 1641 he left Holland and sailed as an assistant writer to Asia. He worked mostly in Japan, where he was head of the settlement in 1660. Three times (in 1655, 1657, and 1659) he was a

member of the Council of Justice in Batavia. In Holland he was known as someone with a good reputation. On 24 Jan 1661 he returned home to Holland as a commander of two ships: the *Kalf* and the *Venenburg*.

Location: Nationaal Archief, Den Haag, De Archieven van de Nederlandse Factorij Japan (NFJ); toegangsnummer 1.04.21; inventaris nummer 291 [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch Factory in Japan (NFJ); access number 1.04.21; record number 291]. Address: Siam.

11. Verdonck, -. 1664. [Re: Order for provisions]. Letter to the Deshima factory [Nagasaki, Kyushu, southern Japan], Aug. Handwritten, with signature. [Dut]

• ***Summary:*** Order for some small kegs of soy [sauce].

Location: Nationaal Archief, Den Haag, De Archieven van de Nederlandse Factorij Japan (NFJ); inventaris nummer 295 [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch Factory in Japan (NFJ); record number 295]. Address: Head *(Opperhofd),* Dutch factory in Tonking [Tonkin, in today's northern Vietnam].

12. Fernández Navarrete, Domingo. 1665. [Journal]. In: Awnsham Churchill and John Churchill, comps. 1704. A Collection of Voyages and Travels. London: Published by the author. 4 vols. See vol. 1, p. 251-52. Chap. 13. [Spa; Eng]

• ***Summary:*** This passage in Fernández Navarrete's journal, written in 1665 in Spanish, first published in Spanish in 1676, but not published in English until 1704 by Churchill & Churchill, appears in Chapter 13 of the Journal, titled "His Journey to Che Kiang" (p. 251-52). The following is from the 1704 translation; the unnamed translator may have been Captain John Stevens:

"16. Before I proceed to the next chapter, because I forgot it in the first book, I will here briefly mention the most usual, common and cheap sort of food all *China* abounds in, and which all men in that empire eat, from the emperor to the meanest *Chinese,* the emperor and great men as a dainty, the common sort as necessary sustenance. It is call'd *teu fu* [tofu], that is, paste of kidney-beans *[Llamase Teu Fu, esto es, masa de frixoles {frijoles}].* I did not see how they made it. They draw the milk out of the kidney-beans, and turning [curding] it, make great cakes of it like cheeses *[quesos],* as big as a large sieve, and five or six fingers thick. All the mass is as white as the very snow, to look to nothing can be finer. It is eaten raw, but generally boil'd and dressed with herbs, fish, and other things. Alone it is insipid, but very good so dressed and excellent fry'd in butter. They have it also dry'd and smok'd, and mix'd with caraway-seeds, which is best of all. It is incredible what vast quantities of it are consum'd in *China,* and very hard to conceive there should be such abundance of kidney-beans. That *Chinese* who has *teu fu,* herbs and rice, needs no other sustenance to work; and I think there is no body but has it, because they may have a pound (which is above twenty ounces) of it any where for a half-penny. It is a great help in case of want, and is good for carriage. It has one good quality, which is, that it causes the different airs and seasons, which in that vast region vary much, to make no alteration in the body, and therefore they that travel from one province to another make use of it. *Teu fu* is one of the most remarkable things in *China,* there are many will leave pullets for it. If I am not deceiv'd, the *Chineses* of *Manila* [Philippines] make it, but no *European* eats it, which is perhaps because they have not tasted it, no more than they do fritters fry'd in oil of *Ajonjoli* ([sesame seed] a very small seed they have in *Spain* and *India,* which we have not) which the *Chineses* make in that city and is an extraordinary dainty."

Note 1. Friar Domingo Fernández Navarrete was born in 1618 in Castrogeriz, Spain (he was Castilian), and he died in 1686 on the island of Santo Domingo, where he was Archbishop and Primate of the Spanish Indies. He wrote in Spanish, and served as a Dominican missionary in China (where he observed soyfoods) from 1658 to 1669. This is the earliest document seen, written by a European, that mentions soymilk, and the third earliest that mentions soya or tofu.

Note 2. This is the earliest Spanish-language document (Feb. 2004) seen that mentions tofu, which it calls *Teu Fu* or *masa de frixoles {frijoles}.* The author is not certain that Chinese in Manila made tofu. If they did, this would be the earliest document seen (Jan. 2001) concerning soybean products (tofu) in the Philippines. This document would also contain the earliest date seen for soybean products in the Philippines (1665); soybeans as such had not yet been reported by that date. Yet if the Chinese were making tofu at this time in Manila, they must have had soybeans. Therefore, this would be the earliest document concerning soybeans in the Philippines. And these soybeans were probably being cultivated at this time in the Philippines.

Note 3. This is the earliest document seen concerning soybeans in connection with (but not yet in) Spain.

Note 4. This is the earliest document seen (Jan. 2002) concerning soybeans in Southeast Asia. This document contains the earliest date seen for soybeans in Southeast Asia (1665). Note 5. This is the earliest document seen (Feb. 2004) that mentions smoked tofu. It is interesting that a European mentions smoked tofu, which he apparently saw in China, before it is mentioned in any known Chinese document–in 1680.

Note 6. This is the earliest European-language document seen (Aug. 2007) that mentions sesame oil, which it calls "oil of Ajonjoli."

Note 7. Navarrete's 1665 journal is the earliest Spanish-language document seen (Jan. 2000) concerning soy. When it was published in 1676 in Spanish, it was the earliest Spanish-language publication seen concerning soy.

Note 8. For a biography of Domingo Fernández Navarrete (1610-1698), see J.S. Cummins (1962). In the National Union Catalog, his surname is given as "Fernández Navarrete" (i.e. his name is indexed under "F," not under "N"). In May 1677, long after leaving China, he was nominated Archbishop of Santo Domingo (an early name for the Dominican Republic); he arrived there on 20 Sept. 1677. He learned about food uses of soybeans in about 1665 while he served as a Dominican missionary in China (1658-1669). The island on which he was archbishop, called Hispaniola in English or Española in Spanish, was visited by Christopher Columbus in 1492 and settled in 1493; it became the center of Spain's rule in the West Indies and the base for Spain's expansion to the American mainland. Its capital constitutes the oldest continuous European settlement in the Americas. The natives were soon exterminated by the Spanish and replaced by negro slaves. During the 1600s, the western third of the island (known today as Haiti) was occupied by French buccaneers and ceded to France by Spain in 1697, after Navarrete wrote about soya; it came to be known by the French as the colony of Saint Domingue, while the eastern two-thirds of the island where Navarrete lived (Santo Domingo, known today as the Dominican Republic) remained under control by Spain. Hymowitz and Newell (1981) noted that this was the earliest accurate European description seen for the use of soybeans as a food. Thus the first two European references to soyfoods were both about tofu.

For a good biography of Fernández Navarrete, see Cummins 1962.

13. Maetsuyker, Joan. 1668. [Re: Request for a decision concerning private merchandise]. Letter to Heren XVII ("17 Lords," leaders of the Dutch East India Company, VOC), Netherlands, Dec. 19. [Dut]

• ***Summary:*** The Governor-General and the Council in Batavia requested a decision from the "Heren XVII" about private merchandise from Japan imported into Batavia. Mostly this private merchandise consists of saké *(sacky),* murasaki [soy sauce], *(moersacky),* pickled vegetables *(connemonne [kô-no-mono]),* etc. Tbis merchandise is imported in little quantities, but with great frequency. The Governor-General and the Council in Batavia advises the Heren XVII to permit this private merchandise, because small quantities were imported... so there is no disadvantage to the VOC. They are goods sent by people in Japan to their friends in Batavia.

Bibliographic reference in Dutch: W. Ph. Coolhaas, Generale Missiven van Gouverneurs-Generaal en Raden aan Heren XVII, RGP grote serie deel 3 ('s-Gravenhage 1968) 663. The pages with the quotation is folio 274v-275v.

Note 1. This is the earliest letter seen that mentions "murasaki" written to the Heren XVII or to the Netherlands.

Note 2. If *moersacky* refers to soy sauce, this is the 2nd earliest document seen (May 2010) concerning soybean products (soy sauce) in Indonesia; soybeans as such have not yet been reported. Address: Governor-General in Batavia [today's Jakarta, Indonesia].

14. Pavilioen, Anthonio; Meersche, Jacob van der; Welsingh, Isaac; Exbusier, Jacob; Buijtendijck, Reijnier van; Hervendoncq, Joris. 1670. [Re: Order for goods from Batavia for use by the Honorable Dutch East India Company in Nagapatnam]. Letter to Governor-General Joan Maatsuijcker [Maetsuyker] and the Councillors of the Indies [Heren Raden van Indie] in Batavia [Dutch East Indies], Feb. 13. p. 550r to 574r. See p. 572r. Handwritten, with signatures. [Dut]

• ***Summary:*** On p. 572r (the recto {front} of folio {page} 572) we read: "Our order for commodities and other items for the use of the Honorable Company. Gold from Japan and from other places with which Coromandel has commerce each year. A list of merchandise: 8 little pints *(pintjes)* of fine oil of cloves, cinnamon, mace, etc. 12 *leggers* (a legger is a large keg of 400 liters capacity) of Spanish wine. 20 kegs of Mum. 2 kegs of good Dutch butter. 20 leggers of wine-vinegar. 9 aums (an aum is a keg of 153.6 liters capacity) of good olive oil. 30 kegs of sake *(Zakkij)* from Japan. 12 kegs of soy [sauce] *(baliën Soija)* from Japan. 6 kegs of miso *(missoe)* from Japan.

Bibliographic reference in Dutch: NA, VOC 1274, BBP (13-7-1670) 550r-574r. On microfilm.

This letter has been collated into Casteel Geldria (Fort Geldria, the headquarters of the VOC factories on the Coromandel Coast) in Palliacatta on 1 Nov. 1670 by Joannes Huijsman, the secretary. The letter is part of a thick bundle of correspondence in the series *Overgekomen Brieven en Papieren* (Letters and papers sent from Batavia and other factories to the headquarters of the VOC in the Netherlands).

This long letter is about management and commerce. The first three folios discuss ships that have arrived. Two folios deal with a political question in the area around Masulipatnam. Folios 552 to 562 discuss merchandise supplied from several districts to Nagapatnam by ship and from the interior, and commerce problems in some districts. Folio 563 is about the weight of the coin used in Pulicat. Folio 565 is about timber. Etc.

Location: Nationaal Archief, Den Haag, De Archieven van de Verenigde Oost-Indische Compagnie (VOC); toegangsnummer 1.04.02: inventaris nummer 1274, folios 550-574 [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of

the Dutch East India Company (VOC); inventory number 1.04.02: record number 1274, folios / pages 550-574].

Note: This is the earliest document seen (May 2010) that clearly mentions soybean products (soy sauce and miso) in Indonesia; soybeans as such have not yet been reported. Address: Fortified town of Nagapatnam [in today's southern India].

15. Maetsuyker, Joan. 1674. [Re: List of ships ready to sail for the Netherlands]. Letter to Heren XVII ("17 Lords," leaders of the Dutch East India Company, VOC), Netherlands, Nov. 18. [Dut]

• ***Summary:*** The ship named "Sticht Uijtrecht" will sail for the chamber of Amsterdam. Private merchandise of Willem van Achterveld, sergeant: Includes: 2 crates [with bottles] Spanish wine and mum. 1 crate of brandy. 1 little barrel of soy [sauce] *(1 vaatie met sooij)...*

Bibliographic reference in Dutch: NA, VOC 1297, OBP (18-11-1674) f.142r.

Location: Nationaal Archief, Den Haag, De Archieven van de VOC; toegangsnummer 1.04.02; inventaris nummer 1297 [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the VOC; access number 1.04.02; record number 1297]. Address: Governor-General in Batavia [today's Jakarta, Indonesia].

16. Governor General and Council of the Indies *(Indië).* 1675. Generale missive [General missive]. Letter to Heren XVII [directors of the VOC] in the Netherlands, autumn. 3 p. Handwritten. [Dut]

• ***Summary:*** "Specification of the goods which several persons take along with them on the ships for the respective chambers of Amsterdam, Zealand, Delft, Rotterdam and Enkhuizen. Homeward shipped on request and permitted by the Governor General and the Council of the Indies with written decree to take along with them the following goods."

"The ship *Ternate* for the chamber of Amsterdam." Note 1. For some ships, lists of private goods are mentioned. But soy [sauce] is mentioned only in the list of private goods for Joan Putmans, the merchant on the ship ternate. On folio / page 225 we read: "2 chests *(kelders)* with Japanese porcelain pots in one of them and candy or candied fruit in the other. 1 chest *(kelder)* with Japanese Soy [sauce] *(Japanse Soija),* 25 pots with *atchian / atchiar* [maybe atjar pickles] and diverse candied fruit, 1 picul tea [1 picul = about 125 lb], 20 catties bird nests in a little basket of cane / canister" [1 catty = 625 gm]."

Note 2. The goods owned by Joan Putmans are being shipped as "private trade freight" (Japanese: *waki nimotsu)* rather than as "official trade freight" *(motokata / compania nimotsu).* It is not known how much soy sauce he was shipping or in what type of containers it was packaged. Dutch research Herman Ketting, PhD thinks there is a good chance that Putmans used the soy for himself or gave it to friends and relatives in the Netherlands.

Note 3. About the sender: The Governor and the Council of the Indies send a General Letter for the Heren XVII with every homeward bound fleet. This letter is a contemporary handwritten copy. The letter is written in a letter-book for the administration of the Heren XVII, who are the administrators of the Dutch East India Co. (VOC).

Note 3. Herman Ketting, who found this letter, writes (16 July 2007): "So far as I can see now, the cargo lists in the General Missive are the only lists of the VOC, which mentioned the soy [sauce] shipped yearly to the Netherlands. They were made for the Heren XVII and the administration of the VOC-chambers. So I think the soy loaded in the ships bound for the Netherlands, actually arrived in the Netherlands."

Note 4. If this soy sauce did actually arrive in the Netherlands, this would be the earliest document seen (July 2007) showing soy sauce in the Netherlands, or in Europe.

Bibliographic reference in Dutch: NA, VOC 1307, Generale Missiven (najaar 1675) 224r.-226r.

Location: Nationaal Archief, Den Haag, Archieven van de Verenigde Oost-Indische Compagnie (VOC); toegangsnummer 1.04.21; inventaris nummer 1307 [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch Factory in Japan (NFJ); access number 1.04.21; record number 1307]. Address: Batavia [today's Jakarta, Indonesia].

17. Hoorn, J. van. 1676. [Re: Order for provisions]. Letter to the Deshima factory [Nagasaki, Kyushu, southern Japan], June 30. Unpaginated Handwritten, with signature. [Dut]

• ***Summary:*** "General request for merchandise and necessities, which are required from Japan this year for several settlements in Asia as for the fatherland *(vaderlandt / patria).*

For Batavia: 100 kegs of several provisions such as: 40 kegs sake *(sackij),* 20 kegs soy [sauce] *(Soija),* 15 kegs pickled vegetables *(connemon [konmono]),* 10 kegs salted, pickled plums *(meboos [umeboshi]),* 10 kegs miso *(missauw).*

For Ceylon *(Chijlon):* 48 kegs of provisions as follows: 20 kegs of good sake, 12 kegs soy [sauce] *(Soija),* 8 kegs pickled vegetables, 4 kegs salted, pickled plums *[umeboshi],* 4 kegs *ameneranskij.*

For Coromandel *(Choromandel):* As many kegs of Japanese provisions as is specified hereafter for Bengal.

For Bengal: 17 kegs of provisions as: 6 kegs sake, 4 kegs soy [sauce], 3 kegs pickled vegetables, 2 kegs *Ammeneranskij,* 2 kegs salted, pickled plums *[umeboshi].*

For Malacca: Provisions: 2 kegs each of Soy *(Soija),* pickled vegetables, miso *(missouw),* salted, pickled plums

[umeboshi], and *ameneranskij.*

Note: This is the earliest document seen (May 2010) concerning soybean products (soy sauce) in today's Malaysia. This document contains the earliest date seen for soybean products in Malaysia (June 1676); soybeans as such have not yet been reported.

For Surat *(Zuratta):* 9 kegs of provisions such as sake, pickled vegetables, and soy [sauce] *(Soija).*

Bibliographic reference in Dutch: NA, NFJ 307, ontvangen brieven (30-6-1676). On microfilm.

Location: Nationaal Archief, Den Haag, De Archieven van de Nederlandse Factorij Japan (NFJ); toegangsnummer 1.04.21; inventaris nummer 355 [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch Factory in Japan (NFJ); access number 1.04.21; record number 355. The pages are not numbered]. This letter is written in a letter-book for the administration on Deshima.

Note 1. It seems that soy [sauce] is always mentioned in lists of provisions for the table of VOC governors or directors, and their guests; this was written in one letter (see Coijet 1659, Aug. 7).

Note 2. This is a special letter. Part of it contains information from a letter written in the Netherlands by the directors in Holland (Heren XVII). The rest of the information comes from settlements in Asia and was collected and written in Batavia, then sent to Japan. Address: Batavia castle (Batavia in't Kasteel) [today's Jakarta, Indonesia].

18. Breving, Abert; Haas, Dirk de; Schim, Isaac; Bank, C. 1678. [Re: Unable to comply with order for provisions]. Letter to Rijcklof van Goens, Governor-General and the Council of the [Dutch East] Indies in Batavia [today's Jakarta, Indonesia], Nov. 4. Unpaginated. Handwritten, with signature. [Dut]

• ***Summary:*** There was a request from governor-general Rijckloff van Goens in Batavia to transport Sake *(Sakki)* and Soy [sauce] *(Soija)* in waterproof vats, so that the liquids will be well preserved. Albert Brevinck in Japan answers: "That is impossible because we are lacking good vats *(vaten).* For this reason we request that you send vats of first rate quality to Japan. This year we will send the sake for Batavia and Ceylon in good double-walled kegs *(balien)* to help preserve the sake."

Bibliographic reference in Dutch: NA, NFJ 309, verzonden brieven (4-11-1678). On microfilm.

Location: Nationaal Archief, Den Haag, De Archieven van de Nederlandse Factorij Japan (NFJ); toegangsnummer 1.04.21; inventaris nummer 309 [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch Factory in Japan (NFJ); access number 1.04.21; record number 309. The pages are not numbered]. This letter is written in a letter-book for the administration on Deshima.

Location: Nationaal Archief, Den Haag, De Archieven van de Nederlandse Factorij Japan (NFJ); inventaris nummer 309 [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch Factory in Japan (NFJ); record number 309].

Note: About the sender: In *Pieter van Dam's Beschryvinghe van de Oostindische Compagnie,* by F.W. Stapel is an entry for Albert Breving under Albert Brevinck. In 1671 he was already head of the settlement in Japan, but after that he was transferred to Tonkin. From 1677 to 1679 he was again head of the settlement in Japan. In 1681 he was Council of Justice and he refused a request to once again become head of the settlement in Japan.

About the recipient: Rijckloff van Goens lived 1619-1682. In 1631 he began his VOC service. In 1655 he was back at home in the Netherlands. In 1656 he was appointed to extraordinary Council of the [Dutch East] Indies, In 1660 he became governor of Ceylon. From 1675 to 1678 he was director-general in Batavia, and after that until 1681 he was governor-general. He died in Nov. 1682 at home in the Netherlands. Source: *Bewind en belied bij de VOC... 1672-1702,* by Femme S. Gaastra (Zutphen 1989). Address: Nagasaki [Japan].

19. Goens, R. van; Speelman, Cornelius; Both, Balthasar; Hurrt, Anth.; Blom, Dirk; Outhoorn, W. van; Camphuijs, Joan. 1680. [Re: Sending sake and soy sauce in casks and pots]. Letter to the Deshima factory [Nagasaki, Kyushu, southern Japan], June 30. Unpaginated. Handwritten, with signature. [Dut]

• ***Summary:*** Van Goens etc. request that the sake *(sakij)* and soy [sauce] *(soije)* be poured into well-made casks before shipping. They advise for sake and soy [sauce] as well as for pickled vegetables *(konnemon [kô-no-mono]),* umeboshi *(mebos,* [salt pickled plums]), etc. to send them in pots *(potten).* Every pot must be placed in a keg and the space between the pot and the keg must be filled up with straw, so there is no danger of the pots breaking in the kegs.

Van Goens etc. will send pots made in the Netherlands for the shipping of the sake and soy. At Coromandel [on the coast of southeast India] the merchants are annoyed at the bad quality of the sake in the kegs; this is caused by the native wood of which the kegs are made.

Another summary (by Cynthia Viallé): "Batavia informs Deshima that it is sending Dutch tubs to hold the sake and soy [sauce]. The tubs should be cleaned first and prepared to contain the sake and soy."

An appendix to this letter: For Batavia: Four aums of Soy [sauce] in aums and half aums [Note: 1 aum is a measure of capacity (a barrel) of about 177 liters]. Twenty pots put in kegs with pickled vegetables *(konnemon)* and

miso *(missou)*. Twelve pots of umeboshi as before with fruits. If possible we want them as good as the Japanese send to their friends who live in Batavia, because those are better than the fruits they usually send to us.

For Coromandel: 6 quarter kegs of miso *(missouw)*. 10 kegs of Soy [sauce] *(Zoija)*. 10 kegs of pickled vegetables. 12 double kegs of saké *(Zackij)*. 10 kegs of *omenaranski* [meaning unclear], 4 kegs of umeboshi.

For Ceylon [today's Sri Lanka]: 15 single kegs of Soy [sauce]. 6 double kegs of saké *(sackij)*. 12 kegs of pickled vegetables. 20 kegs of umeboshi. 12 kegs *omenaranski* [meaning unclear], 6 kegs of miso *(missouw)*.

Bibliographic reference in Dutch: NA, NFJ 311, ontvangen brieven (30-6-1680). On microfilm. The first page of this letter is torn off.

About the sender: Rijckloff van Goens lived 1619-1682. In 1631 he began his service (as a boy) in the VOC (Dutch East India Company). In 1655 he returned home to the Netherlands. In 1656 he was appointed to the extraordinary Council of India (the Dutch East Indies). From 1660 he was governor of Ceylon. From 1675-1678 he was director-general in Batavia, and after that until 1681 he was governor-general. He died in Nov. 1682 at home in the Netherlands.

Location: Nationaal Archief, Den Haag, De Archieven van de Nederlandse Factorij Japan (NFJ); inventaris nummer 311 [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch Factory in Japan (NFJ); record number 311]. Address: In the castle *(kasteel)* Batavia [today's Jakarta, Indonesia].

20. [Manifest (cargo-list) of goods imported to Batavia in 1681 by two Chinese junks]. 1681. Colombo. p. 860r-61r. See p. 860r. Feb. 7 and 28. Unpublished manuscript. [Dut]
• ***Summary:*** Two Chinese trading junks had arrived from Japan in 1681. On Feb. 7, the junk of captain Quanjock arrived with: 22 straw Calmus (Sweet flag) roots... 1 wicker basket *(canasser)* of medicine and one of tea, 681 kegs and pots containing pickled vegetables *(connemon [kô-no-mono])*, soy [sauce] *(soij)* and miso *(missoij)*.

Note: This is the earliest Dutch-language document seen (March 2009) that uses the word "missoij" to refer to miso.

On Feb. 28 the junk of captain Lunsincqua arrived with: 40 little bureaus. 5 double kegs and 6 single kegs of camphor. 200 kegs and pots containing chestnuts *(carthanjen)*, soy [sauce] *(Zoija)*, and pickled vegetables *(connemon [kô-no-mono])*.

Bibliographic reference in Dutch: NA, VOC 1354, OBP (7 and 28-2-1681) 860r-861r. On microfilm. This letter is part of the correspondence in the series *Overgekomen Brieven en Papieren* (OBP)–letters and papers sent from Batavia and other factories to the headquarters of the VOC in the Netherlands. This is an important and voluminous part of the VOC archive.

Location: Nationaal Archief, Den Haag, De Archieven van de Verenigde Oost-Indische Compagnie (VOC); inventaris nummer 1354, folio 860 [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch East India Company (VOC); record number 1354, folio / page 860]. On microfilm. Address: Colombo [in today's Sri Lanka].

21. Schinne, Isaac van; Cansius, Hendrik; Jonge, Constantin Ranst de; Buijtenhem, Hendrik van; Sweers, Balthasar; Dijck, Pieter van. 1681. [Re: Sending provisions]. Letter to the Governor-General and the Council in Batavia [today's Jakarta, Indonesia], Oct. 31. Handwritten, with signature. [Dut]
• ***Summary:*** The Deshima factory is sending 1,000 pairs of cotton stockings, all the porcelain, also the soy [sauce] *(Soija)*, saké *(Sackij)*, miso *(Misou)*, pickled vegetables *(Konnemon [Kô-no-mono])*, and umeboshi *(Mebos* [salt pickled plums]), all of the best quality we can get, just as you ordered.

Note: This is the earliest Dutch-language document seen (March 2009) that uses the word "Misou" to refer to miso.

Location: Nationaal Archief, Den Haag, De Archieven van de Nederlandse Factorij Japan (NFJ); toegangsnummer 1.04.21; inventaris nummer 312 [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch Factory in Japan (NFJ); access number 1.04.21; record number 312]. Address: Deshima factory, Nagasaki [Japan].

22. Dampier, William. 1688. Voyage round the world. In: William Dampier. 1705. Voyage Round the World. The Supplement of the Voyage Round the World, Describing the Countreys of Tonquin, Achin, Malacca, &c. their Product, Inhabitants, Manners, Trade, Policy, &c. London: Printed for James Knapton, at the Crown in St. Paul's Church Yard. See vol. II. Part I, p. 26-28.
• ***Summary:*** While traveling in Tonquin (today's north Vietnam) the author writes: "The *Nuke-Mum* [fish sauce]... is also very savory, and used as a good sauce for Fowls, not only by the Natives, but also by the *Europeans*, who esteem it equal with *Soy* [sauce] I have been told that *Soy* is made partly with a fishy Composition... tho' a Gentleman... told me that it is made with wheat and a Sort of Beans mixt with Water and Salt" (p. 28).

Note 1. First cited by Yule and Burnell (1886, p. 651, and 1903, p. 858; both give the year as 1688), and the *Oxford English Dictionary* (1919, Soy). Captain Dampier–a "swashbuckling buccaneer"–lived 1652-1715.

Note 2. This is the earliest English-language document seen (April 2008) that uses the word "Soy" to refer to soy sauce. The passage on soy sauce, although written in 1688, was not published until 1705.

23. E.B. 1690. A new dictionary of the terms ancient and modern of the canting crew,... London: Printed for W. Hawes, P. Gilbourne and W. Davis. [184] p. 18 cm. [Eng]*
• ***Summary:*** "Catchup, a high East-India Sauce." Note 1. This is an English-language slang dictionary.

Note 2. This is the earliest English-language document seen (Feb. 2006) that mentions Catchup or Indonesian soy sauce.

Note 3. At this time, "East India" (or more commonly) "the East Indies" had two meanings: (1) A collective name, applied loosely and vaguely, to India, Indochina (today's Vietnam and Cambodia), and the Malay Archipelago (today's Indonesia and Malaysia). (2) In better usage, politically, a name applied to today's Indonesia, formerly the Netherlands East Indies or Dutch East Indies. Address: Gent., England.

24. Saito, Akio. 1699. [Chronology of soybeans in Japan, 1600 to 1699, the early Tokugawa/Edo period] (Document part). In: Akio Saito. 1985. Daizu Geppo (Soybean Monthly News). Jan. p. 14-16. [Jap; eng+]
• ***Summary:*** 1600–Komakabe?, the name of a type of tofu, appears in the *Diary of Oyudono no Kami (Oyudono Kami no Nikki).* The very firm tofu called *kata-dofu* that is presently sold in Kochi prefecture (on the southern part of the island of Shikoku) originated from Komakabe.

1601–Daté Masamune (DAH-tay Mah-sah-MU-nay; lived 1567-1636) of Sendai establishes the Goenso-gura and starts making miso. This is the first time that an organized method has ever been used to make miso in Japan. The purpose of this is to make miso for the army and to store salt. According to some theories, the date was 1645 rather than 1601.

1603–In *Nippo Jisho,* a Japanese-Portuguese dictionary, tofu (called "taufu") is mentioned. It says that tofu is a food that is made from powdered / ground beans and that looks like freshly made cheese.

1605–Tokugawa Ieyasu commands the monks at Daifukuji temple to make Hamana Natto.

1616–Tanaka Genba of Kamiusa no Kuni is advised to make tamari shoyu as a side business by Sanagi Kyurouemon of Settsu. The latter runs a sake factory and has a wholesale seafood products shop in Edo. This is the beginning Choshi Shoyu and Higeta Shoyu.

1619–At about this time shoyu in quantity is brought from the Kyoto-Osaka area *(Kansai)* to Edo by Taru Kaisen and Hishigaki Kaisen. Note 1. A "Kaisen" is a ship that has a carrying capacity of at least 200 koku (= 9,520 gallons or 36,000 liters). That shoyu is regarded as the best quality and it soon takes over the entire Edo shoyu market.

1624-1644–Konpura Nakama (The union of merchants who go to Dejima / Deshima, an island in Nagasaki Bay) starts to export shoyu through the Dutch East India Company *(Higashi Indo Gaisha)* to Europe and Southeast Asia. It is said that in Europe this shoyu even reached the dining table of Louis XIV. Note 2. This document contains the earliest date seen for soybean products (shoyu) in Europe and Southeast Asia (probably India, 1644); soybeans as such had not yet been reported by that date. [Question: What is the source of these two dates?]

1626–Sendai Han *(daimyo* domain) starts to monopolize the selling of salt for the first time in the history of Japan. Because of this, all other Hans start to do likewise. Makabeya Ichibei of Kokubunji-cho in Sendai starts to sell Sendai Miso. He continues to sell his miso to the Han government for several generations.

1642–Because of famines in various provinces *(kuni),* the people were advised to eat coarse grains *(zakkoku)* and banned from eating rice. The sale of tofu, udon (wheat noodles), soba (buckwheat noodles), and *manju* (steamed glutinous rice cakes with a sweet azuki-jam filling) were also prohibited.

1645–The Ako Han starts a salt farm. Hatcho miso starts to be made in Mikawa, Okazaki. Hamaguchi Gihei of Hiromura in Kishu goes to Choshi and starts making shoyu. This is the beginning of Yamasa Shoyu.

1649 Feb.–The Tokugawa government *(bakufu)* passes a law to control the lives of farmers. Called Kanno Jorei *(Keian no Ofuregaki),* it states that farmers must plant soybeans and azuki beans between their rice fields and farms. Azé-mame (soybeans grown on the raised footpaths between rice fields) may have started from this forceful edict.

1652 May–Various farmers in Waksa, Kohama-han, Enshiki-gun? protest the heavy soybean tax increase. The farmland tax is often paid with soybeans. The leaders of the protest are killed.

1657 Jan. 18-19–A large fire (called *Sodefuri Kaji)* burned Edo (today's Tokyo). Laborers came from throughout Japan to reconstruct the city. To feed them, many sellers of pre-cooked, ready-to-eat food sprung up in Edo.

1666–Maruo Magouemon? Chotoku? of Hanshu Tatsuno makes Usukuchi Shoyu (light-colored soy sauce). After this, Tatsuno Shoyu's main product becomes Usukuchi Shoyu.

1681–The government bans the withholding or monopolizing of crops (such as rice, barley, or soybeans) following a year with a bad harvest.

1695–Dr. Hitomi Hitsudai, a Japanese physician, age 74, writes the *Honcho Skokkan* and talks about the good and bad points of daily foods from his medical viewpoint. The

12 volume book is written entirely in Chinese. He praises the therapeutic virtues of soybeans, miso, natto, tofu, and shoyu. A translation into Japanese was later made by Shimada Isao.

1695–At about this time, tofu is sold by vendors sitting by the road. We do not know for sure when tofu was first sold by walking street vendors, but it is guessed that this may have taken place in about 1837-1853 when the book *Morisada Manko* was written by Kitagawa Morisada.

1696–There is famine throughout Japan. In eastern Japan, especially in Tsugaru Han, half of the population dies of starvation.

1696–One of the greatest scholars of agriculture during the Edo period, Miyazaki Yasusada (1623-1697), write *Nôgyo Zensho* (Encyclopedia of Agriculture). In it he described the many different colors, sizes, and shapes of soybeans cultivated at that time.

1697–Koikuchi shoyu, similar to the type made today, starts to be made from tamari shoyu in Choshi.

1698–After a big fire in Edo, sellers of Dengaku (skewered grilled tofu with a sweet miso topping) start to appear. Address: Norin Suisansho, Tokei Johobu, Norin Tokeika Kacho Hosa.

25. Fernández Navarrete, Domingo. 1704. An account of the empire of China, historical, political, moral, and religious. Vol. 1. In: Awnsham Churchill and John Churchill, comps. A Collection of Voyages and Travels. London: Published by the author. 4 vols. 424 p. See p. 251-52. Chap. 13. [Eng]

• ***Summary:*** The subtitle of the entire volume reads: "Some now printed from original manuscripts. Others translated out of foreign languages, and now first pub. in English. To which are added some few that have formerly appear'd in English, but do now for their excellence and scarcity deserve to be reprinted."

At the bottom of the title page of this chapter is written: "Written in Spanish by R.F.F. Dominick Fernandez Navarette [sic, Navarrete], Divinity Professor in the College and University of St. Thomas at Manila, Apostolick Missioner in China, Superior of those of his Mission, and Procurator General at the Court of Madrid for the Province of the Rosary in the Philippine Islands, of the Order of Preachers." Domingo Fernández Navarrete lived 1610-1698. Many curious observations are contained in this work, which is a translation of *Tratados historicos, politicos, ethicos, y religiosos de la monarchia de China* (1676). In this collection it appears as the first item in Volume I, which bears out the tendency for travel literature of this period to be of less significance for geography and history than for literature. The name of the translator is not mentioned, but Cummins (1962, p. cxvi) speculates that it may have been Captain John Stevens. The *Tratados* appears in all the Churchill editions.

The author's exact description of tofu in China, which first became available in English in 1704 in this book as compiled/edited by Churchill and Churchill is as follows:

"16. Before I proceed to the next chapter, because I forgot it in the first book, I will here briefly mention the most usual, common and cheap sort of food all *China* abounds in, and which all men in that empire eat, from the emperor to the meanest *Chinese,* the emperor and great men as a dainty, the common sort as necessary sustenance. It is call'd *teu fu,* that is, paste of kidney-beans *[Llamase Teu Fu, esto es, masa de frixoles {frijoles}].* I did not see how they made it. They draw the milk out of the kidney-beans, and turning it, make great cakes of it like cheeses, as big as a large sieve, and five or six fingers thick. All the mass is as white as the very snow, to look to nothing can be finer. It is eaten raw, but generally boil'd and dressed with herbs, fish, and other things. Alone it is insipid, but very good so dressed and excellent fry'd in butter. They have it also dry'd and smok'd [dried and smoked], and mix'd with caraway-seeds, which is best of all. It is incredible what vast quantities of it are consum'd in *China,* and very hard to conceive there should be such abundance of kidney-beans. That *Chinese* who has *teu fu,* herbs and rice, needs no other sustenance to work; and I think there is no body but has it, because they may have a pound (which is above twenty ounces) of it any where for a half-penny. It is a great help in case of want, and is good for carriage. It has one good quality, which is, that it causes the different airs and seasons, which in that vast region vary much, to make no alteration in the body, and therefore they that travel from one province to another make use of it. *Teu fu* is one of the most remarkable things in *China,* there are many will leave pullets for it. If I am not deceiv'd, the *Chineses* of *Manila* [Philippines] make it, but no *European* eats it, which is perhaps because they have not tasted it, no more than they do fritters fry'd in oil of *Ajonjoli* ([sesame seed] a very small seed they have in *Spain* and *India,* which we have not) which the *Chineses* make in that city and is an extraordinary dainty."

Note 1. This is the earliest English-language document seen (Feb. 2006) that uses the term "kidney- beans" to refer to soybeans.

Note 2. This is the earliest English-language document seen (Feb. 2004) that uses the word "teu fu" (or "teu-fu") to refer to Chinese-style tofu. This is also the earliest English-language document that mentions tofu in connection with China. Benjamin Franklin in London read the English translation and in 1770 wrote his friend John Bartram in Philadelphia, Pennsylvania, about tofu and Chinese Garavances / Caravances.

Note 3. This is the earliest English-language document seen (Feb. 2004) that mentions smoked tofu or that uses the word "smoked" (actually smok'd) in connection with tofu.

Note 4. This is the earliest English-language document seen (Aug. 2007) that mentions sesame seeds, which it calls *Ajonjoli.*

Note 5. This is the earliest book chapter seen (Oct. 2001) that mentions soy.

For a good biography of Fernández Navarrete, see Cummins 1962. Address: Divinity Professor in the College and University of St. Thomas at Manila, Philippines.

26. Dampier, William. 1705. Voyage round the world. The supplement of the voyage round the world, describing the countreys of Tonquin, Achin, Malacca, &c. their product, inhabitants, manners, trade, policy, &c. London: Printed for James Knapton, at the Crown in St. Paul's Church Yard. See vol. II. Part I, p. 26-28. See also 1729 and 1906 editions. [Eng]

• ***Summary:*** The passage on soy sauce, written by Captain Dampier in 1688 (as indicated by a note in the margin reading "An. 1688"), makes this the earliest document seen (March 2002) that contains the word "soy," used to refer to what is now called "soy sauce." He begins by describing the process used by the natives in Tonquin (Tonkin, today's northern Vietnam) for using shrimps, small fish, salt, and water to make what is today called nuoc-mam in an earthen vessel or jar. "The masht Fish that remains behind is called *Balachaun,* and the liquor pour'd off is called *Nuke-Mum.* The poor people eat the *Balachaun* with their Rice. 'Tis rank scented, yet the taste is not altogether unpleasant; but rather savory, after one is a little used to it. The *Nuke-Mum* is of a pale brown colour, inclining to grey; and pretty clear. It is also very savory, and used as a good sauce for Fowls, not only by the Natives, but also by the *Europeans,* who esteem it equal with *Soy.* I have been told that *Soy* is made partly with a Fishy composition, and it seems most likely by the taste: tho a Gentleman of my acquaintance, who was very intimate with one that sailed often from *Tonquin* to *Japan,* from whence the true *Soy* comes, told me, that it is made only with Wheat, and a sort of Beans mixt with Water and Salt."

Note 1. This is the earliest English-language document seen (Jan. 2000) that mentions soy sauce in connection with Japan.

Note 2. First cited by Yule and Burnell (1886, p. 651. They cite the 1729 London ed.; and 1903, p. 858), and the *Oxford English Dictionary* (1919, Soy). Dampier lived 1652-1715.

About this book: It was first published in 1697 in London. A second edition was published the same year, a third edition (corrected) in 1698-1703. Tonquin refers to northern Vietnam, called Tonquin when it was part of French Indochina. Achin is today's Aceh (Atjeh), a region on the northern tip of Sumatra, Indonesia, whose main town is Banda Aceh (formerly Kutaranja). Malacca is a coastal town in today's Malaysia on the Straight of Malacca near Sumatra. This document contains no clear reference to soya in Tonquin (today's North Vietnam). Address: London.

27. Lockyer, Charles. 1711. Account of the trade in India: Containing rules for good government in trade. London: Printed for the author, and sold by Samuel Crouch. [12] + 340 p. See p. 128-29. 19 cm.

• ***Summary:*** Mr. Lockyer visited Sumatra, Canton, and India during the early 18th century. In Chapter 5, titled "Canton in China," he gives precautions to observe when buying each of various goods there: "Soy comes in Tubs from *Jappan,* and the best Ketchup from *Tonqueen;* yet good of both sorts, are made and sold very cheap in *China.* Buy none but what is right, which you are likelier to meet with among the Merchants than Shop-keepers. The best way is to agree by the Catty; for the Tubs are seldom or never full: But if they will not hearken to it, try which are the heaviest, and refuse all that are not likely to contain the Quantity they ought; draw it off immediately, and secure it in Bottles: Therefore in your Passage thither save as many as you can; for I know not a more profitable commodity.

Note 1. *Tonqueen* refers to Tonkin, which is the northern part of today's (Feb. 2010) Vietnam. France assumed sovereignty over all of Vietnam after the Sino-French War (1884-1885). The French colonial government then divided Vietnam into three different administrative territories. They named the territories: Tonkin (in the north), Annam (in the center), and Cochinchina (in the south). The great majority of the Vietnamese regarded their country as a single land and fought for much of the next 90 years to achieve unification.

Note 2. A catty is a Chinese unit of weight; 1 catty = 1.33 lb. weight avoirdupois.

28. Kaempfer, Engelbert. 1727. The history of Japan,... Its metals, minerals, trees, plants, animals, birds and fishes;... Together with a description of the Kingdom of Siam 1690-1692. (translated by J.G. Scheuchzer from the original edition of April 1727. 2 vols.). London: Printed for the translator. See vol. I, book I, chapter IX, p. 121-22. [1 ref. Eng]

• ***Summary:*** In Chapter IX, "Of the fertility of the country as to plants," the section titled *Gokokf [Goku-fu]* ("five grains," p. 121-22) states: "The chief produce of the Fields, which contributes most to the sustenance of Life, is by the Japanese comprehended under the name of *Gokokf,* that is, the *five Fruits of the Fields.* 'Tis by their good or bad growth they estimate the value of the Ground, the fruitfulness of the Year, and the wealth of the Possessor. They make up the chief dishes at their meals, and make good the want there is of Flesh-meat, which Custom and Religion forbid them to eat." Note 1. This is the earliest English-language document seen (Dec. 2003) that uses the term "Flesh-meat" to refer to meat.

The five grains *(Gokokf)* are: (1) *Kome* or Rice (from which "they brew a sort of strong fat Beer, call'd *Sacki...*"). (2) *Oomugi* or Barley. "They feed their Cattle and Horses with it: Some dress their Victuals with the Flower [Flour], and make Cakes of it." (3) *Koomuggi* or Wheat. (4) *Daidsu* or Daidbeans. (5) *"Adsuki* [azuki] or *Sodsu* [shôzu, shôdzu = small + bean] that is Sobeans" [azuki].

Concerning soybeans: "4. *Daidsu,* that is, *Daidbeans,* is a certain sort of Beans, about the bigness of Turkish Pease, growing after the manner of Lupins. They are next to the Rice in use and esteem. Of the Meal of these Beans is made what they call *Midsu,* a mealy Pap, which they dress their Victuals withal, as we do with Butter. What they call *Soeju,* is also made of it, which is a sort of an *Embamma,* as they call it, which they eat at meals to get a good stomach. This *Soeju* is exported by the Dutch, and brought even into *Holland.* I have describ'd their way of making it in my *Amoenitates Exoticae.* p. 839. where the Plant it self bearing these beans is figur'd and describ'd."

Note 2. *Midsu* clearly refers to miso, and *Soeju* to shoyu. This is the earliest English-language document seen (March 2009) that mentions miso, or miso in connection with Japan. It is also the earliest English-language document seen (March 2009) that compares miso with butter. *Midsu* has almost the same pronunciation (phonetics), and the same etymology and meaning as the today's word "miso." Since spelling did not become fixed until the 18th century, this could be considered the earliest occurrence of "miso" in an English-language document.

Note 3. This is the earliest English-language document seen (Jan. 2006) that uses the word *Soeju* to refer to soy sauce. It is clearly Kaempfer's spelling of the Japanese word *shoyu.*

The author continues (p. 121-22): "5. *Adsuki* or *Sodsu,* that is Sobeans. They grow likewise after the manner of Lupins, and are black, not unlike *Lentils,* or the Indian *Cajan.* The flower [flour] is bak'd with sugar into *Mansje [Manju]* and other Cakes."

Note 4. This is the earliest English-language document seen (March 2006) that clearly mentions azuki beans. It is also the earliest English-language document seen (March 2006) that uses the word "Adsuki" or the word "Sodsu" to refer to azuki beans. Cooked and mashed or ground dry into flour are mixed with sugar to make *an* or "sweetened azuki bean paste." This is used as a filling for the popular steamed Japanese sweet bun named *manju.*

Besides the several sorts of *Gokokf* just mentioned, the following Plants are comprehended under the same name: *Awa,* Indian Corn, *(Panicum Indicum Tabern), Kibi,* or *Milium vulgare nostras, Millet: Fije,* or *Panicum vulgare juba minore semine nigricante:* And in general all sorts of Corn and *Mami* [Mamé = beans], that is pease and pulse. Azuki beans, though usually red, also occasionally have black or white seedcoats.

In the Introduction to this book, the translator explains that it was first published in English, after Dr. Kæmpfer's death in 1716, thanks to Sir Hans Sloane, who purchased all of Kæmpfer's plates, drawings, and manuscript memoirs as they were about "to be disposed of." Sloane added them to his library, which the translator believes is "the completest of its kind in Europe," with an extensive collection of Books of Physik, Natural History and Travels." "This History of Japan was by the Author divided into five Books."

Note 5. Kaempfer lived 1651-1716. John Gaspar Scheuchzer lived 1702-1729. His first translation was this one, in 1727. The title page states that the original was "Written in High-Dutch by Engelberus Kaempfer, M.D., Physician to the Dutch Embassy to the Emperor's Court; and translated from his Original Manuscript, never before printed, by J.G. Scheuchzer, F.R.S. and a member of the College of Physicians, *London.* With the Life of the Author, and an Introduction. Illustrated with many copper plates."

Note 6. In 1986 a 3 volume edition was published in Glasgow, Scotland by James Maclehose and Sons. This book contains no mention of soybeans in Siam (Thailand).

Note 7. This is the earliest English-language document seen (Nov. 2007) that mentions Lupins (or "lupin" or "lupine" or "lupines").

Note 8. This is the earliest English-language document seen (Dec. 2000) that mentions the *Goku-fu* or "five grains" and includes the soybean among them.

Note 9. This is the earliest English-language document seen (June 2008) that mentions lentils; it compares them with adsuki [azuki] beans. Address: M.D., Physician to the Dutch Embassy to the Emperor's Court [in Japan].

29. Bradley, Richard. 1732. The country housewife and lady's director, in the management of a house, and the delights and profits of a farm... with the best method of making ketchup, and many other curious and durable sauces. 6th ed, with additions. London: Printed for D. Browne and R. Woodman. vii + 188 + [12] p. See Part II, p. 150. Illust.

• ***Summary:*** This book mentions the word "Ketchup" or the term "Mushroom Ketchup" at least 12 times and contains what Andrew F. Smith in *Pure Ketchup* (1996) says (p. 14) is the earliest recipe seen for "Mushroom Ketchup." In Vol. 1 (p. 142-43), under the month of September, Bradley begins: "The following Receipts for making of Mushroom-Ketchup, and "Mushroom-Gravey, I had from a Gentleman named Garneau, whom I met at Brussels, and by Experience find them to be very good." Heat the gills of large mushrooms in a dry skillet "over a gentle Fire till they begin to change into Water; and then frequently stirring them till there is as much Liquor come out of them as can be expected, pressing them often with a Spoon against the side of the Vessel; then strain off the Liquor, and put to every

Quart of it about eighty Cloves, if they are fresh and good, or half as many more, if they are dry, or have been kept a long time, and about a Drachm of Mace: add to this about a Pint of strong red Port Wine that has not been adulterated, and boil them all together till you judge that every Quart has lost about a fourth Part or half a Pint; then pass it thro' a Sieve, and let it stand to cool, and when it is quite cold, bottle it up in dry Bottles of Pints or Half-Pints, and cork them close, for it is the surest way to keep these kind of Liquors... I have had a Bottle of this sort of Ketchup, that has been open'd and set by for above a Year, that has not received the least Damage;... A little of it is very rich in any Sauce, and especially when Gravey is wanting: Therefore it may be of service to Travellers, who too frequently meet with good Fish, and other Meats, in Britain, as well as in several other parts of Europe, that are spoiled in the dressing; but it must be consider'd, that there is no Salt in this, so that whenever it is used, Salt, Anchovies, or other such like relishing things, may be used with it, if they are agreeable to the Palate, and so likewise with the Mushroom Gravey in the following Receipt."

The recipe, titled *"Ketchup,* in Paste. From *Bencoulin* in the *East-Indies"* states (Part II, p. 150). "There is a Kidney-Bean, we have here, which has a fine relish in it, as the *Indians* say, but in fact there is none but what they give it by Art. This Bean, when it is full ripe, is taken out of the Shells, and boiled to a Pulp, and that Pulp strained till it becomes like Butter; then they put some of all the Spices into it, in Powder, as, Nutmeg, Cloves, Mace, and Pepper, Garlick, and Orange-Juice, or some Mango Pickle. This being well mix'd together, makes an agreeable Sauce, when it is put in any warm Liquor."

Note 1. "Kidney-Bean" almost certainly refers to the soybean. This is the 3rd earliest English-language document seen (Feb. 2006) that uses the term "Kidney- bean" to refer to the soybean. The first two were Férnandez (1704) and Tournefort (1730).

Note 2. This is the earliest document seen (May 2010) that mentions a relative of Indonesian-style soy sauce *(kécap)* or that describes its preparation. Bradley wrote the Malay / Indonesian word *kécap* as Ketchup, thus starting a confusion that has lasted to the present. However, unlike soy sauce, this Ketchup has the consistency of a paste, is not fermented, and contains no salt. In today's Indonesia (May 2010), the word *kecap* (ketchup), used alone, means "soy sauce;" *kecap manis* is sweet soy sauce. *Kecap asin* is salty soy sauce. But *kecap ikan* is a brown salty liquid produced by autolysis of fish or fish material, i.e., the degradation of fish material by enzymes in that material.

Note 2. Since this sauce contains no salt or sugar, it could not have lasted for long unless sterilized and sealed. That may explain why "this recipe appears to have had no influence on subsequent cookery writers (Andrew F. Smith. 1996. *Pure Ketchup,* p. 13).

Note 3. Bencoulin (today spelled Bengkulu, formerly also spelled Bengkoelen, Benkoelen, or Benkulen) was a settlement on the southwest coast of Sumatra, established by the British in 1684, at which time it was the only British settlement in Southeast Asia; a fort was built a few years later. An early center of the British pepper and spice trade, it was ceded to the Dutch in 1824 in exchange for Melaka. Andrew Smith (1996, p. 13) observes: "The provenance of this recipe establishes that the British were introduced to some ketchups in what is today Indonesia."

Note 4. This text is now (June 2007) available online: Search for "Project Gutenberg Richard Bradley." Click "Release #7262." Click "Text" and search for any of the above words or strings.

Note 5. This book went through many editions in London. The 1st edition appeared in 1726 (Printed for James Woodman and David Lyon). The 2nd edition appeared in 1727 (Printed for James Woodman and David Lyon). The 6th edition appeared in 1732 (Printed for D. Browne and T. Woodman). The recipe for ketchup apparently first appeared in the 6th edition. Richard Bradley lived 1688-1732.

30. Ship Enckhuizen in Nagasaki loaded with soy [sauce]. 1737. *

• ***Summary:*** Herman Ketting is working with William Shurtleff, trying to find when the Dutch East India Company (VOC) first imported soy sauce from Japan to the Netherlands. Ketting writes (20 June 2007): The citation gives the following information: On 13 October 1737 a ship named Enckhuizen (which we know was in Asia at that time) was in Nagasaki loaded with 75 double barrels of Soy [sauce] marked with a "Z." The 75 Barrels were shipped from Nagasaki to Batavia, the VOC's headquarters. Of this total, 35 barrels were bound for mainland Holland [Netherlands].

This was surely not the first shipment of soy [sauce] to Holland, because I have sent you some information about the ship Westerwik which lay off the Cape of Good Hope [South Africa] with some tainted soy the same year. In the meantime I have found a letter sent to Holland which informed the Herren XVII that soy is being sent to Holland in June 1737. If you like, I will send you this information [from the General Missives] in the usual format.

31. Governors General and the Council of the Indies (Indië). ed. 1739. Generale missiven [General missives]. In: Willem P. Coolhaas and Jurrien van Goor, comp. 2004. Generale Missiven van Gouveneurs-General en Raden aan Heren XVII der Verenigde Oostindische Compagnie: Deel X: 1737-1743. 's-Gravenhage: Nijhoff. Book X. 1159 p. (Letters to the Heren XVII of the Dutch East India Company). [Dut]

• ***Summary:*** On page 253 (31 Jan. 1739) "zoya" is mentioned twice and "Japans soja" once: "Ship *Enkhuyzen / Enkhuisen / Enckhuizen.* Soy [sauce] *(Zoya)* for Hoorn and Enkhuizen f139:12:-8."

"Ship *Schellack.* 4 chests (kelders) of Soy sauce for Delft and Rotterdam f139:12:-8."

"With the fleet of 1739 in total, 36 chests (kelders) of Japanese Soy *(Japanse soja)* f 1231:—:—.

Note 1. Enthuizen, Hoorn, Delft, and Rotterdam were harbor towns and early "chambers" *(kamers)* of the Dutch East India Co. (VOC), from which overseas trade with the East Indies was conducted. The other two early chambers were Amsterdam and Zeeland.

Note 2. The symbol "f" stands for guilder, the basic Dutch monetary unit. "f 2:07:8" is read "two guilders, 7 stuivers and 6 pennigen." One gulden (singular of guilder) = 20 stuivers. One stuiver = 12 pennigen.

Note 3. The General Missives are letters written by the Governors General and the Council of the Dutch East Indies *(Indië)* and sent to the Heren XVII [the directors of the VOC] in the Netherlands. Items in the General Missives are the demand for men and materials for Indies, the number and quality of ships in the Indies, questions about management and information concerning the cargo sent with the fleet to the Netherlands. Address: Batavia, Netherlands.

32. Valckenier, A. 1739. [Re: Merchandise loaded from Batavia, Dutch East Indies]. Letter to Heren XVII ("17 Lords," leaders of the Dutch East India Company, VOC), Netherlands, Jan. 31. p. 2000-01 [Dut]

• ***Summary:*** Loaded merchandise is listed according to their place of origin. For example merchandise from Coromandel.

Batavia's collection: 11,500 pounds of tin from Malacca. f. 3942:-4:-. 30,500 pounds of copper, Japanese, by staffs, f. 13,944:12:-. 36 crates with bottles of Japanese soy sauce *(Zoija Japance)* f. 1231:16:-8. 45,000 pounds of spiaulter (an alloy / mixture of lead and tin) f. 150,606:-6:-8. 4,209 pounds of black ebony f. 90:-3:-.

Bibliographic reference in Dutch: NA, VOC 2422, OBP (21 Jan. 1739) 2001vo.

Location: Nationaal Archief, Den Haag, De Archieven van de VOC; toegangsnummer 1.04.02; inventaris nummer 2422 [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the VOC; access number 1.04.02; record number 2422].

Note 1. The symbol "f." stands for guilder, the basic Dutch monetary unit. "f 2:07:8" is read "two guilders, 7 stuivers and 6 pennigen." One gulden (singular of guilder) = 20 stuivers. One stuiver = 12 pennigen.

Note 2. A. Valckenier was Governor General in Batavia from 1737 to 1741.

Note 3. An alloy of lead and tin is commonly called either old pewter, tin pewter, or solder. Address: Governor-General, and the Councils of the Indies, in Batavia [today's Jakarta, Indonesia].

33. De vergadering van het Haags Besogene [Meeting of the Haags Besogene]. 1740. The Hague, Netherlands. Unpaginated. [Dut]

• ***Summary:*** The meeting of the Haags Besogene starts 20 Oct. 1740. The committee works on the 24th four-year (quadrennial) account of the Dutch East India Co (VOC).

Monday, 24 Oct. 1740, in the morning. Proceeding with the reading and control of the delivery books to be sold and delivered goods and merchandise, from 1 June 1737 until 15 May 1738, item from 16 May 1738 until 15 May 1739, and finally from 16 May 1739 until 31 May 1740.

Monday, 24 Oct. 1740, after midday. Started with the reading and control of the accounts and merchandise, which on 17 May 1736 were stockpiled in the warehouse of this chamber [Amsterdam] and four years ago were received from the [Dutch East] Indies (Indië [Batavia]). Items that since 31 May 1736 were delivered from the stock according to the journal of bookkeeping and the ledger and the part of the stock lying unsold in the Company's warehouses:... Japanese Soy [sauce] *(Japanse Soija);* received as before–30 kelders. Note 1. A kelder is a chest; in this case it contains bottles of soy sauce.

Bibliographic reference in Dutch: NA, VOC 4472, Haags Besogene (20 t/m 24-10-1740).

Location: Nationaal Archief, Den Haag, De Archieven van de Verenigde Oost-Indische Compagnie (VOC); toegangsnummer 1.04.21; inventaris nummer 4472. Notulen van het Haags Besogene [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch East India Co. (NFJ); access number 1.04.21; record number 4472. Notes of the Haags besogene].

Note 2. This is the earliest document seen (June 2007) showing soy sauce in the Netherlands. This document contains the earliest date seen for soy in the Netherlands (31 May 1736).

Note 3: The Haags Besogne prepared the meetings of the Heren XVII [the 17 directors who made the most important decisions]. To prepare those meetings, the Haags Besogne had to deal with the letters received from Batavia and the chambers in Holland and Zealand. The Haags Besogne also controlled the different bookkeeping journals, and they saw every letter, report or bookkeeping document in the administration of the VOC; they made many abridgements of or notes about them. On the basis of the findings, the Haags Besogne gave advice to the Heren XVII. After that. the Heren XVII made their decisions. So we can found in the archive of the Haags Besogne some information from books or sources which are lost. There is

only one problem: there is no index to or register on the notes of the Haags Besogne. So a researcher must be familiar with the notes of the Haags Besogne. Address: The Hague, Netherlands.

34. Notulen van het Haags Besogene [Notes of meeting of the Haags Besogene]. 1744. The Hague, Netherlands. Unpaginated. Oct. 19-22. [Dut]

• ***Summary:*** Monday 19 Oct. 1744. The committee starts to work on the 25th four-year (quadrennial) account [of the Dutch East India Co (VOC)] and has agreed to come together for that purpose during the morning from 9 until 12 and after midday from 3:30 until 5:30 p.m...

Thursday 22 Oct. 1744. Started with the reading and control of the account of goods and merchandise which on 31 May 1740 were stockpiled in the warehouse of this chamber [Amsterdam] and which 4 years ago were received from the Indies *(Indië* [Batavia]). Items that according to the journal of bookkeeping and the ledger have been delivered from the stock since that time and the part of the stock from 15 May 1744 has lain unsold in the Company's warehouses. The findings are stated below:

"... Japanese Soy [sauce] *(Japanse Soija):* from the years 1738 and 1739 were stockpiled–30 kelders. Added to this, received from the Indies *(Indië)* during the past four years–61 kelders.

Total in stock as of 15 May 1744–91 kelders. Note 1. A kelder is a chest; in this case it contains bottles of soy sauce.

Bibliographic reference in Dutch: NA, VOC 4472, Haags Besogene (19 t/m 22-10-1744).

Location: Nationaal Archief, Den Haag, De Archieven van de Verenigde Oost-Indische Compagnie (VOC); toegangsnummer 1.04.21; inventaris nummer 4472. Notulen van het Haags Besogene [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch East India Co. (NFJ); access number 1.04.21; record number 4472. Notes of the Haags besogene].

Note 2. A careful examination (by a Dutch PhD researcher at the Hague) of the records VOC shipments arriving in Holland from Batavia finds no evidence that soy sauce was delivered to intermediaries for the Dutch or other markets. For goods such as pepper, sugar, coffee and tea, the Haags Besogne always noted how much was delivered. But for soy sauce they did not. Therefore the soy sauce was probably consumed by VOC directors and their servants.

Note 3. Soy was delivered by VOC ships and stored in VOC warehouses. The inspectors of the warehouses never mentioned that this soy had been delivered to a private merchant. Our reached his conclusion after comparing the note about soy and, for example, a note about pepper. Address: The Hague, Netherlands.

35. Rumphius, Georgius Everhardus. 1747. Herbarium Amboinense. Vol. 5 [The flora of Amboina. Vol. 5]. Amstelaedami (Amsterdam). See p. 388-89. Illustration, pl. 140. [Lat; Dut]

• ***Summary:*** Liber IX. cap. XXXI [Book 9, Chap. 31]. The left-hand column, titled "Cadelium. Cadelie." is written in Latin. The right-hand column titled "De Cadelie-Plant" is written in Dutch. This is a *Phaseolus niger,* in growth and shape similar to the *Katjang Kitsjil,* although a smaller bush, about a foot high, with most branches located up high, a little tipping down. The lower stem is round, the top rough. The leaves are ordered three-by-three, on long branches, thinner and smaller than the average *Katjang,* and almost similar to the *Lagondi,* but somewhat peaky, with yellow flowers like the little *Katjang.*

The fruit are short pods, more than a finger length long and half a finger wide, rough on the outside and flat, hanging together in groups. Inside are 2-3 little beans, looking like lentils, maybe a little longer but bigger, and very black. The multiple roots are long, thin and fibrous with some swellings or warts here and there.

Names: Latin: *Phaseolus niger, & Cadelium.* Malay, Javanese, and Balinese: *Kadelee.* Flemish (Belgice): *Zwarte Boontjes.* Chinese *(Sinice): Authau [au-tau?].*

Occurrence: On Amboina [or Ambon, an island of the Moluccas in today's Indonesia] they are rare, but they are more abundant on Java, Bali, and other Malaysian islands.

Cultivation: If scarce, they were pushed into the soil, but the Javanese and Balinese, who have large fields of them, sow them since the birds do not eat the bitter seeds. The ripe bushes are pulled out completely, the leaves rubbed off (since not a lot of leaves are left on the ripe bushes), bound 8-10 together and hung up. When people want to eat them, they are put in warm water (bush and all), the pods open up and the beans are taken out. Or the dried beans are taken out of the pod and cooked into something special.

When they are sown on plowed land, the rows are covered using a broom of the stiff leaves of the *Goemoetoe* tree or *Sagueers/Sagueri* tree. To keep the birds from eating the ripe seeds, the young white leaves of the aforementioned tree are cut into thin strips, attached to long ropes and hung over the *Katjang* field. The wind moving the strips scare away the birds or a boy is assigned to do so.

Utilization: These little beans were cooked and eaten like other beans, although they are not widely consumed that way because they are harder and bitter. Most were sold to the Chinese, who use them to make flour, which is in turn made into low-quality noodles (Lara in Latin, Laxa in Dutch), called *Tautsjiam.* These are long, flat strips, resembling vermicelli, which they cut out of rolled-out dough, then dry in the sun and bind together into bundles. These noodles are cooked with meat or poultry, and thinly cut cabbage, which creates a special (although in our nation considered to look disgusting) and delicious tasting food,

easy to digest, and allowed to be served to all sick people. But the real noodles of this type (Lara, Laxa) are made from rice- and wheat flour, which are thick round strips like vermicelli. The noodles from the little beans are very thin and small flat strips since the flour of the Kadelee makes a flexible but tough dough, which can be rolled out very thinly since of all beans the Kadelee have the toughest substance.

The beans are first roasted a little over a fire until the black skin opens or puffs up, then they are pounded steadily in a mortar (Dutch: Rystbloek) until the hulls come off; then one can run and grind the dehulled beans into a sticky substance. From this flour the Chinese also make another food called Tahu (tofu), because the dough, which is about as thick as one's thumb, and spread out on a table, they cut squares or marbles, which they then cook in bacon fat with spices and coriander, just like our cooks make certain balls from flour, sliced bacon, and spices.

A superb, large illustration (pl. 140) shows a soybean plant with leaves, pods, and roots (but no nodules). In the lower left-hand corner is a close-up illustration of one soybean pod attached to a stem, and two soybean seeds. Rumphius did not draw this himself. Since he was now blind, a scribe drew it following his description (see next page).

In summary: Rumphius reported soybeans (Cadelium, Malay name = kadelee) in Amboina in 1747. He also reported many food uses (tofu, roasted soy flour made into noodles, green vegetable soybeans, black whole dry soybeans) and use as green manure. However he did not mention soy sauce (kecap / ketchup), which by 1747 had been exported to Europe as "ketchup" for about a century by the Dutch East India Co. and Dutch traders.

Brief biography of Rumphius: Georg Eberhard Rumpf (lived 1627-1702; Latinized name Georgius Everhardus Rumphius) was a German-born naturalist. In late 1652 he enlisted as a midshipman in the Dutch East India Co. In Dec. he left Texel island in Holland and in June 1653 he arrived at Batavia, the chief Dutch city on Java in the Dutch East Indies. On 8 Nov. 1653 he was sent by the company to Amboina (now Ambon Island in the Maluku Archipelago [Spice Islands, Moluccas], in eastern Indonesia). In Feb. 1662 he was given a salary and permission to work as a naturalist on Amboina. By 1663 he had been at work for some time on his first book, a flora *(Amboinsch Kruidboek, Herbarium Amboinensis).* Most of his writing on this book is thought to have been done between 1653 and 1670. In late 1690 the manuscript for the first six of twelve books were ready to be sent to Batavia. In mid-1692 the text was sent on to the Netherlands with the ship *Waterland.* But on Sept. 12 this ship was sunk by the French and all the text was lost. Fortunately a copy had been retained. But by the spring of 1670 Rumphius had gone blind through overuse of his eyes. So he was given scribes and artists by the company to be his hands and eyes. In 1673, aided by his wife, he commenced to translate the Latin text of his work into Dutch. On 17 Feb. 1674, his wife and youngest daughter were killed in a violent earthquake that devastated Amboina. In 1687 a huge fire destroyed his library, many of his manuscripts, and his illustrations to the book. Although 60 years old, blind, and feeble, Rumphius was undaunted. He started all over describing to scribes and artists the multitude of plants he had written of and illustrated. He, of course, never saw these new illustrations. On 8 Feb. 1696 the remaining manuscript chapters were sent on the ship *Sir Janslandt* to the Netherlands. When, in 1696, the *Herbarium Amboinensis* finally arrived in the Netherlands, the directors of the Dutch East India Co. "decided that it contained so much sensitive [valuable] information that it would be better not to publish" the work, which was later edited by J. Burmann. The magnificently illustrated work was finally published in six folio parts in Amsterdam between 1741 and 1750–more than 39 years after Rumphius's death (compiled from many sources). Vol. 5 of 6, which mentions the soybean was published in 1747, after Kaempfer, Hermann, and Linnaeus had published their description of the soybean.

Rumphius gave a good description of the soybean plant, called it *Cadelium,* mentioned that the native Amboinese name was *kadelee* (now spelled *kedele),* said that it grew most abundantly in Java, Bali, and other Malayan islands, and included a remarkably good illustration of the plant. Only the position of the pods is incorrect. (Piper & Morse 1923; Hymowitz 1981).

Note 1. This is the earliest document seen (May 2010) concerning soybeans in Indonesia, or the cultivation of soybeans in Indonesia. This is the earliest written botanical description of the soybean, though the fourth earliest one to be published. He wrote this 20 years before Englebert Kaempfer went to Japan.

Note 2. To determine the earliest date seen for soybeans in Indonesia, we must look at Rumphius's life. From the above we can say that he had probably seen soybeans in Amboina by 1670, and definitely by 1696. These are also probably the earliest dates seen for the cultivation of soybeans in Indonesia. The source of these soybeans is unknown.

Note 3. This is the earliest document seen (May 2010) concerning soybeans in Southeast Asia, or the cultivation of soybeans in Southeast Asia. This document contains the earliest date seen for soybeans in Southeast Asia, or the cultivation of soybeans in Southeast Asia (1747).

Note 4. This is the earliest Latin-language or Dutch-language or document seen (Feb. 2004) that mentions tofu, which it calls *Tahu.*

Note 5. This is the earliest document seen (July 2003) stating that a type of vermicelli or noodles is made with soybeans.

Note 6. This book also contains early references to *Dolichos sinensis* (p. 375; the yard-long bean or asparagus bean) and to *Phaseolus niger* (p. 388). Address: Amboina, Dutch East Indies.

36. Notulen van het Haags Besogene [Notes of meeting of the Haags Besogene]. 1748. The Hague, Netherlands. Unpaginated. Oct. 25. [Dut]

• ***Summary:*** Started with the reading and control of the account of goods and merchandise, which on 15 May 1744 are stockpiled in the warehouses of this chamber [Amsterdam] and which have been received during the last four years from the Indies *(Indië* [Batavia]). Items that according to the journal of bookkeeping and the ledger have been delivered from the stock since 31 May 1748 and that part of the stock lying unsold in the Company's warehouses.

"... Soy [sauce] *(Soija):* According to the list closed on 15 May 1744 were stockpiled–91 kelders. And received from the Indies *(Indien)* during the past four years–72 kelders."

Total: 163 kelders. Note 1. A kelder is a chest; in this case it contains bottles of soy sauce.

"From that is delivered during this time: 106 chests (kelders).

"On account of the filling of half empty bottles *(flessen)* and broken bottles: 4 chests (kelders).

"For the benefit of inns and yachts used: 2 chests (kelders). Total: 163 chests (kelders) [So the books balance].

Bibliographic reference in Dutch: NA, VOC 4474, Haags Besogene (25-10-1748).

Location: Nationaal Archief, Den Haag, De Archieven van de Verenigde Oost-Indische Compagnie (VOC); toegangsnummer 1.04.21; inventaris nummer 4474. Notulen van het Haags Besogene [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch East India Co. (NFJ); access number 1.04.21; record number 4474. Notes of the Haags besogene]. Address: The Hague, Netherlands.

37. Glasse, Hannah (Mrs.). 1751. The art of cookery, made plain and easy: Which far exceeds any thing of the kind ever yet published... by a lady. 4th ed., with additions. London: Printed for the author, and sold at the Bluecoat-Boy... at Mrs. Ashburn's china-shop... [2] + iv + [16] + 334 p. See p. 308-09. 1 leaf of plates. 21 cm. (8vo). [Eng]

• ***Summary:*** Chapter XIX, titled "To make anchovies, vermicelli, catchup, vinegar,..." has 2 recipes for homemade catchup (p. 308-09).

"To make Catchup: Take the large Flaps of Mushrooms, pick nothing but the Straws and Dirt from it [sic], then lay them in a broad earthen Pan, throw a good deal of Salt over them, let them lye till next Morning, then with your Hand break them, put them into a Stew-pan, let them boil a Minute or two, then strain them through a coarse Cloth, and wring it hard. To take out all of the juice, let it stand to settle, then pour it off clear, run it through a thick Flannel Bag (some filtre it through brown Paper, but that is a very tedious Way) then boil it; to a Quart of the Liquor put a Quarter of an Ounce of whole Ginger, and Half a Quarter of an Ounce of whole Pepper. Boil it briskly a Quarter of an Hour, then strain it, and when it is cold, put it into Pint Bottles. In each Bottle, put four or five Blades of Mace, and six Cloves, cork it tight, and it will keep two Years. This gives the best Flavour of the Mushrooms to any Sauce. If you put to a Pint of this Catchup, a Pint of Mum, it will taste like foreign Catchup."

Note 1. Mum is a type of malt liquor (beer, alcoholic) originally brewed in Brunswick, Germany, widely used in Germany, and imported in large quantities into England in the 17th and 18th centuries. This recipe uses salt, but no sweetener, to help it keep. "Foreign Catchup" probably referred to soy sauce imported from the Dutch East Indies.

"Another way to make Catchup: Take the large Flaps, and salt them as above; boil the Liquor, strain it through a Flannel Bag. To a Quart of that Liquor put a Quart of stale Beer, a large stick of Horseraddish cut into little Slips, five or six Bay-leaves, an Onion stuck with twenty or thirty cloves, a Quarter of an ounce of Mace, a Quarter of an Ounce of Nutmegs beat, a Quarter of an ounce of Black and White Pepper, a Quarter of an Ounce of All-Spice, and four or five Races [Roots] of Ginger. Cover it close and let it simmer very softly till about one Third is wasted; then strain it through a Flannel Bag, when it is cold bottle it in Pint Bottles, cork it close, and it will keep a great while. You may put Red in the room [place] of Beer; some put in a Head of Garlick, but I think that spoils it. The other Receipt you have in the Chapter for the Sea."

In Chapter XI, "For captains of ships," the first recipe (p. 240) is "To make Catchup for twenty Years: Take a Gallon of strong Stale Beer, one Pound of Anchovies washed from the Pickle, a Pound of Shalots [Shallots] peeled, Half an Ounce of Mace, Half an Ounce of Cloves, a Quarter of an Ounce of Whole Pepper, three or four large Races of Ginger, two Quarts of large Mushroom flaps rubbed to Pieces. Cover all this close, and let it simmer till it is Half wasted, then strain it thro' a Flannel Bag, let it stand till it is quite cold, then bottle it. You may carry it to the *Indies.* A Spoonful of this to a Pound of fresh Butter melted, makes fine Fish-Sauce: Or in the room of Gravy-Sauce. The stronger and staler the Beer is the better the Catchup will be."

Note 2. Hannah Glasse lived 1708-1770. Address: England.

38. Homoed, Hendrik van. 1752. Diary. In: Leonard Blussé, Cynthia Viallé, et al, eds. 2004. The Deshima Diaries

Marginalia, 1740-1800. Tokyo: Japan-Netherlands Institute. xl + 898 p. See p. 154, 163-64 (#117-18).
• ***Summary:*** 1752 April 28–"I was amazed by what they told me because they know that they cannot keep it a secret from me if the junk is from Batavia [Jakarta]. As soon as they had left, I asked about the Japanese who had told the story of it being a junk from Batavia. The first slave brought him. I asked him where the junk was from and he replied from Jacatra [Jakarta] and that it carried only *miso* beans [i.e., soybeans used to make miso]... The Japanese coolie told me that there was no truth to his story about the junk."

1752 May 1–"Several apprentices clarified the story about the junk. The Chinese farmers have been mistaken for female slaves. They wear a different type of clothes. I asked Jûemon why the junk was being unloaded because I could not imagine that the government would accept a cargo of *miso* and other beans as tradable goods. Japan produces enough *miso* beans itself. He replied that the cargo will be sold out of compassion for the Chinese farmers." Address: Opperhoofd (Chief of the Dutch factory), Deshima, Nagasaki, Japan.

39. Notulen van het Haags Besogene [Notes of meeting of the Haags Besogene]. 1752. The Hague, Netherlands. Unpaginated. Oct. 19. [Dut]
• ***Summary:*** On the first page of notes of the meeting concerning the stock in the warehouses we read:

"Thursday, 19 Oct. 1752: Started with the reading and control of the account of goods and merchandise, which on 31 May [1752] were stockpiled in the warehouses of this chamber [Amsterdam] and which have been received during the last four years from the Indies *(Indië* [Batavia]). Items that according to the journal of bookkeeping and the ledger have been delivered from the stock since 31 May 1752 and that part of the stock lying unsold in the Company's warehouses.

"... Japanese Soy [sauce] *(Japanse Soija):* According to the list closed on 31 May 1748 were stockpiled–51 *kelders.* And received from the Indies *(Indien)* during the past four years–51 *kelders."*

Total: 102 *kelders.* Note 1. A kelder is a chest; in this case it contains bottles of soy sauce.

"From that is delivered during this time: 39 chests (kelders).

"According to the list closed on 31 May 1752, in stock: 45 chests (kelders).

"Provided for consumption in inns and yachts: 3 chests (kelders).

"In disuse, broken and empty: 15 chests (kelders). Total: 102 chests (kelders) [So the books balance].

Bibliographic reference in Dutch: NA, VOC 4475, Haags Besogene (19-10-1752).

Location: Nationaal Archief, Den Haag, De Archieven van de Verenigde Oost-Indische Compagnie (VOC); toegangsnummer 1.04.21; inventaris nummer 4475. Notulen van het Haags Besogene [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch East India Co. (NFJ); access number 1.04.21; record number 4475. Notes of the Haags besogene]. Address: The Hague, Netherlands.

40. Stickman, Olavus. 1754. Herbarium Amboinense, quod concens. experient. facult. mecicæ in Regia Academia Upsaliensi, sub presædio ... Caroli Linnaei [The flora of Ambon / Amboina...]. Upsaliae, exc. L.M. Hojer. 28 p. See p. 23? 19 x 15 cm. [Lat]*
• ***Summary:*** A commentary on the *Herbarium Amboinense* (1747) by G.E. Rumpf (Rumphius; See vol. 5, p. 388-89). In this work, Olavus / Olav Stickman, one of Linnaeus' pupils, provides a concordance between the botanical names employed in *Herbarium Amboinense* and modern Linnean binomials. This is the first place where Linnaeus / Stickman reduced the name of the soybean to *Phaseolus max.* Stickman defended his thesis on 11 May 1854, with his advisor, Linnaeus, present at the public examination.

Note 1. The *National Union Catalog* cites this as: Linnaeus, C. *(praeses).* [1754] ... Herbarium amboinense ... Library of Congress collection of academic dissertations. Dissertation–Upsala [Uppsala, Upsaliæ] (Olof Stickman, respondent). A commentary on the work of G.E. Rumpf. Also in Linnaeus' Amoenitates academicae, vol. 4, ed. 1, 1759 (and 1760).

Note 2. Ambon, Amboina, or Amboyna is an island of the Moluccas, Indonesia.

41. Notulen van het Haags Besogene [Notes of meeting of the Haags Besogene]. 1756. The Hague, Netherlands. Unpaginated. Oct. 20. [Dut]
• ***Summary:*** On the first page of notes of the meeting concerning the stock in the warehouses we read:

"Wednesday, 20 Oct. 1756. Started with the reading and control of the account of goods and merchandise, which on 31 May 1756 were stockpiled in the warehouses of this chamber [Amsterdam] and which have been received during the last four years from the Indies *(Indien* [Batavia]). Items that according to the journal of bookkeeping and the ledger have been delivered from the stock since 31 May 1756 and that part of the stock lying unsold in the Company's warehouses.

"... Japanese Soy [sauce] *(Japanese Soija):* According to the list closed on 31 May 1752 there were stockpiled–45 kelders. And received from the Indies *(Indien)* during the past four years–60 kelders."

Total: 105 kelders. Note 1. A kelder is a chest; in this case it contains bottles of soy sauce.

"From that is delivered during this time: 93 chests (kelders).

"Provided for consumption in inns and yachts: 2 chests (kelders).

"In disuse, broken and empty: 10 chests (kelders). Total: 105 chests (kelders) [So the books balance].

Bibliographic reference in Dutch: NA, VOC 4477, Haags Besogene (20-10-1756).

Location: Nationaal Archief, Den Haag, De Archieven van de Verenigde Oost-Indische Compagnie (VOC); toegangsnummer 1.04.21; inventaris nummer 4477. Notulen van het Haags Besogene [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch East India Co. (NFJ); access number 1.04.21; record number 4477. Notes of the Haags besogene]. Address: The Hague, Netherlands.

42. Linnaeus, Carolus. 1759. Amoenitates Academicæ; seu dissertationes variæ physicæ, medicæ, botanicæ, [Academic delights or various dissertations on physics, medicine, botany, previously published separately and now collected and augmented with copper plates. Vol. 4]. Holmiae [Stockholm, Sweden], sumtu & literis. L. Salvii. 600 leaves. See p. 132. This is a 10 volume work. [Lat]

• ***Summary:*** On page 112 starts a part of this book titled *Herbarium Amboinense* [The flora of Amboina. Olof Stickman, respondent]. It is dated Uppsala 1754. On page 132 (no. 140) Linnaeus repeats (from the original 1754 edition of this work) his reduction the name of the soybean to Phaseolus max.

43. Ekeberg, Karl Gustaf. 1764. Om Chinesiska Soyan [On Chinese soy sauce]. *Kongliga Vetenskaps Academiens Handlingar (Transactions of the Royal Academy of Sciences, New Series, Stockholm)* 25:38-40. Jan/March. [Swe; eng+]

• ***Summary:*** A detailed description in Swedish of how the Chinese make soy sauce, written with the intent that Europeans would start making it themselves.

"The natives of nearly all of the Indies (India) use for their cooking a sauce which they have prepared in advance. This sauce serves the purpose of both economizing and making the food better tasting. The inhabitants of the Moluccan Islands [later part of Indonesia] and the islands lying around the Strait prepare, by rotting of small fish, a sauce which in taste and smell doesn't differ much from anchovies, rather than [using] the soy [sauce] that more recently has become known in Europe.

"The Chinese, who are not inferior to any other people of the world when it comes to home economy or the ability to imitate what they have seen, although not the inventors of soy sauce themselves, have tried to imitate their neighbors the Japanese, whose soy sauce surpasses that of the Chinese, be it more in price than in taste (goodness). They favor using it in the preparation of several dishes, and especially for dipping meat, fish, and vegetables into, lavishly and differently from other sauces.

"I have the honour to herewith to describe how Chinese soy sauce is prepared, because it has come to be used by us and we ought to be able to produce it ourselves.

"I have previously remarked in a short account of Chinese home economics in the country, that they have a type of small bean called Pactau ["white bean" = white soybean] among their grains. It differs only in size from the Caravance bean *(Caravancer)* usually used as nourishment on board during the voyage home. These Pactau beans are the main ingredient of the soy sauce, and since both types of beans resemble one another fairly closely in taste, and since the Caravance beans do not differ very much from our Turkish beans *(Turkika Boner),* I do not doubt that soy sauce could be prepared from the latter [Turkish beans], if not from our own field-beans. The Chinese prefer, when short of their Pactau beans, to prepare the sauce from a type of lesser blackish-green bean, which they call Hactau. Our native beans ought to be tried, therefore, in case the crop of Pactau beans, imported for experimenting, should fail.

"Thirty-five pounds [actually skalpund; 1 skalpund = 425 gm] of these beans, are cleaned then boiled for 2 or 3 hours in a covered kettle in clean water over a slow fire, until they can be easily mashed between the fingers. Water is added little by little so that the beans do not burn. The beans are removed and spread out on wide, shallow containers (trays) so that the water can run off, and while they are still damp they are rolled in a fine flour (which is ground from the same kind of bean) until they are covered on all sides. They are then placed on smaller trays or loosely woven mats and stacked one and a half inches (literally "thumbs"), one above the other, then placed in an open and loosely woven basket, which is wrapped in a mat or cloth, so that they can ferment and grow moldy during a period of three or four days. Then the cloth is removed and air let in, so that they should become withered and somewhat dried by the time they are left in strong solar heat (or in any other warm area) so that they can dry until they become so hard that they shatter when hit with a hammer and the pieces fly around.

"The flour and the mold are now separated from the beans by rubbing them between the hands. Then the beans are placed in a large or several smaller jars (earthen vessels) and covered with a clear (salt) pickling brine, prepared from 20 pounds of nice clean salt and 100 pounds of clean spring water. The vessels are placed open in the sun during the day, but are closed at night to keep out the cold and the dampness. Otherwise they are placed in a warm area for six whole weeks, to draw [until their whole substance has been well extracted]. When it is observed that the pickling brine has become dark brown and strong, it is poured off, and brought to a boil several times to increase the strength. Some people add sugar, ginger and other spices to it,

according to taste, while it is cooking. They then let the sauce stand with the spices for a few days, before the spices are removed by straining."

Note 1. The author, Carl Gustaf Ekeberg (written like this on title page) lived 1716-84. He was captain of a ship in the Swedish East India Company's service. He arrived in Canton on 24 August 1766, but had previously visited in 1762. Beckmann (1798, p. 344) gives an English translation of the latter half of this document, starting at "Thirty-five pounds..." Note 2. This is the earliest Swedish-language document seen that uses the term *Caravancer* to refer to soybeans.

Note 3. This is the earliest document seen (July 2001) stating that sugar and/or spices are sometimes added to soy sauce during the last stage of processing.

Note 4. This is the earliest journal article seen (Oct. 2001) that mentions soy.

Note 5. This periodical started publication in 1739 in Stockholm. Address: Captaine vid Ostindiska Compagniet (Captain with the East India Company).

44. Stork, William. 1769. A description of East-Florida, with a journal, kept by John Bartram of Philadelphia, botanist to His Majesty for the Floridas; upon a journey from St. Augustine up the River St. John's, as far as the lakes. With explanatory botanical notes... The third edition, much enlarged and improved. London: Sold by W. Nicoll; and T. Jeffries. [4], viii, 40, [2], xii, 35, [1] p. Illust. maps. 30 cm. [2 ref]

• ***Summary:*** This book is divided into two parts, each of which is paginated separately. At the beginning of the 2nd part is "The introduction to the journal" of John Bartram. When talking about the importance of new plants and naturalists to the American colonies he states (p. ii): "I cannot touch upon this subject without mentioning Mr. John Ellis, Fellow of the Royal Society, and agent for West-Florida... It is to this very ingenious gentleman that I am indebted for the following catalogue of plants that may be useful in America, in which, to avoid confusion in the botanical names, Mr. Ellis hath given both the generical and the specifick or trivial names of the plants, with the page referred to in the celebrated Dr. Linnaeus's 2nd edition of his Species of Plants..."

There follows (p. iii on) a 4-column table in which numerous plants are listed under the following column headings: (1) The "Latin names"–genus and species. (2) "2d Ed. Lin. Sp."–The page on which this plant is mentioned in the 2nd ed. of Linnaeus' *Species Plantarum.* (3). English names. (4) Observations.

On p. v we read: "Dolichos soja Linn. Lin. Sp. 1023. A kind of kidbean called Daidsu. Used for making Soye* or Indian Ketchup. See Kaempfer, Amoenitatis, 837.

"* The method of preparing East-India Soye or India Ketchup. Take a certain measure, for instance a gallon, of that sort of kidney-beans, called Daidsu by the Japonese, and Caravances by the Europeans; let them be boiled till they are soft; also a gallon of bruised wheat or barley, (but wheat makes the blackest Soye) and a gallon of common salt. Let the boiled caravances be mixed with the bruised wheat, and be kept covered close a day and a night in a warm place, that it may ferment. Then put the mixture of the caravances and wheat, together with the gallon of salt, into an earthen vessel, with two gallons and a half of common water, and cover it up very close. The next day stir it about well with a battering machine or mill (Rutabulum) for several days, twice or thrice a day, in order to blend it more thoroughly together. This work must be continued for two or three months, then strain off and press out the liquor, and keep it for use in wooden vessels; the older it is the clearer it will be, and of so much more value. After it is pressed out, you may pour on the remaining mass more water, then stir it about violently, and in some days after you may press out more Soye."

Note 1. This is the earliest American document seen (Dec. 2005) that uses the term "Dolichos soja" or the word "Daidsu" or "kidbean" to refer to the soybean.

Note 2. This is the earliest English-language document seen (Jan. 2006) that uses the word "Soye" to refer to soy sauce, or the term "East-India Soye" or the term "India Ketchup" to refer to soy sauce from the East Indies, probably the Dutch East Indies (today's Indonesia).

Note 3. John Ellis (ca. 1705-1776), an Irish naturalist living in London, was active in studying the plants of the American colonies and in introducing new plants to them. He was also a commercial agent, representing a number of American colonies in London. In 1769 Ellis was the commercial agent for West Florida in London. Notice that his is a list of plants "that may be useful in America." He does not say they are already growing in America.

Note 4. Ellis does not mention koji (grains or beans covered with a white mycelium of *Aspergillus* mold), and does not understand its importance in making soy sauce. Kaempfer, from whom Ellis got his instructions for preparing soy sauce, did not mention koji either in connection with soy sauce. However Kaempfer did mention *koos* (by which he probably meant koji), in the previous paragraph of his 1712 classic, in which he described how to make miso.

Note 5. This is the earliest English-language document seen (March 2006) that uses the word "Caravances" (using this or any related spelling) to refer to soybeans.

Note 6. Also included in Ellis's catalog are: Safflower, *Sesamum Orientale* [sesame seeds], locust tree or St. John's Bread *(Ceratonia Siliqua),* true opium poppy, tallow tree of China, true rhubarb, sago palm-tree, true bamboo cane, East India mango-tree, paper mulberry tree, arnotto [anatto], etc.

Note 7. This is the earliest English-language document seen (Aug. 2007) that uses the word "Sesamum" or the term

*Sesamum Orientale* to refer to sesame seeds, or that gives their scientific name; it says (p. iii): "Latin name: *Sesamum Orientale.* 2d Ed. L. Sp. [2nd edition of Linnaeus' *Species plantarum]:* p. 883. English names: Oyly grain. Observations: Propagated in the Levant [countries of the eastern Mediterranean] for oyl, which does not soon grow rancid by keeping."

Note 8. William Stork, a German botanist and member of the Royal Society (London), had this treatise published in London as a promotion of Florida as an attractive place for settlers by describing the climate, soil, flora, and fauna. He emphasized its agricultural potential for cultivating rice, cotton, silk, sugar, and other profitable crops. According to Prof. Ted Hymowitz (March 2006), Stork lived in St. Augustine, Florida, in 1765, and then went to England. Address: [England].

45. Webster (George). 1771. Classified ad: Has for sale the following articles,... *New-York Journal; or, the General Advertiser (New York City).* Aug. 1. p. 403.

• ***Summary:*** "... Fine hyson, congo, Soushong, breakfast, green and bohea teas,...

Sorted pickles: Cucumbers, beans, peppers, mushrooms, buttons. Walnuts, peaches, mangoes. Nasturtium and onions. Ketchup and India soy [sauce]. Florence oil in betties and bottles."

Note: The meaning of the word "Ketchup" is unclear. Since the word meaning "soy sauce" is pronounced that way (but also spelled in various other ways, such as ketchap or kecap) it probably refers to soy sauce made in the Dutch East Indies (especially today's Indonesia). However it could possibly refer to a similar product from southern China or elsewhere in Southeast Asia. If this Ketchup was soy sauce made in the Dutch East Indies, was it the sweet, thick type made only in Indonesia, or the salty type *(kecap asin)* made by Chinese throughout Asia? In early American newspapers, advertisements in which both the word "soy" [sauce] and the word "ketchup" appear can be grouped into three periods: (1) From 1771 to 1790–When the word "Ketchup" is mentioned, it appears without an adjective preceding it, immediately before or after the word "soy." For example: "Ketchup and India soy." "India soy and ketchup." "Catsup and India Soy" (1785). (2) From 1781 to 1783–"Ketchup" still appears without an adjective preceding it, and it is mentioned near the word "soy" but not immediately before or after it. For example: "Ketchup, French and Spanish olives, Salad oil, India soy [sauce],..." (3) 1783 on. Ketchup has an adjective preceding it, indicating that it was probably a less-expensive imitation of soy sauce imported from the Dutch East Indies. For example: Mushroom Ketchup."

This ad also appeared in the Aug. 8 (p. 405) and Aug. 15 (p. 412) issues of this newspaper. Address: Grocer, Next door to Alderman Lott's, in Leary's-Street.

46. Mason, Charlotte (Mrs.). 1775. The lady's assistant for regulating and supplying her table: Being a complete system of cookery, containing one hundred and fifty select bills of fare... 2nd ed., corrected and considerably enlarged. London: Printed for J. Walter. vi + 471 + [19] p. Index. 22 cm.

• ***Summary:*** The section on "Spices" (p. 309+) contains a short subsection titled "Soy" (p. 319) which states: "Soy [sauce] comes from the East Indies; it is made from mushrooms which grow in the woods. They are of a purplish colour, and are wrinkled on the surface like a morel. They gather them in the middle of the day, and wash them in salt and water; and then lay them in a dish, mash them with their hands, and sprinkle them with salt and beaten pepper; the next day the liquor is pressed off, and some * galangals and spices added to it; it is boiled up until it is very strong, and then some more salt is sprinkled into it. In this manner it will keep many years." Footnote: "* Galangals is a root which grows in the East Indies."

Note 1. This is the earliest document seen (Jan. 2010) which states that the main ingredients in soy [sauce] are mushrooms and salt.

Note 2. This is the earliest edition of this cookbook seen (May 2010) in which soy is mentioned. This entry on soy is found unchanged in all subsequent editions (to 1805). So the author never did realize that that main ingredient in soy [sauce] is soybeans!

Note 3. This recipe or process for making soy sauce is unlike any we have ever seen. Also, we have never heard of using mushrooms as a major ingredient in soy sauce–much less as the main ingredient. What was her source of this unusual information? The typical ingredients are soybeans, wheat or barley, salt, and water. In the two-step fermentation, the wheat is first fermented with a mold to make koji. Then the wheat koji is mixed with the other ingredients and fermented in a vat. After 1-3 years the liquid soy sauce is filtered, then pressed off. However, as early as 1680, the Chinese were adding mushrooms to soy sauce as a seasoning (see *Shixian hongmi* [Guide to the mysteries of cuisine]), and by 1765 Diderot, in his *Encyclopedia* under "Soy" noted that mushroom sauce and other seasonings were often added to soy sauce to enhance its flavor and shelf life. *Florence Lin's Chinese Vegetarian Cookbook* (1976, p. 220) stated that soy sauce comes in different flavors, such as "mushroom soy sauce."

Note 3. The term "East Indies" at this time applied loosely and vaguely to India, Indochina, and the Malay archipelago (incl. mainly today's Indonesia and Malaysia). Address: [England].

47. Le, Quy Don. 1777. Van-dai loai-ngu [Encyclopedia of Vietnam. 9 vols.] Vietnam. Reprinted in 1972-73 in Saigon in 3 vols. Reprinted in 1987 in Garden Grove, California, in 1 vol. (557 p.; in Vietnamese). [Vie]*

• ***Summary:*** In this book soybean cultivation in Vietnam is mentioned (Tran Van Lai 1993, p. 143).

Note 1. Le Quy Don (lived 1726-1784) was an 18th-century Vietnamese philosopher, poet, encyclopedist, and government official. His pseudonym was Que Duong. He was a native of Duyen Ha village in present-day Thai Binh Province. He is considered one of most outstanding and prolific savants of the Vietnamese middle ages. In 1760, Le Quy Don went to China with an embassy mission. He later served as a government official in the ministries of war, finance and public works. He also served as the rector of the National University situated in Van Mieu in Hanoi and as Director of the Bureau of Annals. Le Quy Don was responsible for a large number of encyclopedic, historical, bibliographical, and philosophical works. It is estimated that he has the largest volume of works among the old Vietnamese savants (about 40 series with hundreds of volumes). The encyclopedia *Vân Dài Loai Ngu* (9 volumes) is Vietnam's largest encyclopedia, a landmark in Vietnamese science in the middle ages (Source: Wikipedia, Aug. 2008).

According to OCLC, a microfilm of the original is in the L'École française d'Extrême-Orient, Saigon. Twenty-three libraries worldwide (incl. 12 in the USA) own the 1972-73 edition (3 vols., published in Saigon), and 18 libraries worldwide (incl. 15 in the USA) own the 1987 ed. (557 p., published in Garden Grove, California).

Note 2. This is the earliest document seen (May 2010) concerning soybeans in Vietnam, or the cultivation of soybeans in Vietnam. This document contains the earliest date seen for soybeans in Vietnam, or the cultivation of soybeans in Vietnam (1777). The source of these soybeans is unknown.

48. Mason, Charlotte (Mrs.). 1777. The lady's assistant for regulating and supplying her table, being a complete system of cookery... 3rd ed. London: J. Walter. 436 + [17] p. Index. 21 cm.
• ***Summary:*** The section on "Spices" (p. 290+) contains a short subsection titled "Soy" (p. 299) which is identical to that in the 2nd edition of 1775.

The recipe "To bake a collar of fish (p. 236-37) states: "; add to it... a few mushrooms, two spoonfuls of catchup, or half a one of soy,..."

The word "catchup" appears in this early cookbook at least 62 times, and "walnut catchup" appears at least nine times–so by 1777 catchup has become a widely-used condiment in England.

The section on "Catchup" (p. 297-99) contains the following recipes: Catchup of mushrooms. Another way. To make catchup. Catchup of walnuts. Another walnut catchup. Catchup of the shells. Oyster catchup. English catchup. Next comes the recipe for Soy (p. 299).

Catchup also appears in recipes on pages 132-33, 143, 148-49, 153, 156-58, 164, 167, 169, 171, 173, 213, 220, 237-38, 253, 255, 257, 274, 308-09, 318, 320. Catsup is not mentioned.

Interesting non-soy ingredients. The word "almonds" appears 54 times in this book and the word "almond" 31 times. Almond recipes include: Almond pudding (p. 345, 350). Almond fraze (p. 362, with "half a pound of Jordan almonds"). Almond tarts (p. 365, 366). Almond cheesecakes (p. 368). Almond custard (p. 371). Almond cake (p. 374). Almond loaves (p. 382). Almond cream (p. 414, or pastachia [pistachio] cream, to be mixed with a pint of dairy cream). Almond soup (p. 205).

Quotation on the title page, near the bottom: "The most refin'd understanding and the most exalted sentiments do not place a 'woman above the little duties of life.' Mrs. Griffith." Address: A professed housekeeper, who had upwards of thirty years experience in families of the first fashion [England].

49. Mason, Charlotte (Mrs.). 1778. The lady's assistant for regulating and supplying her table, being a complete system of cookery... 4th ed. improved, to the present time. London: Printed for J. Walter. 446 + [18] p. Index. 17 cm.
• ***Summary:*** The section on "Spices" (p. 293+) contains a short subsection titled "Soy" (p. 303) which is identical to that in the 3rd edition of 1777. Address: [England].

50. Bryant, Charles. 1783. Flora diætetica: Or history of esculent plants, both domestic and foreign. In which they are accurately described, and reduced to their Linnæan generic and specific names. With their English names annexed, and ranged under eleven general heads. London: B. White. 379 p. See p. 297, 300-01. [2 ref]
• ***Summary:*** In Chapter VII. Leguminous plants. Section I. Pods and seeds of herbaceous plants (p. 297), there is a listing for "3. Dolichos soja. East India Kidney Bean." Pages 300-01 contain full details: "Dolichos soja. Indian Kidney Bean. Lin. Sp. pl. 1023. This is a perennial and a native of India. It sends up an erect, slender, hairy stalk, to the height of about four feet, furnished with leaves much like those of the Common Kidney Bean, but more hairy underneath. The flowers are produced in erect racemi, at the bosoms of the leaves; they are of the pea-kind, of a bluish white color, and are succeeded by pendulous, hairy pods, resembling those of the Yellow Lupine, each containing three or four oval, white seeds, a little larger than peas.

"This plant is much cultivated in Japan, where it is called *Daidsu,* and where the pods supply their kitchens for various purposes; but the two principal are with a sort of butter, termed *Miso,* and a pickle, called *Sooju* or *Soy* [sauce].

"The Miso is made by boiling a certain quantity of the beans for a considerable time in water, till they become very soft, when they are repeatedly brayed with a large quantity of salt, till all is incorporated. To this mass they add a

certain preparation of rice, named Koos [probably koji; Kaempfer introduced this term in 1712], and having well blended the whole together, it is put into a wooden vessel, where in about 2 months it becomes fit for use, and serves the purposes of butter. The manner of preparing the Koos is a kind of secret business, and is in the hands of some certain people only, who sell the Koos about the streets, to those who make Miso.

"In order to prepare Sooju they take equal quantities of beans, wheat, or barley-meal, and boil them to a pulp, with common salt. As soon as this mixture is properly incorporated, it is kept in a warm place for twenty-four hours to ferment; after which the mass is put into a pot, covered with salt, and a quantity of water poured over the whole. This is suffered to stand for two or three months, they never failing to stir it well at least once a day, if twice or thrice it will be the better; then the liquor is filtered from the mass, and preserved in wooden vessels, to be used as occasions require. This liquor is excellent for pickling anything in, and the older it is the better."

Note 1. Bryant's account is largely based on that of Engelbert Kaempfer in his book *Amoenitatum Exoticarum*, written in Japan in 1690-92, and published in 1712. Bryant's book has an excellent, extensive index. It is the earliest English-language document seen (May 2006) that contains a detailed botanical description of the soybean.

Note 2. This is the earliest document seen (July 2006) concerning soybeans (but only wild perennial relatives of soybeans) in India; cultivated soybeans have not yet been reported.

Note 3. This is the earliest English-language document seen (April 2009) that uses the term "East India Kidney Bean" (singular or plural, regardless of capitalization or hyphenation) to refer to the soybean.

Note 4. This is the earliest English-language document seen (March 2009) that uses the term "a sort of butter" to refer to miso.

Also discusses: Several species of edible seaweeds [sea vegetables]: "13. *Fucus saccharinus–Sweet Fucus or Sea Belts. Lin. Sp. pl. [Species plantarum] 1630. Fucus alatus sive phafnagoides. Bauh. Pin. 364 [Caspar Bauhin. 1623. Pinax Theatri Botanici].*

*"14. Fucus palmatus–Handed Fucus. Lin. Sp. pl. 1630.*

*"15. Fucus digitatus–Fingered Fucus. Hud. Flo. Ang. 579 [William Hudson. 1762, 1798. Flora Anglica]. Fucus arboreus polyschides edulis. Bauh. Pin.*

*"16. Fucus esculentus–Edible Fucus Hud. Flo. Ang. 578* (p. 90-91, 100-01).

"39. *Ulva lactuca* or Green laver. Lin. Sp. pl. 1632. *Muscus marinus lactucæ similis. Bauh. Pin. 364* (p. 117-18).

*Amaranthus oleraceus* or Esculent Amaranth from India (p. 119). *Arachis hypogæa* or American Ground Nut [Peanut] (p. 298-99). *Cicer arietinum* or Chich Pea [Chick Pea] (p. 299; it "grows naturally among the corn in Spain and Italy, and it is much cultivated in these places for the table... It is much cultivated in Barbary [the Mediterranean coast of north Africa], by the name of *Gravances*, and is counted one of their best sorts of pulse"). *Ervum lens* or Lentil (p. 301-02; it "is a common weed in the cornfields of France... *Lentils* are a strong, flatulent food, very hard of digestion, and therefore seldom used now but to boil in soups, in order to thicken them"). *Lotus tetragonolobus* or Square-podded Pea [Winged Bean]. Lotus ruber, siliqua angulosa Bauh. Pin. 332 (p. 302-03). *Lupinus albus* or White Lupine (p. 303-04). *Ceratonia siliqua* or Carob tree (St. John's bread, p. 309-10). Coffea Arabica or Arabian coffee (p. 311). Coffea occidentalis or American coffee (p. 311-12). *Coix lacryma Jobi* or Job's tears (p. 332). *Polygonum fagopyrum* or Buck Wheat (p. 343). Ginkgo or Maiden-hair tree (p. 377-78). Bread fruit tree (378-79). Some of these are described in detail in separate records.

Note 5. This is the earliest Western document seen (Jan. 2005) that discusses sea vegetables (p. 117-18).

Note 6. This is the earliest document seen (June 2006) that mentions *Coix lacryma Jobi* or Job's tears.

Note 7. This is the earliest English-language document seen (June 2008) that gives a scientific name for lentils *(Ervum lens)*.

Note 8. This is the earliest English-language document seen (June 2008) that mentions the chick pea (which it calls "Chich Pea") or gives its scientific name *(Cicer arietinum)*.

Near the front of the book, a section titled "Terms explained" (xiii-xvi) is a glossary that gives concise definitions of the following botanical terms: Annual, biennial, perennial, sessile, serrated, crenated, pinnated or winged, peduncle, spike, spicula, panicle, spadix, racemus, umbel, calyx, catkin, petal, glume, arista or awn, floret, germen or seed bud, pericarpum, capsule, stamina, styles, stigma, summit. Address: Norwich, England.

51. Long's (Joshua). 1785. Classified ad: Just arrived, a Parcel of fine French Pomatums, hard and soft... *Times (London).* April 28. p. 1, col. 4.

• ***Summary:*** "... also West India Pickles of all Sorts; the same from the East Indies, as mangoes, Limes, Pickalilly, and Mountain cabbage; Lemon Pickle, Lime Juice, Lime Rob, &c... Vermicelli and Maccaroni [Macaroni], Lock Soy, &c. real Japan Soy [sauce], Kian Pepper [Cayenne], and real East India Currie Powder."

"N.B. An exceeding fine Parcel of real cold drawn Castor Oil."

Note 1. This is the earliest document seen (Jan. 2009) that uses the term "Lock Soy." Notice that in this list of items advertised, "Lock Soy" comes immediately after "Vermicelli and Macaroni." Most early publications that describe "Lock Soy," starting with *A Voyage to Cochinchina, in the Years 1792 and 1793*, by John Barrow

(published 1806) state that it is type of rice vermicelli; made in today's south central Vietnam (around Da Nang), it is opaque.

Letter (e-mail) from Andrea Nguyen, Vietnamese-born food writer from Santa Cruz, California. 2010. May 4. Lock Soy could well be Soi Loc–a type of noodle made from tapioca in the area of Da Nang, Vietnam. Squiggly and chewy, it resembles worms. Soy is a misspelling of *soi,* which means "strands." Loc refers to "tapioca." If this explanation is correct, it used mostly with sweets and does not contain any soy ingredients.

As of Feb. 2007, the term "Lock Soy" appears in this database nine times from 1785 to 1911.

Note 2. This is also the earliest document seen (Jan. 2006) that uses the term "Japan Soy," or the term "real Japan soy" to refer to soy sauce. As of Feb. 2007, the term "Japan Soy" (referring to soy sauce) appears in this database 42 times from 1785 to 1873.

Note 3. This is also the earliest document seen (Dec. 2005) in the *Times* (London) that uses the term "Soy" (with or without capitalization) to refer to soy sauce.

Pomatum is a synonym for "pomade," a perfumed ointment, especially a fragrant hair dressing. Address: No. 73, Cheapside, London.

52. Mason, Charlotte (Mrs.). 1787. The lady's assistant for regulating and supplying the table, being a complete system of cookery, &c... Sixth edition, enlarged, corrected, and improved, to the present time. London: Printed for J. Walter, at Homer's-Head, Charing Cross. [20] + 484 + [20] p. See p. 317.

• ***Summary:*** The section on "Kechup" contains a recipe titled "Soy" [sauce] (p. 317) which states: "Soy comes from the East Indies; it is made from their mushrooms, which grow in the woods. They are of a purplish colour, and are wrinkled on the surface like a morell. They gather them in the middle of the day, and wash them in salt and water; and then lay them in a dish, mash them with their hands, and sprinkle them with salt and beaten pepper; the next day the liquor is pressed off, and some * galangals and spices added to it; it is boiled up till it is very strong, and then some more salt is sprinkled into it. In this manner it will keep many years.

Footnote: * Galangals is a root which grows in the East Indies.

The word "ketchup" appears in this early cookbook at least 65 times, and "walnut ketchup" appears at least four times–so by 1787 ketchup has become a widely-used condiment in England. A section titled "Ketchup" (p. 315-17) appears just before the "Soy" recipe. There are ten recipes for home-made ketchup: Ketchup of mushrooms. Another way. To make ketchup. Ketchup of Walnuts. Another walnut ketchup. Another walnut ketchup. White ketchup. Ketchup of the shells [of walnuts] Oyster ketchup. English kechup.

Here are three of the most basic ketchup recipes given.

"To make Ketchup: Put the peel of nine Seville oranges to three pints of the best white-wine vinegar; let it stand three or four months; pound two hundred of walnuts, just before they are fit for pickling; squeeze out two quarts of juice, put it to the vinegar; tie a quarter of an ounce of cloves, the same of mace, a quarter of a pound of eschalot, in a muslin rag; put them into the liquor; in three weeks, boil it gently till near half is consumed; when cold bottle it."

"Ketchup of walnuts: Bruise a hundred or two of walnuts, just before they are fit to pickle; squeeze out the juice, let it stand all night, pour off the clear; to every quart one pound of anchovies; boil it; when the anchovies are dissolved, strain the liquor; add half a pint of red wine, a gill of vinegar, ten cloves of garlic; mace, cloves, and nutmeg, half a quarter of an ounce each, pounded; let this simmer till the garlic is tender."

"English ketchup: Take a quart of white wine vinegar, put into it ten cloves of garlic, peeled and bruised; take also a quart of white port, put it on the fire; and when it boils, put in twelve or fourteen anchovies washed and pulled to pieces; let them simmer in the wine till they are dissolved; when cold, put them to the vinegar, then take half a pint of white wine, and put into it some mace, some ginger sliced, a few cloves, a spoonful of whole pepper bruised, let them boil a little; when almost cold, slice in a whole nutmeg, and some lemon-peel, with two or three spoonfuls of horse-radish; stop it close, and stir it once or twice a day. It will soon be fit for use. It must be kept close stopped."

Note: This 6th edition was the last real edition ever published. So the author never corrected her apparently mistaken recipe for "Soy."

Interesting non-soy ingredients. The word "almonds" appears 54 times in this book and the word "almond" 31 times. Almond recipes include: Almond pudding (p. 345, 350). Almond fraze (p. 362). Almond tarts (p. 365, 366). Almond cheesecakes (p. 368). Almond custard (p. 371). Almond cake (p. 374). Almond loaves (p. 382). Almond cream (p. 414, or pastachia [pistachio] cream, to be mixed with a pint of dairy cream). Almond soup (p. 205). Address: A professed housekeeper, who had upwards of thirty years experience in families of the first fashion [England].

53. Alting, Willem Arnold. 1790. [Re: Request for provisions]. Letter to Hendrik Casper Romberg (Chief) and Petrus Theodorus Chasse, Deshima factory [Nagasaki, Kyushu, southern Japan], June 23. Handwritten, with signature. [Dut]

• ***Summary:*** In the future, we request that your honourable sirs do not send the demand for fruits that we normally claim from Japan, except for Soy [sauce] *(Soija)* and Saké *(Sackij).* [i.e., please continue to send soy and sake].

Bibliographic reference in Dutch: NA, NFJ 410, ontvangen brieven (23-6-1790). No page or folio numbers. Contemporary hand-written letter in a letter-book for the administration on Deshima.

Location: Nationaal Archief, Den Haag, De Archieven van de Nederlandse Factorij Japan (NFJ); toegangsnummer 1.04.21; inventaris nummer 410 [National Archives. Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch Factory in Japan (NFJ); access number 1.04.21; record number 285]. Address: Governor-General, and the Council, Batavia [today's Jakarta, Indonesia].

54. Governor-General and the Council. 1790. [Re: Provisions]. Letter to the Deshima factory [Nagasaki, Kyushu, southern Japan], June 23. Handwritten, with signature. [Dut]

• ***Summary:*** Batavia informs Deshima that in the future no preserved fruits [such as *umeboshi]* need to be sent to Batavia, only the soy [sauce] and sake requested. The tubs should be cleaned first and prepared to contain the sake and soy.

Location: Nationaal Archief, Den Haag, De Archieven van de Nederlandse Factorij Japan (NFJ); inventaris nummer 410 [National Archives, Prins Wilhem Alexanderhof 20, The Hague. www.nationaalarchief.nl. The Archives of the Dutch Factory in Japan (NFJ); record number 410]. Address: Batavia [today's Jakarta, Indonesia].

55. Lamarck, Jean Baptiste... de. 1790. Dictionnaire encyclopédique méthodique. Botanique. Vol. 2. Dolic du Japon, Dolichos soja Lin. [Systematic and encyclopedic dictionary. Botany. Vol. 2. The Soybean, Dolichos soja]. Paris: Chez Laporte, Imprimeur-Libraire. 774 p. See p. 299. [1 ref. Fre]

• ***Summary:*** Plants are listed by French names. The author lists the soybean under Dolic. as follows: "28. Dolic du Japon, *Dolichos soja. Lin. Dolichos caule erecto flexuos, racemis axillaribus eredis, leguminibus pendulis hispidis subdispermis.* Lin. Thunb. Fl. Jap. 282.

*"Phaseolus erectus, siliquis Lupini, fructu pisi majoris candido.* Kæmpf. Amoen Exot. 837. t. 838. Japonicè; daidsu s. mame. Phaseolus Japonicus. Raj. Suppl. 438. nº. 28 [John Ray. 1704. *Historia plantarum. Vol. 3. Supplementum.* See p. 438].

The original French reads: "Sa tige est droite, haute d'un pied & demi, striée ou cannelée dans sa partie supérieure, & abondamment chargée de poils rousseâtres. Ses feuilles sont composées de trois folioles ovales, obtuses, velues, molles, soutenues sur des pétioles communs velus & striés. Les fleurs font petites, purpurines, disposées dans les aisselles des feuilles sur des grappes droites, velues, & fort courtes. Les gousses sont longues d'un pouce & demi, pendantes, un peu comprimées, pointues, dispermes, & couvertes de poils rousseâtres fort abondans. Cette plante croît au Japon, dans les Indes orientales, & est cultivée au Jardin du Roi. Les Japonois préparent avec ses semences une sorte de bouillie qui leur tient lieu de beurre, & dont ils font une sauce fameuse, qui se sert avec les viandes rôties; ils nomment la bouillie *miso,* & la sauce *sooja* ou *soja.*"

In English, this means: "Its stalk is straight, a foot and a half high, striped or fluted in its upper part and abundantly covered with reddish or russet hairs. Its leaves are comprised of 3 oval leaflets, obtuse (rounded at the free end), hairy, soft, several leaves are borne on petioles that are hairy and striped. The flowers are small, purplish, arranged on the axils of the leaves, in straight clusters which are hairy and very short. The pods are an inch and a half long, pendant, slightly compressed (not round), pointed, dispermes, and covered with very abundant reddish hairs. This plant grows in Japan and the East Indies, and is cultivated at the Royal Garden *(Jardin du Roi).* It is an annual, and I have seen a living plant specimen. Using its seeds, the Japanese prepare a sort of paste [miso], which they use in place of butter, and that is also used to make a famous sauce, which is served with roasted meats. They call the paste *miso* and the sauce *sooja* or *soja.*

Note 1. This is the earliest (and only) French-language document seen (Jan. 2010) that uses the term *"Dolic du Japon"* (regardless of capitalization or hyphenation) to refer to the soybean.

Note 2. This is the earliest French-language document seen (Jan. 2010) that uses the term *la sauce soja* to refer to soy sauce.

Note 3. Merrill stated incorrectly that Lamarck called the soybean "Phaseolus max" following Linnaeus. Address: Former officer in the Regiment de Beaujolais, Royal Academy of Sciences.

56. Loureiro, Joao de. 1790. Flora Cochinchinensis: sistens plantas in regno Cochinchina nascentes. Tomus II. [The flora of Cochin China, setting forth the plants in the kingdom of Cochin China. Vol. 2.]. Ulyssipone [Lisbon], Portugal. p. 433-884. See p. 441-42, 522-24. 27 cm. [Lat]

• ***Summary:*** In the section titled "Diadelphia. Decandria" (p. 441-42) we read: "Sp. 13. Dolichos Soja, Dau nanh. Hoam téu [huang-tou = yellow bean]. Writing in Latin, he gives a botanical description of the plant, describes its habitat as Cochin China and China, and cites as sources Thunberg, Kaempfer, and Rumphius. Then he adds: "Uses: These seeds, having been boiled or lightly toasted, are quite acceptable to both the stomach and the palate. From them is made the famous Japanese soy sauce called Soia, which the Chinese and Cochin Chinese frequently use for cooking food and stimulating the appetite. There is also produced a white food resembling coagulated milk *(lactis coagulati)* and called Teu hu or Tau hu [tofu] by the Chinese; it is the most widely used food among them. Although it is rather

bland by itself, if the appropriate condiments are added, it becomes a food which is neither unpleasant nor unhealthy."

The author: Ioannis (Joao) de Loureiro was born in Portugal in 1715. Somewhere between 1735 and 1743 he arrived in Cochin China (today's Vietnam) as a Jesuit missionary. Living at Hué, the capital, near the sea coast, he tells us that he had no access to European medicines. So he was obliged to depend entirely on native medicinals, and by investigating them he was necessarily induced to study the local flora and to make botanical collections. Thus he developed a herbarium of nearly 1,000 species. In 1779 he went to Canton to do botanical research for 3 years, living within a factory. He left for Lisbon in 1782, and died in 1794 or 1796. He was one of the most prominent botanical collectors of the 1700s, giving rich descriptions of economical and medicinal uses.

The book: Volume 1 was first published in 1789; the set was reissued 3-4 years later edited by Willdenow, with added notes. It describes 1,257 plants (Bretschneider 1880, p. 129-46).

Note 1. This is the 2nd earliest document seen (May 2010) concerning soybeans in Vietnam, or the cultivation of soybeans in Vietnam. This document contains the 2nd earliest date seen for soybeans in Vietnam, or the cultivation of soybeans in Vietnam (1790). The source of these soybeans is unknown.

Note 2. This is the earliest Latin-language document seen (Feb. 2004) that uses the word "Teu hu" or "Tau hu" to refer to tofu.

Also discusses: *Dolichos tetragonolobus* (p. 437. Winged bean? Habitat: Cochin China and China). The genus *Arachis* (p. 522-24), with two species: *Arachis asiatica* and *Arachis africana.* He notes (p. 524) that Linnaeus calls the latter *Arachis hypogoea* [peanut]. Address: Portugal.

57. Farley, John. 1792. The London art of cookery, and housekeeper's complete assistant: On a new plan... 7th ed. London: Printed for J. Scatcherd and J. Whitaker. vi + [26] + 467 p. See p. 271. [Eng]

• ***Summary:*** In the chapter on "Pickling," the recipe for "Soy" [sauce] states (p. 271): "This article comes from the East Indies, and is made from their mushrooms, which grow in the woods. They are of a purplish colour, and are wrinkled on the surface like a morell [morel; a type of mushroom]. They gather them in the middle of the day, and wash them in salt and water. They then lay them in a dish, mash them with their hands, and sprinkle them with salt and beaten pepper. The next day the liquor is pressed off, and some galangals (a root which grows in the East Indies) and spices added to it. It is boiled up till it be very strong, and then some more salt is sprinkled into it. In this manner it will keep many years."

In the same chapter there are also recipes for Walnut catchup and for Mushroom catchup (p. 255). The word "catchup" appears in this book on 59 different pages. Address: Principal cook at the London Tavern.

58. Loureiro, Joao de. 1793. Flora Cochinchinensis: sistens Plantas in regno Cochinchina nascentes. Vol. 2. Dolichos soja [The flora of Cochin China. Vol. 2.]. Denuo in Germania edita cum notis Caroli Ludovici Willdenow; Bernolini [Berlin], impensis. See p. 537-38. Edited by Willdenow, with added notes. Also published by the Acad. Sci. of Lisbon. [Lat]

• ***Summary:*** The first edition of this important work was published in 1790. The content of this 1793 edition concerning *Dolichos soja,* published in Berlin and edited by Willdenow, is almost identical to that of the 1790 edition. The text has been re-set to fit on the smaller pages, and some abbreviations have been written out. In the chapter titled "Diadelphia. Decandria" we find: Arachis (p. 430-31; incl. Arachis Asiatica and Arachis Africana, also called Arachis Hypogoea). Phaseolus radiatus (p. 435). Dolichos Soja (p. 537-38).

By unusual coincidence, the earliest known recorded feeding of cow's milk to a human infant (by Underwood) also occurred in 1793. Address: Portugal.

59. Thunberg, Charles Peter. 1795. Travels in Europe, Africa, and Asia, made between the years 1770 and 1779. In four volumes. Vol. IV. Containing travels in the empire of Japan, and in the islands of Java and Ceylon, together with the voyage home. 2nd. ed. London: Printed for F. and C. Rivington. xix + 310 p. See p. 37, 88, 107, 121-22, 177. Index. 21 cm. [Eng]

• ***Summary:*** In the chapter on Japanese foods, we read (p. 37): "Rice, which is here exceedingly white and well-tasted, supplies, with the Japanese, the place of bread; they eat it boiled with every kind of provisions. *Miso* soup, boiled with fish and onions, is eaten by the common people, frequently three times a day, or at each of their customary meals. *Misos* are not unlike lentils, and are small beans, gathered from the *Dolichos soja."* Note 1. The latter sentence, which is incorrect, led many subsequent early writers to believe that the seeds of the soy bean were called miso, or that miso was a type of small bean. Rather, miso is a paste made from soy beans.

In the chapter on Japanese agriculture, we read (p. 88): "Of Beans, Peas, and Lentils, many sorts are cultivated, both the larger *(Phaseoli)* and the smaller *(Dolichos).* Of *Daidsu* Beans (Dolichos *Soja)* the meal is used for dressing victuals, and the expressed juice for making Soy; as is likewise the whole Bean for the soup called *Miso,* which is a daily dish with the common people. *Atsuki* [Azuki] Beans likewise *(Phaseolus radiatus)* are ground to meal, of which small cakes are made with sugar."

Note 2. This is the 2nd earliest English-language document seen (Jan. 2005) that clearly mentions azuki beans, which it calls *Atsuki Beans.* It is also the earliest English-language document seen (March 2006) that uses the word *Atsuki* to refer to azuki beans.

Note 3. It is not clear what Thunberg means by "meal" when he says "the meal is used for dressing victuals."

In the chapter on Commerce, after discussing the tea trade, Thunberg writes (p. 107): "The *Tea Trade* is confined entirely to the inland consumption, the quantity exported amounting to little or nothing. The traffic in *Soy* [sauce], on the other hand is more considerable; and as the tea produced in this country is reckoned inferior to that of China, so the soy is much better than that which is brewed in China. For this reason, soy is not only exported to Batavia [Jakarta], in the wooden barrels in which it is made, but likewise sold from thence to Europe and to every part of the East Indies. In some places in Japan too the soy is reckoned still better than in others; but, in order to preserve the very best sort, and prevent its undergoing a fermentation, in consequence of the heat of the climate, and thus being totally spoiled, the Dutch at the Factory [at Desima / Dezima / Dejima] boil it up in iron kettles, and afterwards draw it off into bottles, which are then well corked and sealed [by applying bitumen / coal tar to the stopper]. This mode of treatment renders it stronger and preserves it better, and makes it serviceable for all kinds of sauce. The *Silk trade* is indeed in a very flourishing state in the empire..."

In the chapter titled "Residence at Dezima [1776], Previous to my Return Home," the author writes (p. 121-22): "Soy-sauce, which is every where and every day used throughout the whole empire, I might almost say in every dish, and which begins even to be made use of in Europe, is prepared from Soy Beans *(Dolichos Soja)* and salt, mixed with barley or wheat. For this purpose, they cultivate this species of bean in several places, although it grows in great plenty wild. Scarcely any kind of legumen [legume] is more copiously used than this. The seeds are served up in soups, once or twice a day all the year round, to people of distinction or otherwise, to the poor and to the rich. *Soy* is prepared in the following manner: The beans are boiled till they become rather soft; afterwards an equal quantity of pounded barley or wheat is added. These ingredients being mixed together, are set in a warm place, and covered up for four and twenty hours, that they may ferment. An equal quantity of salt is then added to the mixture, and twice and a half as much water is poured upon it. After it has been mixed in this manner in an earthen vessel, it must stand well covered two or three whole months together, during which period it is necessary however at first for it to be stirred about several times in the day for several days together. The liquor is then pressed and strained off, and kept in wooden vessels. Some provinces furnish better soy than others; but exclusively of this, it grows better and clearer through age. Its colour is invariably brown, and its chief excellence consists in the agreeable salt taste which it possesses."

While in Colombo, Ceylon, in 1777 the author stated that "the *Dolichos pruriens* grew here tolerably common, with its hairy pods, the hairs of which attaching themselves to the hands, occasion much itching, which is allayed by oil, or decoction of rice, and are celebrated as a Vermifuge." Note 4. This plant appears in the index as "Dolichos Soja."

Note 5. This is the earliest English-language document seen (March 2009) that contains the term "Miso soup."

Note 6. On the title page, the author's name is given as Carl Peter Thunberg, rather than Karl Peter. Of the four volumes, only vol. IV bears a date, which is 1795. The translator's name is not given, not even in the "Translator's preface" nor in any record on WorldCat / OCLC online bibliographic database. The original text was written in 1776. Yule & Burnell (1886, p. 651, and 1903, p. 859) state: "1776. An elaborate account of the preparation of Soy is given in *Thunberg's Travels,* E.T., [vol.] iv. 121-122;"

Note 7. This is the earliest English-language document seen (Feb. 2008) that contains the word "Soy Beans" (or "Soy-Beans") (p. 121-22).

Note 8. This is the earliest English-language document seen (Jan. 2006) that contains the term "soy-sauce" (or "soy sauce"). The *Oxford English Dictionary* says (incorrectly): "1818 Todd (transl. Thunberg), Soy-sauce is prepared from soy-beans *(dolichos soja)* and salt, mixed with barley or wheat."

Note 9. Lewis and Murakami (1923, p. 223) state: "The third English edition of Charles Peter Thunberg's *Travels* (London 1796) contains an English-Japanese vocabulary of approximately 1,500 words; this was probably the first English-Japanese vocabulary ever published. It seems to have been unknown to our author [Ranald MacDonald] and his scholars." Address: Prof. of Botany, Univ. of Upsal [Uppsala], Sweden.

60. Thunberg, Karl Peter. 1796. Voyages de C.P. Thunberg. Tome second [Voyages of C.P. Thunberg. Vol. 2]. Paris: Benoit Dandre. iv + 544 p. See p. 3, 4, 145, 266-68. [Fre]
• ***Summary:*** An early traveler to East Asia who mentioned soyfoods was the Swedish doctor and prof. of botany at the Univ. of Uppsala, Carl P. Thunberg. In Chapter 20 titled "Japanese Foods" he states (p. 267-68): "Three times a day, with each meal, the people eat miso soup prepared with fish and leeks. These miso [he apparently thought miso was the name of a legume; see Thunberg 1796 in English] closely resemble lentils. They are the small dolic beans of Japan *(ce sont de petites fèves de* dolic *du Japon).**" (Footnote: * *"Dolichos soja.* Lam. Diction. [Lamarck 1790. Dictionary] No. 28)."

"Miso or soy sauce *(Le miso ou la sauce de soya)* constitute the principal food of the Japanese. People of all levels, great or small, rich or poor, eat them several times a

day year-round. Here is how they are prepared. The beans are cooked until they are just soft, then they are mixed with an equal quantity of barley or wheat, and the mixture is allowed to ferment for 24 hours in a warm place. Now an equal quantity of salt and 2½ times the amount of water. The mixture is put in an earthen pot, which is well closed and left for 2½ months; it is stirred during the initial days. After the necessary time the liquid is pressed out and stored in wooden kegs. The inhabitants of certain provinces make better 'soya' than those in others. Moreover, the longer it ages, the tastier and clearer it becomes. It is always brown and its principal flavor is a pleasant saltiness. The Japanese also eat fish, boiled or fried in oil" (p. 267-68).

"The tea of Japan is inferior to that of China. However, Japanese 'soya' [soy sauce] is preferable to that of the Chinese. It is shipped in numerous vats to Batavia [today's Jakarta, Indonesia], India, and Europe. The Dutch have found a way of protecting it from the effects of heat and of preserving the fermentation. They boil it in an iron pot, funnel it into bottles, and seal the mouths with pitch. This liquid retains all its 'force' and can be mixed with all other sauces." Note: All this took place long before Appert's invention of canning in 1809 and Pasteur's invention of pasteurization in 1862. In fact pasteurization had been practiced in Japan for 200 to 300 years before this time.

In Chapter 23, "The State of Agriculture in Japan," the author notes (p. 291): The Japanese plant a great deal of rapeseed, and the seed furnishes an excellent oil for lamps. In Japanese, the plant is named *na tanne* and the oil *na tanne abra* or *na tanne no abra* (sic, *natane abura).* "Soy flour *(La farine des fèves de daidsou* (Footnote: *Dolichos soïa))* is used in various dishes. The liquid that is pressed out is used to make soy sauce *(du soya).* The roots are put in a soup named *miso,* which the people use daily for nourishment. Small cakes are also made with the flour of azuki beans *(la farine de haricots d'atsouki* (Footnote: *Phaseolus radiatus))* mixed with sugar." Note 1. This is the earliest French-language document seen (Jan. 2005) that mentions azuki beans, which it calls *haricots d'atsouki.*

Pages 314-15 state: "Their soy sauce *(sauce de soya),* which has been introduced by many Europe countries, is made with soybeans *(se fait avec des fèves-soya* (Footnote: *Dolichos soya)),* barley or wheat, and salt. Although these beans come spontaneously and abundantly in many places, the consumption which they make of this flour causes them to take particular care with the plant's cultivation."

Note 2. This is the earliest French-language document seen (Jan. 2010) that uses the term *sauce de soya* to refer to soy sauce. Address: France.

61. Beckmann, Professor [Johann?]. 1798. Account of the methods employed in Japan and China to prepare soy, with some observations on the bean from which it is produced. *Philosophical Magazine (The) (London)* 1:342-45. Sept. [4 ref]

• ***Summary:*** "This article [soy sauce], which is a brown saline liquor, imported to Europe from the East Indies, is employed for seasoning various kinds of dishes, and improving the taste of different sauces. It is brought from Japan in small wooden vessels, and also from China and other parts of India in glass flasks, several of which are packed together in a wooden box. The use of it has been long general in the East Indies; where it is placed on the table at each meal, instead of salt, for the purpose of dipping in it flesh, fish, and other kinds of food.

"The Japanese are said to be the inventors of this article; and, at present, their soy is preferred to any otber; though it is asserted by connoisseurs that this preference arises more from the price than the goodness. In my opinion, it was first introduced in the European commerce in the present century; for it is not to be found in the old catalogues of goods; in Saavary's or Ludovici's dictionaries, nor in the old books on cookery. The first account of the method of preparing it after the Japanese manner was published by Kempfer [Kaempfer].

"Before I give a description of this method, it may not be improper to inform the reader that the people in India, instead of our common kidney beans, cultivate and use as food another species of a familiar kind, called in botany *dolichos,* and which comprehends several species. Among these there is one called *dolichos soya.* The plant is all over rough; and its weak stem rises to the height of a man. Its flowers, which are small, scarcely appear above the calyx, and are a blueish or almost violet color. The rough husks contain for the most part only two seeds, which in form, size and taste differ very little from our garden pease, except that they are flatted, shaped somewhat like an egg, and have a black speck at the place where they begin to germinate*. (Footnote: * *Hilum fuscum.* The first description and figure of this plant was given by Kempfer in his *Amoenitat. exot.* p. 837, 838. Both these, however, were improved and rendered more complete by Bergius in *Abhandlungen der Schwedisch. Akad.* xxvi. p. 281. The latest descriptions are those of Thunberg in his *Flora Japonica,* p. 282.; and Jacquin in *Collectanea ad botanicam et hist. nat.* vol. i. p. 46).

"These seeds form the principal component part of soy. In Japan they are first boiled, and then mixed with the same quantity of barley or wheat meal (the latter is for the purpose of giving the soy a darker colour); and the mixture, being covered up, is deposited for twenty-four hours in a warm place, where it ferments. The same quantity of common salt, with the like quantity and half as much water, is thrown over it; and the whole mass, for the space of two or three months, is stirred round daily with a chocolate stick, and closely covered immediately after. At the expiration of that period it is strained or squeezed through a

linen cloth, and the liquor, which is preserved in wooden vessels, becomes always clearer and better the longer it is kept. The mass which remains is again subjected to a like process by having water poured over it, and, being stirred round for some days, as before, is then strained.

"Of the preparation in China the following account has been given by Eckberg [sic, Ekeberg or Eckeberg], a Swede:" Beckmann then translates the last half of Ekeberg's 1764 Swedish-language article titled "Om Chinesiska Soyan" (On Chinese Soy Sauce), which see.

"From what has been above said, it may be readily perceived that the preparation of soy in Europe would be attended with no difficulty if it were possible to cultivate the beans. Bergius, however, gives his countrymen little hope that this can be done; and chiefly for this reason, that the plant blows so late in green-houses, that the summer is gone before the fruit can ripen. But this is often the case with exotics which are reared by our gardeners in hot-houses. As they only begin to blow when their nourishment decreases and occasions a stoppage of their growth, the same thing may happen too late in too fertile a soil, or when they have a superfluity of nourishment. On the other hand, when they are transplanted into soil somewhat poorer, and into an open place where they have less shelter, they do not grow so quick and so long; but they blow earlier. And hence it happens, that many exotics planted in the open air produce ripe seeds, which could never be obtained from them while they were preserved as curiosities and favourites of the gardener in green-houses. I consider it, therefore, as an experiment worth making, to plant these beans in the open fields; and I am inclined to think that in many summers they would produce ripe seeds, especially as Jacquin says expressly that they throve well at Vienna [Austria] in the open air.

"Should my conjecture, however, be not realised, this would not, at any rate, be the case with that of Bergius, who is of opinion that a kind of soy might be obtained from our peas and beans by the same or a similar process; but indeed it would have this great fault, that it would be too cheap, and too soon become common."

Note 1. The author is probably the German Johann Beckmann (lived 1739-1811). He spoke English, taught mathematics, physics, and natural history at the Lutheran St. Peter's Gymnasium in St. Petersburg, and is best known as the author of that fascinating bedside book *The History of Inventions*. A trained botanist and student of Linnaeus, he first visited Linnaeus in 1765 (See W. Blunt. 1971. p. 166, 172, 174, 175). He also wrote a book on botany, and on the history of inventions and discoveries.

Note 2. This is an excellent, accurate description of both soy sauce and the soybean. It is difficult to tell whether it is compiled from other writings (most likely, see footnote), or whether Beckmann visited India and described (in the third paragraph above) the soybeans that he actually saw growing there. If the latter were true, this would be the earliest document seen (July 2006) concerning soybeans in India, or the cultivation of soybeans in India.

Note 3. This is the second earliest English-language publication or article seen with the word "soy" (or any variation of soy) in the title. Note that this "soy" refers to soy sauce. Address: England.

62. Communications to the Board of Agriculture; on subjects relative to the husbandry and internal improvement of the country. Vol. II. 1800. London: Board of Agriculture. Printed by W. Bulmer. 501 p. See p. 193-96. Illust.
• ***Summary:*** Section IX (p. 193-94) is titled "Copy of a letter from Mr. Campbell, at Fort Marlborough, with an account of seeds sent by him, by the *Queen* Indiaman."

He writes: "Those which go by the Queen are, the cordage palm; the caminium; the copaya, or oil-nut of the Malays; the teak; the soy bean of Japan; and the catupa, a delicate fruit lately discovered." "The adjoined catalogue contains short notices and references to works in which these plants are amply treated of."

He encourages the Board to distribute and test these seeds worldwide, and not only to British colonies. The letter is signed Charles Campbell, Fort Marlborough, 17 May 1798.

On pages 194-96 is an addendum titled "Account of seeds sent in the *Queen* Indiaman." On p. 196 we read:

"*Dolichos Soja*, the Soy Bean.

"This pulse is exotic to the West coast [of Sumatra], and seems to have been imported by the Chinese colonists.

"It is little cultivated here; and never, I believe, with a view to prepare the condiment from it.

"Much of the sauce sold in Europe, under the name of Japan Soy, is manufactured at Batavia [today's Jakarta], by a very simple process. Satisfactory information will, I believe, be found respecting this, in Kempfer's *Amoenitates* [sic, Kaempfer's *Amoenitatum exoticarum...* (1712)], a work I regret the want of.

Note 1. This is the earliest English-language publication seen (Aug. 2008) that contains the word "soy bean" (or "soy beans").

Note 2. Fort Marlborough was in Bengkulu, Sumatra (in today's Indonesia).

63. Mason, Charlotte (Mrs.). 1801. The lady's assistant for regulating and supplying the table: Being a complete system of cookery, &c... A new [8th] edition, enlarged, corrected, and improved, to the present time. London: J. Walter. 422 + 25 + [24] p. Index. 21 cm. *
• ***Summary:*** "Soy is made from mushrooms which grow in the woods [in the East Indies]."

64. *Monthly Review (The): Or Literary Journal, Enlarged.* 1801. Art. XI. Communications to the Board of

Agriculture; on subjects relative to the husbandry and internal improvement of the country. Vol. II. 4to. pp. 500. *1l.* 1*s.* Boards. Nichol, &c. 1800. 34:160-74.

• ***Summary:*** The section titled "Copy of a letter from Mr. Campbell, at Fort Marlborough, with an account of seeds sent by him, by the Queen Indiaman" (p. 168) states: "This paper is more calculated for a botanical than an agricultural society; and we do not perceive of what use it can be to farmers, nor how it can advance the internal improvement of our northern isle. In fact, its object is to promote the transfer of the useful trees and plants of Sumatra to our West Indian colonies, and to the continent of America. The seeds sent home by the Queen were those of the cordage palm, the caminium, the copaya, or oil-nut of the Malays, the teak, the soy bean of Japan, and the catupa, a delicate fruit lately discovered."

Note: Fort Marlborough was in Bengkulu, Sumatra (in today's Indonesia).

65. Pinkerton, John. 1802. Modern geography: A description of the empires, kingdoms, states, and colonies; with the oceans, seas, and isles; in all parts of the world: Including the most recent discoveries, and political alternations. Digested on a new plan... With numerous maps. Vol. II. London: T. Cadell Jun. and W. Davies; and T.N. Longman and O. Rees. viii + 835 p. See p. 110, 170. Maps. Index. 29 cm.

• ***Summary:*** On page 83 is a detailed map of China. In the chapter titled "China proper" (p. 83), the subsection on "Botany" states (p. 110): "Besides the multitude of vegetables that are cultivated as articles of human food, and which are probably natives of India, Japan, and the neighbouring islands, the following are found in a truly wild state in China, viz. three species of dolichos, *kidney bean;* d. sinensis, *calavanses;* d. soya from the beans of which the true Indian soy is made; and d. cultratus..."

In the section on "Japan" (p. 152-), in Chapter IV, "Natural geography," the subsection on Botany states (p. 170): "The vegetable treasures of Japan are numerous, and have been ably explored by Kæmpfer and Thunberg... There are several points of resemblance between the floras of China and Japan, and this similarity has probably been strengthened by a mutual interchange of useful vegetables; if indeed both countries have not rather derived some of their most valuable plants from Cochin-China, or the Philippine islands: the ginger, the soy bean, black pepper, sugar, cotton, and indigo, though perhaps natives of the more southern regions of Asia, are cultivated here with great success and in vast abundance." Note: Pinkerton lived 1758-1826. Address: [England].

66. Carter, Susannah. 1803. The frugal housewife: or, Complete woman cook... New York, NY: Printed and sold by G. & R. Waite. 216 p. Illust. Index. 17 cm.

• ***Summary:*** "Soy" [sauce] is used as an ingredient in the following 4 recipes: To boil skate ("serve it up with butter and mustard in one basin, and anchovy or soy sauce in another," p. 49). To boil soals [soles] ("Serve them up with anchovy sauce, and butter melted plain; or with shrimp, soy, or muscle sauce," p. 49). To boil plaice and flounders ("or butter melted with a little catchup or soy," p. 49-50). To boil a pike, or jack ("Sauce.–Anchovy, shrimp, or soy sauce; or melted butter or catchup," p. 53).

Note 1. This is the earliest English-language document seen (Jan. 2006) that contains the term "soy sauce" (without a hyphen).

The word "catchup" appears 13 times in this book; neither the word "catsup" nor the word "ketchup" ever appears. "Catchup" is never preceded by an adjective (such as "walnut catchup" or "mushroom catchup"). The amount called for is almost always 1 "spoonful" or 2 "spoonfuls." It is almost always used in a sauce or gravy for fish or meat. Alternatives listed after it (so considered less preferable or widely available) are soy sauce (once) and walnut pickle (once). Alternatives listed before it before (so considered preferable or more widely available) are soy [sauce] (once), walnut pickle (once), and walnut liquor (once). In one case it is used together with a spoonful of walnut pickle. From the above observations we can surmise that "catchup" was probably ketjap (soy sauce) from the Dutch East Indies. The word "soy" did not appear in the English name because, at this time, no Englishmen (and probably no Dutchmen or other Westerners) knew that ketjap was made from soybeans.

Note 2. This book was "first published as early as 1765 in London and Dublin (Ireland), and was first reprinted in American in 1772. One of the earliest American-printed cookbooks... it made no mention of colonial cooking or common American ingredients. It wasn't until 1803 that 'an appendix containing several new receipts adapted to the American mode of cooking' was added." This was probably added "by the American publisher to attract American readers, and to respond to the best seller of the day [strongly influenced by Carter's book], Amelia Simmons' *American Cookery* (1796),... the first cookbook authored by an American" (MSU introduction). Address: [Clerkenwell, London, England].

67. Pinkerton, John. 1804. Modern geography: A description of the empires, kingdoms, states, and colonies; with the oceans, seas, and isles; in all parts of the world: Including the most recent discoveries, and political alternations. Digested on a new plan... The article America, corrected and considerably enlarged, by Dr. Barton, of Philadelphia. With numerous maps. Vol. II. Philadelphia: John Conrad & Co.; Baltimore: M. & J. Conrad & Co.;... [ii] + 698 p. See p. 85, 130. Index. 23 cm.

• ***Summary:*** The information about soy in this book is very similar to that in the 1802 edition, although it appears on different pages. In Chapter 4, on the natural geography of China, the section on "Botany" (p. 85) states: "The following are found in a truly wild state in China, viz. three species of dolichos, *kidney bean;* D. sinensis, *calvances;* D. soya, from the beans of which the true Indian soy is made; and D. culcratus: dioscorea alata, *yam;* cucurbita sinensis, China gourd; nicotiana tabacum, tobacco; and convolvolutus battatas, *sweet potato.*

In another Chapter 4, on the natural geography of Japan, the section on "Botany" (p. 130) states: "... the ginger, the soy bean, black pepper, sugar, cotton, and indigo, though perhaps natives of the more southern regions of Asia [Cochin-China] are cultivated here [in Japan] with great success and in vast abundance."

Note 1. Pinkerton lived 1758-1826.

Note 2. This is the earliest document seen (March 2001) that mentions wild soybeans. Address: [England].

68. Mason, Charlotte (Mrs.). 1805. The lady's assistant for regulating and supplying the table, being a complete system of cookery, &c... A new [9th] edition, enlarged, corrected, and improved, to the present time. London: Printed by Thomas Gillet... iv + [16] + 422 + 26 + [20] p. Index. 22 cm. *

• ***Summary:*** "Soy is made from mushrooms which grow in the woods [in the East Indies]."

69. Barrow, John. 1806. A voyage to Cochinchina, in the years 1792 and 1793: Containing a general view of the valuable productions and the political importance of this flourishing Kingdom... To which is annexed an account of a Journey, made in the years 1801 and 1802, to the residence of the chief of the Booshuana {Botswana} Nation, being the remotest point in the interior of southern Africa...]. London: T. Cadell and W. Davies. xvii + 447 p. 28 x 22 cm.

• ***Summary:*** In the section titled "Sketch of the character and condition of the natives of Turon" "Lock-soy is mentioned."

In a discussion about the food of Cochinchina we read (p. 314-15) that rice "'is with them the grand support of existence. Of this grain they have the art of making a kind of vermicelli, usually called *Lock soy,* which is perfectly transparent, and held on that account in high estimation both in Japan and China; to the latter of which it is exported in considerable quantity. It communicates to soup a gelatinous consistence, but at the same time preserves its form and transparency, qualities which would lead one to doubt if rice be the only ingredient in its composition. The Chinese *Lock-soy* is opaque.'"

Note: This is the earliest document seen (July 2009) stating that Lock-soy is a type of dried vermicelli made from rice (rice noodles). Why is "soy" part of the food's name? Is soy an ingredient? Soy flour? What is the origin and etymology of the name?

Sir John Barrow (of England) lived 1764-1848. Address: Esq., F.R.S.

70. Farley, John. 1807. The London art of cookery, and housekeeper's complete assistant, on a new plan. Made plain and easy to the understanding of every housekeeper, cook, and servant in the kingdom... 11th ed. London: Printed for Scatcherd and Letterman; G. Wilkie and J. Robinson; W.J. and J. Richardson; Longman, Hurst, Rees, and Orme;... 368 p. 20 cm. Reprinted in 1988 by Southover Press (Lewes, East Sussex, England).

• ***Summary:*** In the section on "Pickling" is a subsection titled "Soy" [sauce] (p. 212 of 1988 reprint) which states: "This article comes from the East Indies, and is made from their mushrooms, which grow in the woods. They are of a purplish colour, and are wrinkled on the surface like a morel. They gather them in the middle of the day, and wash them in salt and water. Then they lay them in a dish, mash them with their hands, and sprinkle them with salt and beaten pepper. The next day the liquor is pressed off, and some galangals (a root grown in the East Indies) and spices are added to it. It is boiled up till it be very strong, and then some more salt is sprinkled into it. In this manner it will keep for many years."

Note: This early recipe is completely wrong; the main ingredient in soy [sauce] has always been soybeans–never mushrooms. Address: Principal Cook at the London Hotel.

71. Miller, Philip. 1807. The gardener's and botanist's dictionary: Containing the best and newest methods of cultivating and improving the kitchen, fruit, and flower garden and nursery; of performing the practical parts of agriculture; of managing vineyards, and of propagating all sorts of timber trees... The whole corrected and newly arranged..., by Thomas Martyn Vol. II. London: Printed for F.C. & J. Rivington. 2 vol. in 4. Unpaginated. 38 cm. 20 plates. [9 ref. Eng]

• ***Summary:*** The plants are arranged alphabetically in the book by genus, but not alphabetically within one genus by species. "33. Dolichos Soja: *Lin. spec.* 1023. *syst.* 659. *Reich.* 451. *fl. zeyl. n.* 534. *mat. med.* 171. *Kaempf. amoen.* t. 838. (Phaseolus). *Thunb. jap.* 282. *Lour. cochinch.* 441. *Rumph. amb.* 5. t. 140. (Cadelium). *Stems flexuose, racemes axillary, erect, legumes pendulous, hispid, containing about two seeds."*

Three pages later, under "33." is a description of the plant and its uses. "Stem round at bottom and smooth; above striated, very hirsute, a foot and more in height. Leaves petioled, hirsute: leaflets petioled, ovate, obtuse with a point, entire, the middle one on a longer petiole and larger, an inch in length: petiole striated, hirsute, a finger's length. Flowers in short, erect, hirsute racemes: subsessile, from

three to five together. Corollas purple, scarcely larger than the calyx.*

"Native of the East Indies, Ceylon, Japan, &c.

"The seeds, which are usually called *Miso* [sic] in Japan, are put into soups, and are the most common dish there, insomuch that the Japanese frequently eat them three times a day. The *Soja* [soy sauce] of the Japanese, which is preferred to the *Kitjap* of the Chinese, is prepared from these seeds, and is used in almost all their dishes, instead of common salt. The Chinese also have a favourite dish made of these seeds, called *Teu hu* or *Tau hu* [tofu], which looks like curd, and though insipid in itself, yet with proper seasoning as [is] agreeable and wholesome.**"

Footnotes: "*Thunb. and Linn. **Thunb. and Loureiro."

Glycine javanica: "*Java Glycine. Lin. spec.* 1024. *Reich.* 453. *Thunb. in Linn. trans.* 2. 340. *Leaves ternate; stalk villose; petioles rough-haired; bractes lanceolate minute.*

"Stem twining, as in *Phaseolus*, with yellow, reflex hairs scattered over it. Leaves of *Phaseolus*. Pedicels yellow, with close hairs. Stipules, to the petioles oval-oblong, to the peduncles lanceolate. Peduncles the length of the leaves, terminated by an ovate-oblong, close spike of nodding violet-coloured flowers, with very minute bractes between them.–Native of the East-Indies*; and near Nagasaki in Japan, where it is called *Fajo Mame,* and flowers in september and october [sic].**" Footnotes: "*Linn spec. **Thunberg."

On the title page, the subtitle reads: "To which are now first added a complete enumeration and description of all plants hitherto known, with their generic and specific characters, places of growth, times of flowering, and uses both medicinal and economical. The whole corrected and newly arranged, with the addition of all the modern improvements in landscape gardening, and in the culture of trees, plants, and fruits, particularly in the various kinds of hot houses and forcing frames: with plates explanatory both of them, and the principles of botany. By Thomas Martyn, B.D., F.R.S. Regius Professor of Botany in the University of Cambridge."

This elegant set of large books consists of 4 volumes, plus 2 volumes of plates. The soybean appears only in volume 2. Miller gives the most detailed botanical description of the soybean in English up to this time.

Note 1. Philip Miller was head of the famous Chelsea Physic [botanic] Garden in England. Among his many students was William Aiton, who introduced the soybean to England.

Note 2. This is the earliest English-language document seen (Oct. 2004) that uses the term "twining" to describe wild perennial ancestors of the soybean.

Note 3. This is the earliest English-language document seen (Feb. 2004) that uses the word "Teu hu" (or "teu-hu"), or the word "Tau hu" (or Tau-hu") to refer to Chinese-style tofu.

Note 3. This is the earliest English-language document seen (Feb. 2004) that uses the word "curd" in connection with tofu.

Note 4. This is the earliest English-language document seen (Jan. 2004) that uses the word "leaflets" (or "leaflet") in describing the soybean plant.

Note 5. This is the earliest English-language document seen (July 2001) that uses the word "petiole" (or "petioles" or "petioled") in connection with the soybean plant. *Webster's Dictionary* defines petiole (derived from New Latin for little foot), a word first used in 1753, as "a slender stem that supports the blade of a foliage leaf," i.e., the stem of a leaf.

*Webster's Dictionary* defines stipule (derived from New Latin *stipula,* which is derived from the Latin word meaning "stalk"), a word first used in about 1793, as "either of a pair of appendages borne at the base of the leaf in many plants." Address: F.R.S., Gardener to the Worshipful Company of Apothecaries at their Botanic Garden in Chelsea [England] and a Member of the Botanic Academy at Florence.

72. Sinclair, John. 1807. The code of health and longevity: or, A concise view, of the principles calculated for the preservation of health, and the attainment of long life... 4 vols. Edinburgh, Scotland: Printed for Arch. Constable & Co... 772 + 18 p. See Vol. 1, p. 463. Illust. [30+* ref]
• ***Summary:*** Section V, titled "The seasonings, or condiments, with which various sorts of foods are usually accompanied" (p. 453+) states (p. 463): "7. There are various combinations of the condiments above detailed, with other articles, but the two principally used are known under the names of catchup and soy. The first is prepared from the juice of mushrooms, submitted to a putrefactive fermentation, and in that state, salt, vinegar, and aromatics, are added to it, when it becomes fit for use. Soy [sauce] is a preparation from seeds produced in the East Indies, submitted to fermentation in a strong solution of common salt. It possesses, therefore, a saline taste, with little aromatic flavour. Both these articles ere better calculated to please the palate, than to promote health.

"It is justly remarked, that seasonings and sauces ought not to be much indulged in by young stomachs, and strong healthy bodies, who require no spur to their appetite, nor help to digestion. But these helps should be reserved for age, deficiency of stomach, and other infirmities, otherwise that benefit and assistance will not be received from them, which might have been experienced, had the use of them been forborn when they were not necessary *.

Footnote: "* Mainwaring on the Preservation of Health, p. 63."

Note: Sir John Sinclair lived 1754-1835. Address: Sir, Bart. [baronet], Charlotte-Square, Edinburgh [Scotland].

73. Barrow, John. 1808. Reise nach Cochinchina in den Jahren 1792 und 1793: Nebst Nachrichten... [A voyage to Cochinchina, in the years 1792 and 1793: Containing a general view of the valuable productions and the political importance of this flourishing Kingdom... To which is annexed an account of a Journey, made in the years 1801 and 1802, to the residence of the chief of the Booshuana {Botswana} Nation, being the remotest point in the interior of southern Africa...]. Weimar [Germany]: Landes-Industrie-Comptoir. xlxi (i.e. xlvi) + 504 p. 20 cm. Series: Bibliothek der neuesten und wichtigsten Reisebeschreibungen zur Erweiterung der Erdkunde... By Matthias Christian Sprengel, Theophil Friedrich Ehrmann... [Ger]

• ***Summary:*** Lock-Soy is mentioned on pages 412-13. Sir John Barrow (of England) lived 1764-1848.

74. Lindner, Friedrich Ludwig. 1811. Neueste Laender-und Voelkerkunde: Ein geographisches Lesebuch fuer alle Staende. Vol. II [The newest geography and ethnology: A geographical reader for those in all walks of life. Vol. II]. Weimar [Germany]: The Geographical Institute. [Ger]

• ***Summary:*** This seems to be a German translation of *A Voyage to Cochinchina, in the Years 1792 and 1793,* by John Barrow Esq. Lock-Soy is mentioned on page 543.

75. Aiton, William Townsend. 1812. Hortus Kewensis; or, A catalog of the plants cultivated in the Royal Botanic Garden at Kew. Vol. IV. 2nd ed. enlarged. London: Longman, Hurst, Rees, Orme, and Brown. 522 p. See p. 295. [5 ref. Eng; Lat]

• ***Summary:*** In the section on Diadelphia Decandria: "18. Dolichos Soja. caule erecto flexuoso, racemis axillaribus erectis, leguminibus pendulis hispidis subdispermis. *Willden. sp. pl.* 3. p. 1051. *Jacq. ic.* 1. t. 145. Soy Dolichos. Nat. of the East Indies. Introd. 1790, by Walter Ewer, Esq. Fl. July and August. S. Annual" [Summer Annual].

States that Dolichos Soja [the soybean], a native of the East Indies, was introduced to England in 1790 by Walter Ewer, Esq. It flowers in July and August.

Note 1. This is the earliest document seen (Feb. 2001) concerning soybeans in England, or the cultivation of soybeans in England. This document contains the earliest date seen for soybeans in England, or the cultivation of soybeans in England (1790). The source of these soybeans is unclear, though Walter Ewer may have obtained them in or from the "East Indies." Used loosely and vaguely, the term "East Indies" may refer to India, Indochina, and the Malay Archipelago.

Note 2. In this book, Diadelphia starts on page 238, the subcategory Decandria starts on page 248, and the genus *Phaseolus* starts on page 288.

Note 3. Letter (e-mail) from Prof. Ted Hymowitz. 2008. Sept. 6. He believes that Walter Ewer was deputy governor of the East India company's possessions in today's Indonesia. Address: Gardener to His Majesty.

76. Milburn, William. 1813. Oriental commerce; containing a geographical description of the principal places in the East Indies, China, and Japan, with their produce, manufactures, and trade... Vol. II. London: Black, Parry & Co. See p. 519-20.

• ***Summary:*** The subtitle continues "... including the coasting or country trade from port to port; also the rise and progress of the trade of the various European nations with the Eastern world, particularly that of the East India Company, from the discovery of the passage round the Cape of Good Hope to the present period; with an account of the company's establishments, revenues, debts, assets, &c at home and abroad. Deduced from authentic documents, and founded upon practical experience obtained in the course of seven voyages to India and China."

"Soy [sauce]: Is prepared in China and Japan, from a particular species of bean, in the following manner:–the beans are boiled till they become rather soft, to which an equal quantity of wheat or barley is added, and set in a warm place to ferment; the same quantity of salt is then put to the mixture, and three parts as much water added to it. After being properly mixed, it is left to stand, well covered, for two or three months; it is then pressed, and strained off, and kept in wooden vessels. Some places produce better soy [sauce] than others, but exclusively of that, it grows better and clearer through age; its colour is invariably brown. Japan soy is esteemed superior to the Chinese, and is an article of trade from thence to Batavia [Jakarta]. The Dutch, in order to preserve the best sort, and prevent its fermenting, boil it up, and afterwards draw it off into bottles, which are then well corked and sealed.

"Soy should be chosen of a good flavour, not too salt or too sweet, of a good thick consistence, of a dark brown colour and clear; when shaken in a glass, it should leave a coat on the surface, of a bright yellowish brown colour; if it does not, it is an inferior kind, and should be rejected." Note: This is the earliest document seen (Aug. 2003) which states that soy can be shaken in a glass to determine its quality. It is also the first which states that good-quality soy, "when shaken in a glass," "should leave a coat on the surface, of a bright yellowish brown colour..."

"The following are the quantities imported and sold at the East India sales, in the years 1804 to 1808 inclusive, together with sale amount and average price per gallon" [see table below]:

1804: None.

1805: 443 gallons worth £317 (March Sale) and 1125 gallons worth £642 (September Sale), for a total of 1568 gallons worth £959 (average 12 shillings 5 pence per gallon).

1806: 807 gallons worth £477 (September Sale); (average 11 shillings 10 pence per gallon).

1807: None.

1808: 2148 gallons worth £2022 (September Sale); (average 18 shillings 10 pence per gallon).

252 gallons of soy are allowed to a ton. Note: Total sold during the 5 years: 4523 gallons worth £3458. Address: Of the Honourable East India Company's Service.

77. Roxburgh, William. 1814. Hortus bengalensis, or a catalogue of the plants growing in the Honourable East India Company's botanic garden at Calcutta. Serampore: Printed at the Mission Press. v + xii + 104 p. See p. 55. 23 cm. Facsimile edition was reprinted in 1980 by Boerhaave Press, Leiden, Holland.

• ***Summary:*** In the section on Diadelphia Decandria is a listing for Dolichos Soja. It is a native of China, donated by Dr. C. Campbell. The symbols for duration and habit, explained on pages iv-v, indicate that the plant is an annual, of erect habit. The time of flowering is the cool season, from the beginning of November to the end of February. The ripening of the seed and maturation take place during the same season. Footnote 23 (p. 55) explains that in the garden are growing "Two varieties, one with white seed and yellow flowers, the other black seed and purple flowers."

Note 1. In 1832 Roxburgh stated in his *Flora Indica; or, Descriptions of Indian Plants* that *Dolichos Soja* was "Reared in the Honourable Company's Botanic Garden, from seeds received from the Moluccas in 1798."

Note 2. This is the earliest document seen (July 2006) that clearly refers to soybeans in India, or the cultivation of soybeans in India.

Note 3. This is the earliest English-language document seen (Feb. 2007) that clearly refers to black soybeans.

Note 4. According to Stafleu & Cowan. 1976-88. *Taxonomic Literature* Roxburgh (lived 1751-1815) was a British (Scottish) botanist and physician. He received his M.D. degree from Edinburgh, Scotland, in 1876. He was with the East India Company in the Madras Medical Service from 1776 to 1780, superintendent of the Samalkot (Samul Cattah) botanical garden from 1781 to 1793, and superintendent of the Calcutta botanic garden from 1793 to 1813. He was in London 1806-1813. He traveled to the Cape of Good Hope in 1798, 1799, 1813-14, and to St. Helena in 1814. He died in Edinburgh in 1815. His major publication, *Flora Indica* was published by his sons James Roxburgh (1802-1884) and Bruce R. Roxburgh (1797-1861).

Note 5. Also on page 55, Roxburgh states that *Dolichos tetragonolobus* [winged bean] was introduced in 1799 to the Botanic Garden of Shibpur, Calcutta (which at the time was 12 years old). Footnote 10 states: "Cultivated for our table." He gives no native name or place of origin. Address: London, and Superintendent of the Calcutta Botanic Garden, India (1793-1813).

78. Serat Centini [The Book of Centini (manuscript)]. 1815. In: Codex Orientalis 1814 of the Leiden University Library. Vol. 1. See p. 295. [Mal]

• ***Summary:*** "Serat" means book or work or tale. "Centini / Centhini" refers to a character in the book. From a letter dated 16 Nov. 1984 from Dr. S.O. Robson, expert in Javanese languages at the State University of Leiden in the Netherlands: *The Serat Centini* is a classic work of modern Javanese literature, written in verse. It tells of the adventures of "students" wandering in the Javanese countryside in search of truth, and in the course of this story, information (often very detailed) is given on many different subjects–not just religion but also various aspects of Javanese culture and life. Hence the term "encyclopedic" is applied to this work. (see next page)

On one page the word "tempeh" appears.

The word for "tempeh" can be seen in detail.

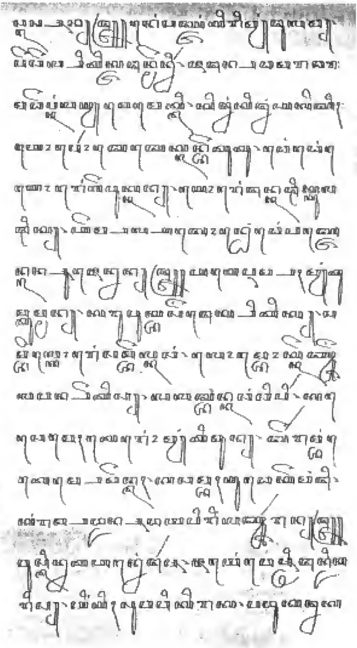
The Serat Centini as we now have it was probably written around A.D. 1815 on the orders of Sunan Sugih, then Crown Prince and later Pakubuwana V of Surakarta. The main author was probably Rangga Sutrasna, although he was probably assisted by others; there are various traditions on this point. The work as a whole, however, is quite possibly based on much older sources. The story is *set* in the reign of Sultan Agung (1613-1645), and the descriptions purport to be of that time.

Codex Orientalis of the Leiden University Library bears the date 1846; it originated from Surakarta and consists of five volumes. The text was published in the *Verhandelingen van het Koninklijk Bataviaasch Genootschap voor Kunsten en Wetenschappen* (Batavia, 1912-15), and a summary of contents was published by Th. Pigeaud (VBG LXXII, 2, Bandung 1933). For further information, see his short introduction.

The passage quoted here is from Canto 31, stanzas 211-213, on page 82 of volume I-II of the printed version referred to above. It occurs in a description of the prosperous village Wanamarta, in the context of a reception and meal given for Jayèngwèsti. This involves all sorts of food. The line mentioning témpé reads: "onions (or garlic) and uncooked témpé."

Note 1. This is the earliest document seen (Feb. 2004), worldwide, that mentions tempeh.

Note 2. This document was first cited for its early reference to tempeh in *The Book of Tempeh,* 2nd ed., by



Shurtleff and Aoyagi (1985, p. 145, 169).

79. Raffles, Thomas Stamford. 1817. The history of Java. 2 vols. London: Black, Parbury & Allen. Vol. 1, xlviii + 479 p. Vol. 2, cclx + 291 p. See vol. I, p. 98. Oxford in Asia Historical Reprints, Oxford Univ. Press, 1978.

• ***Summary:*** In the section titled "Cooking" (Vol. I, p. 98) we read: "The Chinese prepare from the *gédelé [kédelé* = soybean] a species of soy [soy sauce], somewhat inferior to that brought from Japan.

A passage on rice cultivation (Vol. I, p. 116-17) states: "Besides the annual crop of rice which is raised on the *sáwah* lands, a variety of plants are raised upon them as a second or light crop within the same year. Among these are several species of *káchang* or bean... Among the most important are... *kédéle* [soybeans]..." "Together with rice are deposited the seeds of other vegetables, which arrive to maturity at different periods, chiefly after the rice harvest. The most common and useful among these is cotton... Next to this are various leguminous and other plants, which do not interfere with rice. No less than six or eight kinds of vegetables are sometimes in this manner seen to shoot up promiscuously in a single field."

The section on Java's "Oil-giving plants" (p. 123) states: "Of the oil-giving plants there are many. The *káchang góring* of the Malay countries, or, as it is indifferently termed by the Javans, *káchang chína, pénden,* or *tána* [peanut] is cultivated almost exclusively for the purpose of obtaining its oil... It is never employed as an article of food by itself; but what remains of it after the oil is expressed, forms an ingredient for the seasoning of rice... The oil is obtained by grinding the seeds between two grooved cylinders, and then separating it either by expression or boiling. The former is chiefly used by the Chinese, and yields as a refuse the oil-cakes, which I formerly observed were employed as manure in some of the gardens near Batavia."

Raffles (lived 1781-1826) was lieutenant-governor of Java from 1811 to 1816. He acquired and founded Singapore on 6 Feb. 1819. A 2nd edition was published in 1830 in London by J. Murray. Address: Lieutenant-Governor of Java.

80. Rees, Abraham. ed. 1819. The cyclopedia; or, universal dictionary of arts, sciences, and literature: Dolichos soja. London: Longman, Hurst, Rees, Orme & Brown. See vol. XII. Dol. N.P. (Unpaginated). [2 ref. Eng]

• ***Summary:*** "Of the upright kinds [of Dolichos], *D. soja,* Linn. Sp. Pl. 1023. Jacq. Ic. Rar. t. 145, a native of Japan and the East Indies, is famous for its seeds, a great article of food in China and Japan. They are made into a kind of jelly or curd [tofu], esteemed very nutritious, and rendered palatable by adventitious seasoning; or they are prepared with salt, so as to produce the liquid well known at our tables by the name of Soy [sauce]. The flowers of this species are small and unornamental."

First cited by Hymowitz. 1986. Bibliography of early, previously uncited publications on soybeans in the United States. 2 p. Unpublished.

Note 1. This is the earliest English-language document seen (Feb. 2004) that mentions tofu in connection with Japan.

Note 2. This is the earliest English-language document seen (Feb. 2004) that uses the word "jelly" in connection with tofu.

Note 3. This is the earliest English-language document seen (Nov. 2002) that uses the term "upright" to describe the soybean plant.

Note 4. This is the earliest English-language document seen (Dec. 2003) with the word "nutritious" (or "nutrition," "nutritional," "nutritive," or "nutrients") in the title that also mentions soy.

Note 5. Sylvester Graham is said to have obtained much of his information about milling, bread baking, and early diets from this encyclopedia (McCance & Widdowson 1956, p. 49).

81. Crawfurd, John. 1820. History of the Indian Archipelago. Containing an account of the manners, arts, languages, religions, institutions, and commerce of its inhabitants. 3 vols. Edinburgh: Printed for Archibald Constable and Co.; London: Hurst, Robinson, and C. See vol. 1, p. 197-98, 370. Vol. 3, p. 319.

• ***Summary:*** In Vol. 1, the chapter on "Useful arts" states (p. 197): "This preparation, called by the Malays *blachang,* and by the Javanese *trasi,* is a mass composed of small fish, chiefly prawns, which has been fermented, and then dried in the sun. This fetid preparation, so nauseous to a stranger, is the universal sauce of the Indian islanders, more general than soy [sauce] with the Japanese. No food is deemed palatable without it."

Continuing on p. 198: Dampier describes it with perfect accuracy, as follows: "Baluchaun is a composition of a strong savour, yet a very delightsom dish to the natives of this country. To make it, they throw the mixture of shrimps and small fish into a sort of weak pickle, made with salt and water, and put it into a tight earthen vessel or jar. The pickle being thus weak, it keeps not the fish firm and hard, neither is it probably so designed, for the fish are never gutted. Therefore, in a short time they turn all to a mash in the vessel; and when they have lain thus a good while, so that the fish is reduced to a pap, they then draw off the liquor into fresh jars, and preserve it for use. The masht fish that remains behind is called balachaun, and the liquor poured off is called nuke-mum [nuoc-mam]. The poor people eat the balachaun with their rice. 'Tis rank scented, yet the taste is not altogether unpleasant, but rather savory, after one is a little used to it. The nuke-mum is of a pale brown colour,

inclining to grey, and pretty clear. It is also very savory, and used as a good sauce for fowls, not only by the natives, but also by many Europeans, who esteem it equal with soy."* (Footnote: *"Dampier's Voyages, Vol. II, p. 28").

The chapter titled "Husbandry of the materials of food" notes (p. 370): "The whole class of leguminous plants are called by the generic name *Kachang.*

"The most commonly cultivated as green crops, are two broad leaved plants called *Kachang Kadale, (Phaseolus max,)* [soy bean] and *Kachang Ijo, (Phaseolus radiatus.)* The *Kachang Ijo,* or green pulse, is a superior grain to the last, but is more delicate, and requires more care in the culture. The Chinese colonists manufacture Soy from it, and it is for their consumption chiefly that it is raised. Of the *Kadale* ten seeds are considered a good return, and of the other about seven may be an average."

In vol. 3, the chapter titled "Intercolonial commerce" states (p. 319): "The specific commodities which Japan is either capable of affording, or actually does afford, for exportation, are gold, silver, copper, tutenague [tutenag; zinc], iron, camphor, ambergris, tea, rice, soy [sauce], wrought silks, lacquered-ware, and earthenware." Address: F.R.S., Late resident at the court of the Sultan of Java.

82. Koenig, Joseph. 1822. Geist der Kochkunst: Ueberarbeitet und herausgegeben von C.F. von Rumohr. 2 Nachdruckaufl. [Spirit of the culinary art. Edited and published by Karl Friedrich von Rumohr]. Stuttgart and Tuebingen: J.G. Cotta'schen Buchhandlung. vii + 202 p. 21 cm. [Ger]*

• ***Summary:*** In this book the art historian C.F. von Rumohr (lived 1785-1843) conjectures that the Garum sauce of the Romans was an imitation of the East Indian sauce *(Sulze)* made from soybeans *(Soja).* Note: He was probably incorrect in this conjecture.

83. Titsing, Isaac. 1824. Bereiding van de Soija [Preparation of soy sauce]. *Verhandelingen van het Bataviaasch Genootschap van Kunsten en Wetenschappen* 3:159-60. Published in Batavia. [Dut]

• ***Summary:*** "The preparation of soy sauce *(soija)* is simple, and is performed in the following way:

"One takes a *gantang* (a local Malay unit of measure equivalent to 3.125 kg of rice, or about a gallon) of boiled miso-beans *(gestoofde miso-boonen).* A gantang of boiled wheat or barley groats *(gestoofde tarw of gort),* and as many roasted and ground *(gebrande en gemalen)* wheat or barley groats as one deems to be sufficient to give it the necessary color. One then mixes these three together and encloses the mixture in a cupboard to let it mold, for which 8 days are required. After this mixture has become completely green from the mold, it is taken out of the cupboard and allowed to dry in the sun for one full day.

"Next one takes 2½ gantang of boiled water and one gantang of pure salt, which one dissolves in the water completely; after this it is allowed to stand for 24 hours, until the dirt from the salt has sunk and the water has turned cold. The pure water is then strained off, followed by the addition of the above-mentioned molded substance, which is then stirred with a shovel for 14 days.

"One uses wheat or barley groats for this. The difference is that when the soy sauce *(soija)* is made out of barley groats, it will be much thinner, whereas that made from wheat will be much thicker, have more body, and look like ink.

"The soy sauce *(soija),* which the Chinese call *ketjap* is used like a very delicious and tasty salt with roasted flesh foods, both in Batavia [Jakarta] and in the Netherlands."

Mr. Titsingh [Titsing] lived 1744-1812. He wrote a lot about the Dutch East Indies and Japan. Note that in 1880, Mr. A. Paillieux, in the appendix to his long and excellent article on the soybean in *Bulletin de la Societe d'Acclimatation* (Oct. p. 594-95), gives a French translation of this article but cites the original year of publication as 1781, Vol. III. We believe the date should be 1824 instead.

Note 2. This is the earliest Dutch-language document seen (April 2001) that mentions soy sauce, which it calls *de Soija.* The resulting product is more like Chinese-style soy sauce *[kecap asin]* than Indonesian-style soy sauce, which typically includes sugar plus various herbs and spices. It is very interesting that Titsingh chooses to use the word *soija* (based on the Japanese word *shoyu* = soy sauce) rather than the local Malay word *ketjap* to describe how *ketjap* is made. Address: Netherlands.

84. Candolle, Aug. Pyramus de. 1825. Prodromus systematis naturalis regni vegetabilis... Vol. 2 [Introduction to the natural system of the vegetable kingdom... Vol. 2]. Paris: Sumptibus socorium Treuttel et Wuertz. 644 p. See p. 396. A 14-volume work. [6 ref. Lat]

• ***Summary:*** In the chapter on Leguminosae, after the genus Phaseolus and before the genus Dolichos, we find (p. 396): "CLXXIV. SOJA *Moench meth.* 153. *Savi diss.* 1824. p. 16. DC. *leg. mem.* IX. An 8-line description of the genus in Latin is then given, followed by:

"I. Soja hispida (Moench l.c.) (I) [Indigenous] in Japonia, India orient, Moluccis. Dolichos Soja Linn. spec. 1621. Jacq. icon. rar. t. 145. Soja Japonica Savi diss l.c.– Kaempf. amoen. 837 et 838. icon. Corollæ violaceæ vix calyce longiores (v.v.) [vidi vivam = I have seen a living plant specimen.]

"*β pallida* [seeds white], floribus flavis, seminibus albis Roxb. [Roxburgh] cat. p. 55."

Also discusses the following plants: *Psophocarpus tetragonolobus* [the winged bean], p. 403; Grows in Mauritius and Madagascar.

*Arachis hypogaea* [the peanut], p. 474.

*Voandzeia subterranea* [the bambarra groundnut], p. 474.

Augustin Pyramo de Candolle (lived 1778-1841) was the father of Alphonse de Candolle. His son was a joint author.

Note 1. "Roxb. cat. p. 55" refers to: Roxburgh, William. 1814. *Hortus bengalensis, or a catalogue of the plants growing in the Honourable East India Company's botanic garden at Calcutta.* The soybean *(Dolichos Soja)* is listed on p. 55. A footnote explains that in the garden are growing "Two varieties, one with white seed and yellow flowers, the other with black seed and purple flowers." However the word "pallida" is not mentioned.

Note 2. This is the earliest document seen (Oct. 2004) that uses the word *pallida* in connection with soybeans or the color of soybean seeds. The Latin word *pallidus* means pale or white. One of the two soybean varieties described by Roxburgh in 1814 had white seeds. Address: France.

85. Nahuijs van Burgst, Huibert Gerhard. 1827. Brieven over Bencoolen, Padang, het rijk van Memang-Kabau, Rhiouw, Sincapoera en Poelo-Pinang. Tweede, vermeerderde druk [Letters from Bencoolen {Begkulu}. Padang,... 2nd printing]. Breda: Hollingérus Pijpers. xxi + 288 p. 22 cm. [Dut]

• ***Summary:*** Ketjap (soja) is mentioned on page 62. Note: This is a biographical description of the author's travels in today's Indonesia, Singapore, and Malaya. Address: Colonel, Ridder van de Militaire Willemsorde.

86. Sweet, Robert. 1827. Sweet's hortus Britannicus: or A catalogue of plants cultivated in the gardens of great Britain. Arranged in natural orders. London: James Ridgway. [16] + 492 + [24] p. See p. 119, 481. 22 cm. [300+ ref]

• ***Summary:*** Page 119: In the section "Leguminosae" [legumes] is the genus *Dolichos* which contains "35 Soja. w. [Willdenow, Species Plantarum]–1790. Shrub, annual. *Jacq. ic.* = Von Jacquin (Nichol. Jos.) Icones Plantarum rariorum. fol. 1781. t. 145."

Page 481: In the section "Addenda et Corrigenda" is the genus Soja. D.C. [De Candolle]. Soy. Diadelphia Decandria. Soja hispida. D.C. hispid [hairy]. East Indies. 1790. Shrub, annual. *Jacq. ic.*

See also: *Dolichos soja*, p. 119. Address: F.L.S, author, botanical cultivator, The British Flower Garden.

87. Nuttall, Thomas. 1829. Soy bean (Letter to the editor). *New England Farmer* 8(14):105. Oct. 23. Friday.

• ***Summary:*** In this front-page letter dated Oct. 14, Nuttall writes: "As this plant thrives well in this climate, and perfects its seeds, it may not, perhaps, be amiss to say something of its use and history. It is an annual Bean, not much unlike those we commonly cultivate, with an erect stem, showing a slight tendency to twine at the summit only; the flowers are very small for the germs, and reddish in axillary clusters; the legumes are pendulous, hispid with brown bristly hairs, with which the whole plant is more or less clothed–these pods contain 2 or 3 beans when mature, almost of a chocolate brown, and somewhat smaller than any generally cultivated in this country." It belongs to the genus *Dolichos (D. Soja),* which also affords us several other edible legumes. It is said to be indigenous to India and Japan, where as well in China and Cochin-China, it is very generally cultivated for food and probably preferred for its great productiveness. A single bean produced, and perfectly ripened with us at the Botanic Garden, 182 pods with 2 to 3 beans in each. Whether in this country, where so many fine legumes are cultivated, it might be esteemed for food, is doubtful; the experiment may easily be made. But its principal recommendation at present in [sic, is] only as a luxury, affording the well known sauce called *Soy,* which at this time is only prepared is [sic, in] China and Japan–that of the latter country being usually preferred. The mode of obtaining this sauce, is said to be as follows: -

"After the seeds are boiled until they become soft, they are mixed with an equal weight of wheat or barley flour coarsely ground. This mixture is fermented, and a certain proportion of salt and water being added, the whole is allowed to stand for two or three months, care being taken to stir it every day; and by the end of that time it is ready for use. Its composition then appears to be perfectly harmless, which cannot be said of many other sauces; and among the Asiatics it is considered beneficial in promoting an appetite.

"Yours, respectfully, Thomas Nuttall."

Note 1. Unfortunately Nuttall did not indicate where he obtained his seeds. In 1831 a person known only as "H." received a few soybeans from Nuttall and grew them in Milton, Massachusetts. Nuttall lived 1786-1859.

Note 2. This is the earliest document seen (June 2007) concerning soybeans in Massachusetts, or the cultivation of soybeans in Massachusetts. This document contains the earliest date seen for soybeans in Massachusetts, or the cultivation of soybeans in Massachusetts (1829). The beans were probably planted in about May-July 1829. The newspaper was published in Boston.

Note 3. This is the earliest English-language publication seen (Sept. 2006) with the word "soy bean" (or "soy beans") in the title.

Note 4. This letter was reprinted in the *American Farmer* (Baltimore, p. 260-61) on 30 Oct. 1829 (Vol. 33, No. 11). Address: Botanic Garden, Cambridge, Massachusetts.

88. Schrank, F.v.P. von; Martinus, C. von. 1829. Hortus regius Monacensis: Verzeichniss der in koeniglichen botaniscen Garten zu Muenchen wachsenden Pflanzen [Hortus regius Monacensis: Catalog of the plants growing in the royal botanical garden in Munich]. Munich: Im

Königlichen Central-Schuleücher Verlage; Leipzig: in Commission bei Friedrich Fleischer. xii + 210 p. See p. 185. [Ger]

• ***Summary:*** Page 135: "Soja Moench. (Dolichos L.)

"hispida Moench. (Dolichos Soja L.) Japan, East Indies. Annual. Economic plant." Address: [Munich, Bavaria].

89. Crawfurd, John. 1830. Journal of an embassy from the Governor-General of India to the courts of Siam and Cochin China: Exhibiting a view of the actual state of those kingdoms. 2 vols. 2nd ed. London: Henry Colburn and Richard Bentley. See Vol. II, p. 155, 282, 359.

• ***Summary:*** Chapter 2, about Siam, states (p. 155): "The imports from China [to Siam] are very numerous, consisting of what are called in commercial language 'assorted cargoes.' The following is a list of the principal commodities: coarse earthenware and porcelain, spelter, quicksilver, tea, lack-soy (vermicelli), dried fruits, raw silk, crapes, satins and other silk fabrics, nankeens, shoes, fans, umbrellas, writing-paper, sacrificial paper, incense rods, and many other minor articles."

In Chapter 6, about the people of Cochin China (today's Vietnam), we read (p. 282): "They eat vermin, and the flesh of the alligator; hatched eggs with them are a delicacy; and their favourite sauce is a kind of soy [probably nuoc-mam], in part, at least, composed of the juices of putrid fish, and which, both from taste and odour, would be in tolerable to any other people."

Chapter 8, about the Island of Singapore, states (p. 358-59): "The first direct arrival from England to Singapore was in the year 1821; in 1822, four ship cleared out with cargoes for the European market; in 1823, nine; in 1824, twelve; in 1825, fifteen; and in 1826, fourteen ships. The greater number of these were bound for London and Liverpool, but there were some also for Stockholm, Hamburgh [Hamburg], and Bordeaux. The staple imports of this branch are cotton goods, woolens, iron, and spelter [unrefined zinc]. The exports are very various, and may be enumerated as follow: ore of antimony, aniseed, aniseed oil, benjamin [gum benjamin, a balsam or resin from a tree], camphor, cassia, cassia-buds, coffee, cubebs [small spicy berries of the *Piper cubeba* from Java], dragons' blood [a resinous substance, or red juice, extracted from the *Dracoena draco],* elephants' teeth [tusks, ivory], gamboge [a concrete vegetable juice or gum-resin from Cambaja or Cambodja {Cambodia}], horns of cows, deer, and buffalo; hides of ditto, mother of pearl shells, musk, nankins [nankeens, a type of cotton cloth, originally from China], orpiment [sulphuret of arsenic], pepper, Chinese paper, Chinese raw silk, Chinese wrought silk, ratans [small canes, grown in India] and canes; rhubarb, cloves, mace, and nutmegs; pearl sago, Siam sugar, Japan soy [sauce], tin, tortoiseshell, turmeric, gold and silver bullion, and sapan-wood [sappan wood; a red soluble brazilwood obtained from an East Indian tree *Caesalpinia sappan].* In 1824, and I have seen no later statement, the sworn value of these articles was 1,035,868 Spanish dollars."

Note: This is the earliest document seen (May 2010) concerning soybean products (soy sauce) in Singapore. This document contains the earliest date seen for soybean products in Singapore (1826); soybeans as such have not yet been reported. However, in 1830 soy sauce exported from Singapore was probably made in Singapore from soybeans that were in Singapore at this early date; soybeans may well have been cultivated in Singapore at this time. Address: Esq, FRS, FLS, FGS, &c.

90. First report (Part II). Minutes of evidence taken before the select committee of the House of Commons appointed to enquire into the present state of affairs of the East-India Company, and into the trade between Great Britain, the East-Indies, and China;... 1830. London: Printed for Parbury, Allen and Co. p. 246-418. See p. 385.

• ***Summary:*** On 16 March 1830, Mr. John Deans is called in and examined. He has resided constantly in the Eastern Archipelago of the East Indies for upwards of twenty years. For most of the time he lived in Java.

#3609. "Can you give the Committee any information with respect to the trade with Japan?–The Dutch are allowed to trade with Japan, and they are only allowed to send two ships. The trade was conducted until two years ago by the Dutch government of Java. I have here a list of the cargoes in the year 1825, both the imports and exports."

#3610. "Will you state the principal items of the trade?–In the Japan trade in 1825 there were two ships, amounting in all to about 1,300 tons; one was 600 and the other was 700 tons... The import cargoes [to the East Indies from Japan] consisted of... sackie and soy [sauce], 14,332 f. [Dutch florins];..."

91. Hogendorp, C.S.W. de. 1830. Coup d'oeil sur l'île de Java et les autres possessions néerlandaises dans l'archipel des Indes [A glance around the isle of Java and the other Dutch possessions in the East Indies]. Brussels: C.J. de Mat. xii + 422 p. Folded color map. 24 cm. [Fre]

• ***Summary:*** Page 158: Under the name of *katjang idjoe,* the Chinese and some indigenous people cultivate a legume which is quite like the pea *(phaseolus radiatus),* from which is made on Java a sort of soy sauce *(soya),* which is called *ketjap.*

Page 204: The Europeans burn coconut oil in their lamps; and for this use it is preferable to bean oil *(l'huile de katjang)* [probably soy bean oil].

A long table (p. 396-97) shows the items to be taken on an expedition to Japan in 1827. The items exported from Japan on the return trip will consist mainly of refined copper, camphor, silk cloth,... porcelain, soy sauce *(du*

*soya),* saké *(du sackie),...* Address: Graaf [Count], Knight of the Legion of Honor, Former Resident of Batavia, Buitenzorg, and Crawang.

92. Siebold, Philipp Franz von. 1830. Synopsis plantarum oeconomicarum universi regni Japonici [Synopsis of the economic plants from the entire empire of Japan]. *Verhandelingen van het Bataviaasch Genootschap van Kunsten en Wetenschappen* 12:1-74. See p. 54-57. Also first table at end. [Lat; Dut]

• ***Summary:*** The English translation of this periodical title is: "Transactions of the Batavian Society of Arts and Sciences." Batavia roughly corresponds to today's Jakarta on the island of Java, Indonesia. This work lists 447 economic plants, including the soybean. The section on Leguminaceæ [sic, Leguminosæ] (p. 54+), mentions plants of the genera *Dolichos* (incl. *D. hirsutus* or Kudsu / Kudzu), *Sooja, Phaseolus, Pisum, Vicia, Medicago, Arachis, Glycyrrhiza,* and *Mimorsa.* There are two species of soybeans: *Sooja Japonica,* the cultivated soybean, and *Sooja nomame,* the wild soybean. The genus and its species and varieties are described as follows (p. 56):

"CLXXVIII. Sooja, Moench. Sieb. (Sooja du Japon).

296 *S. Japonica,* Sieb. *Sooju* vernacular *Daisu,* Japan.

Varieties, grouped by color: a. White seeds. *Daisu,* Japan. b. White fuscis seeds. *Tobimame,* Japan. c. Fuscis seeds. *Sinsjumame,* Japan. d. Black round seeds. *Kuromame,* Japan. a. Black flattened seeds. *Kurotokorosun,* Japan. a. Greenish seeds. *Awomame,* Japan.

Uses: To make *Sooju, Miso, Toafu* (shoyu, miso, and tofu).

297 *S. nomame,* Sieb. *Nomame ac Jawaraketsmai,* Japan (v.v.). [vidi vivam = I have seen a living plant specimen.] *Plantae sponte crescentis folia adhuc tenera pro potu Thea colliguntur.*

At the end of this article are two large fold-out tables, each 30 by 18 inches, and each titled "Synoptic Table of Plant Uses." Each table contains six vertical double columns. References to soy appear only in table I. At the bottom right corner of the first is written in Latin: *"Dabam in Insula Dezima mensi Novembris 1827, Dr. von Siebold."* This translates as: "Given [as a letter for delivery] from the island of Dezima [Deshima], November 1827, Dr. von Siebold." The plants are divided into categories by type of use. For example: I. Simple foods: A. Cereal grains. B. Legumes. C. Fruits, etc. Under each category is a numbered list of the scientific names of the Japanese plants in that category, followed by its name written in both katakana and Chinese characters. Soy-based uses include: IA. Simple foods *(Alimenta simplicia)* (columns 1-4): Legumes (Legumina). 1. *Sooja Japonica,* Sieb. Daizu, "Yellow + Bean."

Note 1. This is the second earliest document seen (June 1999) written by a European or Westerner in which Chinese characters are used to write the name of the soybean or related products.

II. Composite foods *(Alimenta composita)* (columns 4-5). B. For the sauce "Sooju." Shoyu. Sooja Japonica, Sieb.

C. For the paste *(pulto)* "Miso." Miso. Sooja Japonica, Sieb. plus rice and barley

D. For the cake *(placenta)* "Toofu." Tôfu. Sooja Japonica, Sieb. Note 2. This is the earliest Latin-language or Dutch-language document seen (Feb. 2004) that uses the word "Taofu" or "Toofu" or "Tôfu" to refer to tofu.

P. For the sprouts *(germinatione artifaali)* "Mogasi." Moyashi. Soja Japonica, Sieb.

Note 3. This is the earliest document seen by Siebold in which the soybean is mentioned. This document also contains the earliest date connected with Siebold and soybeans (Nov. 1827). His name on the title page is written "De. de Siebold."

Note 4. Siebold was born on 17 Feb. 1796 in Wurzburg [Bavaria, Germany]. In 1821, as a young ship's doctor, he arrived in Japan, where he worked as a doctor at Deshima near Nagasaki for the Dutch colony.

Also discusses: Column 1 of table 1 also mentions: 13. *Coix lachryma,* P.S., suudama [Job's tears]. 2. *Phaseolus atsuki,* Japon, Azuki. "Red + Small + Bean." 12. *Arachis hypogaea,* L.E. Rakkasei [peanut]. "Fall + Flower + Bean." Column 2 mentions *Sesamum Orientale, P.S., goma [sesame seeds].* Column 3 mentions the wild soybean *(Sooja nomame), Amaranthus oleraceus, A. Japonicus,* and *A. bicolor.* Column 4 also includes sea vegetables *(kaiso).*

Column 5 mentions *ame* [grain syrup], *fu* [wheat gluten cakes], *soba, somen* [wheat noddles], *mochi, konnyaku, kudzu,* and *tokoroten.* III. Medicinal foods *(Medicamina)* (columns 5-6).

93. Don, George. 1832. A general system of gardening and botany: Containing a complete enumeration and description of all plants hitherto known; ...Founded upon Miller's Gardener's Dictionary, and arranged according to the natural system. Vol. 2. London: C.J.G. and F. Rivington. 875 p. See p. 356-57 (Soja), 220-21 (Glycine). Index at front. 27 cm. [3 ref]

• ***Summary:*** This work was published in 4 volumes between 1831 and 1838. It was "caused to be prepared" by the proprietors of *Miller's Gardener's and Botanist's Dictionary.* The alphabetical arrangement of genera used by Miller was discarded. "It only remained, therefore, to choose between the Linnæan artificial method, and the Natural System of Jussieu; but the numerous advantages of the latter, particularly in an extensive work like the present, were too apparent to leave any doubt in the mind of the Editor as to which he ought to adopt... In the Linnæan artificial method, it often happens, that genera, intimately related, are separated far apart into different classes and orders, merely on account of the difference in the number of

| | | | |
|---|---|---|---|
| B. *Legumina.* | | | 3 |
| 1. Sooja Japonica, Sieb. | ダイヅ | 大豆 | 4 |
| 2. *Phaseolus atsuki*, Japon. | アヅキ | 赤豆 | 4 |

II. ALIMENTA COMPOSITA.

| | | |
|---|---|---|
| A. *Pro cerevisia «Sake.»* | サケ | 酒 |
| Oriza sativa, Seringe. | | |
| B. *Pro embammate «Sooju.»* | シヤウユ | 醤油 |
| Sooja Japonica, Sieb. | | |
| Hordeum hexast. ac vulgare, Ser. | | |
| C. *Pro pulto «Miso.»* | ミソ | [illegible] |
| Sooja Japonica, Sieb. | | |

| | | |
|---|---|---|
| 6. Sooja nomame, Sieb. | [illegible] | [illegible] |

their stamens and pistils; a circumstance now found in many instances scarcely to be of sufficient importance, even to separate species, still less genera... The plan of the present work is founded on that of M. de Candolle, in his invaluable works entitled *Regni Vegetabilis Systems Naturale* and *Prodromus*, with such alterations as were rendered necessary by the rapid increase of science, and with numerous additions of new genera and species..." Like Miller, Don classifies soybeans in the genus *Soja.*

"CXC. SOJA *(sooja* is the name of a sauce prepared from the seeds by the Japanese). Moench. meth. 153. Savi, diss. 1824. p. 16. D.C. legum. mem. ix. prod. 2. p. 396.

Note 1. This is the earliest English-language document seen (April 2009) that uses the term "sooja" to refer to soy sauce.

"Lin. Syst. *Diadélphia, Decándria.* Calyx bibracteolate at the base, 5-cleft, the 3 lower segments straight and acute, but the 2 upper ones are joined together beyond the middle. Corolla with an ovate vexillum, which stands on a short stipe, and with an oblong straight keel." Note 2. *A Dictionary of Botany,* by Little and Jones (1980) defines vexillum (plural: vexilla) as "See Banner." Banner is defined as "The broad uppermost petal of a papilionaceous corolla as in the irregular flowers of certain members of the pea family, Fabaceae. Synonym: Standard or vexillum."

"Stamens diadelphous, the tenth one approximate, but certainly distinct. Stipe of ovary not surrounded by a sheath at the base. Style short. Legume oblong, 2-5 seeded, membranous; the seeds intercepted by cellular dissepiments. Seeds ovate, compressed.–A hispid erect herb, with pinnately-trifoliate leaves, and with the flowers either aggregate in the axils of the leaves on short pedicels, or disposed in short peduncalate racemes.

"1 S. híspida (Moench. l. c.) Annual. Hardy. Native of Japan, East Indies, and the Moluccas. Dólichos Soja, Li. spec. 1621. Jacq. icon. rar. t. 145. Soja Japónica, Savi, diss. 1. c. Kæmpf. amoen. 837 and 838, with a figure. Corolla violaceous, hardly longer than the calyx.

"The seeds, which are usually called *Miso* [sic, error based on Miller 1807] in Japan, are put into soups, and are the most common dish there, insomuch that the Japanese frequently eat them three times a day. The *Soja* of the Japanese, which is preferred to the *Kitjap* of the Chinese, is prepared from the seeds, and is used in almost all their dishes instead of common salt. The Chinese also have a favourite dish made of these seeds, called *ten-hu [sic, teu-hu,* i.e. tofu] or *tau-hu,* which looks like curd, and though insipid in itself, yet with proper seasoning is agreeable and wholesome.

*"Var. β, pállida* (D.C. prod 2. p. 396.) flowers yellow; seeds white. Roxb. [Roxburgh] hort. beng. p. 55.

*"Hispid* Soja. Fl. [Flowering] July, Aug. Clt. [Cultivated since] 1790. Pl. [Plant] 1½ foot.

*"Cult* [Culture and propagation]. The seeds of this plant only require to be sown in a warm sheltered situation in the month of May."

Under Phaseolus, Don lists a species named *Phaseolus max,* following Linnaeus and Rumphius, but he apparently did not confuse this with the soybean (listed on the same page under Soja hispida), since he noted that the species was not sufficiently known, the seeds were black, about the size of coriander-seeds, and that *Max* is the Spanish name of the plant.

On p. 220 we read: "XCV. Pueraria (in honour of M.N.N. Puerari, a professor at Copenhagen [Denmark]). D.C. ann. sc. nat. 1825. jan. p. 29. Leg. mem.vi. prod.2. p. 240. Lin. syst. Monadélphia, Decándria." Species: *P. tuberosa, P. Wallichii.*

George Don, son of George Don (1764-1814), was a British plant collector and nurseryman, born in Scotland, and lived 1798-1856. He collected plants on various expeditions for the Horticultural Society of London in Brazil, West Indies, and Sierra Leone. One of the most indefatigable and accurate botanists. Philip Miller lived 1691-1771. Note the similarity of the section on food uses of soybean seeds to that of Miller (1807). Address: England.

94. Koenig, Joseph. 1832. Geist der Kochkunst: Ueberarbeitet und herausgegeben von C.F. Rumohr [or rather, written by him]. Zweite vermehrte und verbesserte Auflage [Spirit of the culinary art. Revised and prepared by Karl Friedrich von Rumohr. 2nd enlarged and improved edition]. Stuttgart and Tuebingen: J.G. Cotta. xvi + 196 p. See p. 155. 21 cm. [Ger]*

• ***Summary:*** In this book the art historian Carl Friedrich von Rumohr (lived 1785-1843) conjectures that the Garum sauce of the Romans was an imitation of the East Indian sauce *(Sulze)* made from soybeans *(Soja).* Note: He was probably incorrect in this conjecture.

95. Roxburgh, William. 1832. Flora Indica; or, descriptions of Indian plants... Ed. 2. Vol. 3. Serampore, India (printed for W. Thacker and Co., Calcutta; and Parbury, Allen and Co., London). viii + 875 p. Edited by William Carey. See p. 314-15. [2 ref]

• ***Summary:*** In the section on Dolichos (p. 314-15) we read: "17. *Dolichos Soja. Willd.* iii. 1051.

"Annual, erect, flexuous, every part hairy. *Flowers* axillary, sub-racemous. *Corol* [corolla] scarcely longer than the calyx. *Legume* reflexed, scimitar-shaped, from two to three-seeded.

"Daidsee. *Kaempf. amoen.* p. 837. f. 838. good.

"Reared in the Honourable Company's Botanic garden [across the Hooghly / Hugli River from Calcutta] from seeds received from the Moluccas (today's Indonesia) in 1798. It may be cultivated at all times of the year,

consequently flowers at all times; but, like all the other leguminous tribe, succeeds best during the cold season.

*"Root* ramous, annual. *Stem* erect, flexuous, very ramous near the base, hairy in every part; from one to four feet in height, but when high it requires support. *Leaves* long-petioled, ternate, hairy. *Leaflets* entire, ovate, the lateral ones broadest, and considerably oblique, the inferior side being much broader than the superior. *Flowers* axillary, sometimes on a common short peduncle, sometimes without it, and smaller than in any other species of *Dolichos* I have yet met with; colour a reddish purple. *Bractes* small, hairy. *Corol* scarcely longer than the segments of the calyx. *Banner* vaulted, emarginate and closing the wings. *Carina, stamina,* and *pistillum* as in the genus."

Watt 1890 cites this as "Ed. C.B.C. p. 563." = "Edited by Carey and Wallich 1832, and reprinted by C.B. [Charles Baron] Clarke" [in 1874]. Clarke wrote a long preface to the 1874 reprint. This 1874 edition was itself reprinted in 1971 in New Delhi by Today & Tomorrow's Printers & Publishers.

Note: This document contains the earliest clear date seen (July 2006) for soybeans in India, or for the cultivation of soybeans in India or South Asia (1798). The source of these soybeans was the Moluccas (today's Indonesia).

Also contains detailed information on the peanut (p. 280-82; *Arachis hypogea.* Willd. iii. 1346) and *Phaseolus radiatus.* Willd. iii. 1036 (p. 296-97; this is apparently not the azuki bean, since the seeds are black. Indian names– Bengali: Mash-Kuluy or Dord. Sanskrit: Masha. Teling: Minoomoo).

*Flora Indica*, William Roxburgh's most important book, was published after his death by his sons James Roxburgh (1802-1884) and Bruce R. Roxburgh (1797-1861). The first edition (2 volumes, been published in 1820 and 1824) contained no mention of the soybean. It had annotations and additions by Nathaniel Wallich (1786-1854). William Carey (1761-1834) was the editor.

According to the 1975 facsimile reprint of the first edition of this book (Oriole Editions, New York): "The people involved: William Roxburgh (1751-1815) came to Madras in 1776 and met Johann Gerhard Koenig, an avid botanist. Roxburgh developed experimental gardens of possible crops, studied wild plants and accumulated a large collection of drawings of plants. In 1793 he became Director of the Botanic Garden in Calcutta which had been founded by his predecessor, Robert Kyd. In 1814 ill health forced him to leave India and he died the next year.

"*William Carey* (1761-1834) was a superb linguist who was the first to translate the New Testament into Bengali. He came to India in 1783 as missionary. He was a friend of Roxburgh and became Roxburgh's editor.

"*Nathaniel Wallich* (1786-1854) became Director of the Calcutta Botanic Garden soon after Roxburgh's death. Wallich was a dedicated collector and spent much time in the field.

"In 1813 Roxburgh turned over the completed manuscript of his *Flora Indica* to William Carey. In 1816, after Roxburgh's death and the arrival of Wallich, Carey went to Wallich to discuss publication of Roxburgh's manuscript. Wallich agreed, saying 'Publish and I will edit it and bring it up to date.'

"The first volume was published in 1820 and the second volume in 1824."

Also discusses: Almonds (p. 403). Sesamum [sesame] (p. 491-92; "Sesamum. Schreb. gen. N. 1048. Sans. Tila. Pers. Roghen. Arab. Duhn"). Arachis / Peanuts (p. 552-53). Hemp (p. 718-19).

Note: This is the earliest English-language document seen (July 2003) that uses the Sanskrit word "Tila" to refer to sesame.

96. Henschel, August Wilhelm Eduard Theodor. 1833. Vita G.E. Rumphii, Plinii Indici. Accedunt specimen materiae Rumphianae medicae clavisque Herbarii et Thesauri amboinensis [Life of G.E. Rumpf / Rumph (Rumphius), the Pliny of the Indies. To which are added a specimen of Rumphius' medicinals and a key to the herbarium and the treasury of plants of the island of Ambon / Amboina]. PhD thesis, Vratislaviae [Wroclav, Poland]. xiv + 215 p. See p. 181. [Lat]*

• ***Summary:*** On page 118-19, under XXX. Papilionaceae, the soybean is not mentioned. But in appendix A, titled "Clavis Herbarii Amboinensis" ["The key to Rumphius' Herbarium Amboinense], on page 181 headed "Liber IX. Tomus V" [Book 9. Vol. 5; the volume and book in which the soybean is described by Rumphius in 1747], the table states: "Tab. 20. Cap. 140. Rumphiana nomina et Amboinica: Cadelium. Cadelie. Recentorium nomina [recent names]: *Soja hirsuta* DC [De Candolle]. (see/sec. Lour. [Loureiro]) Phaseolus Max. Encycl." Henschel is apparently saying that the plant named Cadelium or Cadelie by Rumphius has more recently been known as *Soja hirsuta.*

Merrill (1917, p. 275), discussing changes in nomenclature of the soybean, states: "By Henschel and by Pritzel it has been also correctly referred to *Soja hispida* Moench., another synonym of *Glycine max* Merr." It is not clear whether Merrill was referring to another work by Henschel or whether he mistakenly transcribed "hirsuta" as "hispida.

Note: Vratislaviae, where the author wrote his thesis, was later called Vrotslav, Wroclav, Wreslaw, Breslau, Breslaw, or Breslavia. It is a university city on the Oder (Odra) River in today's Poland, but was formerly in Prussian Lower Silesia. Two other works written by this author are listed as being published in Breslau in 1820 and 1837.

97. Wight, Robert; Walker-Arnott, George A. 1834. Prodromus floræ Peninsulæ Indiæ Orientalis [Introduction to the flora of the East Indian Peninsula]: Containing abridged descriptions of the plants found in the peninsula of British India, arranged according to the natural system. Vol. I. London: Parbury, Allen & Co. xxxvii + 478 p. p. 244-45, 247. [7 ref. Eng]

• ***Summary:*** In the chapter on "Leguminosæ," on page 247 the author discusses Soja Moench, and Dolichos Linn. On page 244-47 he discusses Phaseolus species.

"XLIV. SOJA. *Moench.* Calyx bibracteolate at the base, 5-cleft; the three lower segments straight and acute; the three upper combined to beyond the middle. Corolla papilfonaceous, scarcely longer than the calyx; vexillum ovate, somewhat cucullate and enclosing the alæ [plural of "ala;" the two side petals in a papilionaceous corolla], shortly clawed: keel oblong, straight. Stamens diadelphous (9 and 1), the tenth close to the others. Sheath wanting around the base of the ovary. Style short. Legume oblong scimitar-shaped, 2-5-seeded, membranaceous, furnished with cellular partitions between the seeds. Seeds ovate, compressed.–Annual, erect, flexuose, very hairy. Leaves pinnately trifoliolate. Flowers either aggregated in the axils, or in a short axillary raceme.

"*762. (1) S. *hispida* (Moench).–DC.! *prod.* 2. *p.* 396; Wall.! L. *n.* 5529.–S. Japonica, *Savi.*–Dolichos Soja, *Linn. sp. p.* 1021; *Jacq. ic. rar. t.* 145; *Spr. syst.* 3. *p.* 251; *Roxb. [Roxburgh] fl. Ind. 3.p.* 314; *in* E.I.C. *mus.tab.* 1607."

Note 1. This is the earliest English-language document seen (April 2003) that uses the word "papilfonaceous" (or any related word starting with the letters "papflion" or "papilion" meaning "butterfly") in connection with the soybean.

Note 2. In this book there is also the first reference to Iohnia/Johnia Wightii. Wight lived 1796-1872. Walker-Arnott lived 1799-1868. This is a flora of the area now known as India. Address: 1. Member of the Imp. Acad. Naturæ Curiosorum, Surgeon on the Hon. East India Company's Madras Establishment (and botanist in the East Indies); Google Books at soja + hispida 2008/02.

98. Australian Auction Company. 1840. Entire cargo of the "Juliet." To be sold by public auction (Ad). *Sydney Gazette and New South Wales Advertiser (NSW, Australia).* Jan. 9. p. 3.

• ***Summary:*** "On Monday, the 13th January next,... at 11 o'clock precisely."

"The Entire Cargo of the Barque Juliet from Java consisting of–1,546 Packages superior Black Teas, 7,857 [packages] Superior quality Sugar, 221 baskets fine white ditto [Sugar], 516 Bags Table Rice, 286 Bags Coffee,...125 Casks Arrack [palm wine],... 10 Barrels and 100 cases best Cognac Brandy,... 92 Baskets Salad Oil, 6 Ditto [Baskets] Japan Soy [sauce], 189 Cases French Wines,..."

Note: This is the earliest of 3 documents seen (Oct. 2009) in the Australian Newspapers database that contains the term "Japan Soy." Address: The Mart, George-street [Sydney].

99. Faulkner's. 1840. Classified ad: India Soy, 1*s.* 6*d.* per bottle. *Times (London).* June 8. p. 7, col. 2.

• ***Summary:*** "Essence of anchovies, 1*s.*; Reading sauce, 1*s.*; Harvey's ditto, 1*s.*; Universal ditto, 1*s.*; King of Oude, 1*s.* 3*d.*;... Cavice, 1*s.*; Ketchup, 9*d.*; Chili Tarragon, and raspberry vinegars, 1*s.*..."

Note 1. This is the earliest document seen (Dec. 2005) in the *Times* (London) that uses the term "King of Oude" to refer to the name of a sauce, apparently coined by Faulkner. Oude (later Oudh) was a place in northern British India.

Note 2. Note that India Soy sells for twice as much as Ketchup–which is probably soy sauce from the Dutch East Indies. Unfortunately we cannot make a reliable price comparison since we are not told the size of the bottle in which each was sold. Address: Sauce and foreign warehouse, 44, Jermyn-street, St. James's [London].

100. Penny cyclopaedia of the Society for the Diffusion of Useful Knowledge: Soja hispida. 1841. London: Charles Knight & Co. See vol. 22, p. 193-94. [2 ref]

• ***Summary:*** "Soja Hispida (Moench), Soja Japonica (Savi), the Dolichos Soja (Linn), a leguminous plant, native of Japan and the Moluccas, and abundant in the peninsula of India, though probably introduced there. The seeds resemble those of the haricot, French or kidney bean, and are used by the Chinese to 'form a favourite dish, called *ten-hu*, or *tau-hu* which looks like curd, and which, though insipid in itself, yet with proper seasoning is agreeable and wholesome' (Don's *Dictionary).* The Japanese call the seeds *Miso* [sic, error based on Miller 1807] and put them into soup, of which they sometimes partake three times a day. They likewise prepare with them the sauce termed *Sooja* which has been corrupted into *Soy.*

"'The beans are boiled until all the water is nearly evaporated, and they begin to burn, when they are taken from the fire, and placed in large wide-mouthed jars, exposed to the sun and air; water and a certain proportion of molasses or very brown sugar are added. These jars are stirred well every day, until the liquor and beans are completely mixed and fermented; the material is then strained, salted, and boiled, and skimmed until clarified, and will after this process become of a very deep brown colour, and keep any length of time. It has been stated that the gravy or juice of meat was used in preparing this condiment, but it appears to be entirely made from vegetable materials. There are two or three qualities of soy. To make the best requires much care and attention. Japanese

soy is much esteemed in China on account of the superior manner in which it is made. Shopkeepers at Canton who sell soy have large platforms on the roofs of their houses, where the jars for preparing soy are arranged and exposed to the sun; for the consumption of soy is enormous. Neither rich nor poor can breakfast, dine, or sup without it; it is the sauce for all kinds of food; gives a zest to every dish, and may be said to be indispensable at a Chinese repast.' (Dobell's *Kamschatka.)* Soy is only sparingly used as a sauce in this country. It has the character of being a useful stomachic, but not more so than any of the other condiments when used with moderation."

Note: This is the earliest document seen (May 2004) that uses the word "stomachic" in connection with soy sauce. *Merriam-Webster's Collegiate Dictionary* (1998) defines stomachic (first used as a noun in 1735) as "a stimulant or tonic for the stomach." Address: London, England.

101. Waterston, William. 1843. A cyclopædia of commerce, mercantile law, finance, and commercial geography:... Edinburgh, Scotland: Oliver & Boyd; London: Simpkin, Marshall, & Co. iv + 684 + 39 + 128 p. 23 cm.

• ***Summary:*** The section titled "Soy" (p. 627) states: "Soy, a peculiar savoury sauce made from the bean of the *Soja,* a species of *Dolichos* growing in the eastern parts of Asia. Genuine soy is well flavoured, thick, brown, and clear; and when shaken in a glass, it should leave a coat on the surface of a bright yellowish brown colour. It is imported from Canton, but the best is brought from Japan by way of Batavia" [Dutch East Indies].

Note 1. Following p. 672 (the end of the basic cyclopædia) is a one-page table titled "Tariff of duties exigible in the United Kingdom." For each imported item there are two rates: (1) From foreign countries, and (2) From British possessions. Tariffs are levied on beans (10 pence/bu), "oil-seed cakes" (1 shilling/ton), and some seeds ("Cole. Flax, hemp, rape, sesamum;" 1 pence/qr [pence/ quarter; in the UK a "quarter" is usually a quarter of a hundredweight {112 lb} or 28 lbs]).

Note 2. No soybeans or soy cakes were being imported to England at this time. Soy [sauce] is not mentioned. At the end of the book is an alphabetical "Supplement" and three maps of Great Britain.

Note 3. This is the earliest English-language document seen (March 2005) that mentions "rape" seeds (or the rape plant), or that mentions "Cole" a seed very similar or identical to rape seed.

Note 4. This is the earliest English-language document seen (Sept. 2006) that contains the term "oil-seed" (or "oil seed").

Note 5. This is the earliest English-language document seen (Sept. 2005) that contains the term "oil-seed cake" (or "oil-seed cakes" or "oil seed cake"). Address: Accountant, Edinburgh [Scotland].

102. Siebold, Ph. Fr. de; Zuccarini, J.G. 1845. Florae Japonicae familiae naturales, adjectis generum et specierum exemplis selectis [Flora of Japan: Natural families with genera and selected examples of species]. *Abhandlungen der Mathematisch-Physikalischen Classe der Koeniglich Bayerischen Akademie der Wissenschaften (Munich).* Vol. 4, no. 3, part 2. See p. 119. Reprinted as a monograph in Muenchen, Germany, 1851. [3 ref. Lat]

• ***Summary:*** This work by Philipp Franz von Siebold and Joseph G. Zuccarini first gave the soybean its present genus name, Glycine. It also gave the wild soybean its present scientific name *Glycine soja.*

"9. Glycine DC.

"14. *Gl. Soja Sieb. et Zuccar.*–Gl. volubilis retrorsum hirsuta, foliis longe petiolatis ovato-lanceolatis acutis vel acuminatis hirtis, intermedio pedicellato bistipellato, stipulis parvis linearibus, stipellis setaceis, racemis axillaribus 8–12-floris petiolo multo brevioribus, floribus parvis, inferioribus 3–4 tantum fertilibus, leguminibus linearibus compressis subfalcatis hirsutis 2–3-spermis, styli basi uncinata terminatis, seminibus trausversim ellipticis compressiusculis.–An hic *Glyc. javanica Thunb. Act. Linn. II.* p. 340 excl. Synon?"

"10. Soja Mönch.

"15. *S. hispida Mönch. Dolichos Soja L.–Soja japonica Savi. Daidsu vel Mame Kämpf. Amoen* pag. 837 c. ic. opt., ubi et condimenti conditio effuse describitur."

Note: The year of publication is also given as 1843-1846.

103. Voigt, Johann Otto. 1845. Hortus Suburbanus Calcuttensis: A catalogue of the plants which have been cultivated in the Hon. East India Company's Botanical Garden, Calcutta, and in the Serampore Botanical Garden, generally known as Dr. Carey's Garden, from the beginning of both establishments (1786 and 1800) to the end of August 1841. Calcutta: Bishop's College Press. 745 p. + lxviii. See p. 231. [Eng]

• ***Summary:*** "Soja, Moench. (DC. pr. [De Candolle. Prodromus Systematis Naturalis Regni Vegetabilis] 2, p. 396;–W. and A. pr. [Wight and Arnott. Prodromus Florae Peninsulae Indiae Orientalis] 1, p. 247.) 1. hispida, Moench. (DC. l. c. [De Candolle locus citatus];–W. and A. l. c. [Wight and Arnott locus citatus];–J. Grah. Cat. B. pl. [J. Graham's Catalogue of Bombay plants] p. 52.–S. japonica, Savi.–Dolichos Soja, L.; Jacq. icon rar. [Jacquin, (Nicolas Jos. von) Icones Plantarum Rariorum, 3 vols. 1781] t. 145;–Roxb. fl. ind. [Roxburgh's Flora Indica] 3, p. 314.–Kaempf. amoen. [Kaempfer, (Engelbert) Amoenitates Exoticae, 1712] p. 837, t. 838.)

"Gari-kulay. Annual: Japan. Moluccas. Nepal. Taong-Dong. Cultivated in gardens. Fl. [flowers] smallish, reddish-purple, and seeds black, C.S. [Cold season]. Seeds in Japan commonly eaten in soups. (G. Don.) β. leucosperma. Seeds white; flowers yellow."

Note 1. This work contains a valuable 10-page listing of the "Principal abbreviations employed in this volume," as shown above. It translates the bibliographic shorthand used by botanists of the day into a form that can be understood by today's reader. A statement after the subtitle reads: "Drawn up according to the Jussieuan arrangement, and mostly in conformity with the second edition (1836) of Lindlay's Natural System of Botany."

Note 2. Voigt, a Surgeon of the Danish Government, working in India, lived 1798-1843; this work was published after his death.

Note 3. This is the earliest document seen (May 2010) concerning soya in connection with (but not yet in) Denmark. Address: Surgeon of the Danish Government, Serampore, India.

104. Serat Centini [The Book of Centini]. 1846. In: Codex Orientalis 1814 of the Leiden University Library. Vol. I. See p. 295. Reprinted in Verhandelingen van het Bataviaasch Genootschap, der Kosten en Weetenschappen (Batavia, 1912-15), Vol, I-II. p. 82, Canto 31, stanza 212. [Ind]
• ***Summary:*** Mentions tempeh.

105. *Maitland Mercury & Hunter River General Advertiser (New South Wales, Australia).*1847. Shipping intelligence (From the Sydney Morning Herald). May 1. p. 2.
• ***Summary:*** "Imports. April 27. *Pandora,* barque, 297 tons, Captain Cobb, from China and Manila: Cargo from China–301 chests 600 half-chests and 7 cases congou tea,... 50 boxes soy [sauce],..."

Note: This cargo was for Caucasian clients.

106. T.W.H. 1847. The soy bean (Letter to the editor). *Farmers' Cabinet and American Herd-Book* 12(3):78-79. Oct. 15.
• ***Summary:*** Letter dated 18 Sept. 1847. "It is a native of Japan and of the Molucca Islands. It thrives well in New England, having been successfully raised in the Botanic Garden, at Cambridge, and elsewhere in Massachusetts... The plant is very productive. Eight of the beans, planted in Milton, Mass., in 1831, yielded a wine pint of seed, weighing eleven and a half ounces. One hundred and ten of the beans, taken promiscuously, weighed half an ounce. In this proportion, the production of the eight beans would be 2530, or more than 316 for one. In 1829, a single bean, in the Botanic Garden in Cambridge, produced 182 pods, which, as some of them contained three beans, was more than 364 for one. Should their qualities as articles of food be found agreeable, these beans will become valuable on account of their great productiveness.

"The inhabitants of Japan, of China, and Cochin China, and of some parts of India, cultivate these beans extensively, and eat them cooked or prepared in various ways. They make a very important article in the cookery of the Japanese, who use them chiefly in two forms. The first, called *Miso,* is a rich paste, of the consistence of butter, the place of which it supplies in various dishes, and is composed of a mixture of the beans and rice stewed and highly seasoned with salt. The second, called *Sooju* [shoyu] by the Japanese, is the celebrated sauce, known in commerce by the name of *Soy* [sauce] and imported in large quantities from the East, the best being brought from Japan. The Japanese method of making *Soy* was described by Kaempfer, in the 'Amoenitates Exoticae,' published in Latin, in 1712. It is as follows:" An 18-line description is then given.

"Kaempfer says that the Japanese use this sauce to season every dish of fried or roasted food. For fish, beef, and mutton, it forms a very savoury as well as a harmless condiment, the flavour of which is much admired by those who have become accustomed to it; and by many it is preferred to the best Chinese catsup."

"The making of *Soy,* as here described, seems to be a very simple process, and the experiment is worth trying. Should it prove successful, the cultivation of the plant in this country, may become profitable. The beans are said to be good when cooked, like common kidney beans; but it is doubtful whether they would ever take the place of our best varieties of them."

First cited by Hymowitz. 1986. Bibliography of early, previously uncited publications on soybeans in the United States. 2 p. Unpublished.

Note 1. This is the earliest document seen (July 2000) published in the United States that contains the word "Miso." Note 2. This is the earliest document seen (June 2001) that mentions the term "profitable" (or "profit" or "profits") in connection with soybeans in the United States. Address: Cambridge, Massachusetts.

107. Waterston, William. 1847. A cyclopædia of commerce, mercantile law, finance, commercial geography, and navigation. New ed. Containing the present tariff and an essay on commerce. London: Henry G. Bohn. iv + 684 + 39 + 128 p. 23 cm.
• ***Summary:*** The section titled "Soy" (p. 627) is identical to that in the 1843 edition. Address: Esq., mercantile agent and accountant [England].

108. Hedde, Isidorel; Renard, Éd.; Haussmann, A.; Rondot, Natalie. 1849. Étude pratique du commerce d'exportation de la Chine [Practical study of the business of exporting from China]. Paris: A la Librairie du Commerce, Chez

Renard; Canton, China: Chez Reynvaan et Cie.; Batavia: Chez Sanier. 280 p. See p. 188-90. [3 footnotes. Fre]
• ***Summary:*** Item No. 64 is "Soy sauce" *(Soya).* Names: English: soy. Portuguese: soja. Chinese court dialect [Mandarin]: chi-you. Chinese (Cantonese): chi-yaou. Nature and origin of the basic material: Soy sauce *(le soya)* is a seasoning made with the seeds of a species of bean *(haricot),* which grows in China and Japan: it is the *si-yao* of the Japanese, the *you-tao* of the Chinese, the *dolichos soja* of the botanists. It is a member of the legume family. Footnote: The *you-tao* is found among the edible plants of Macao and Canton, and entire fields of it are cultivated on the island of Tchou-san, as well as in the provinces of Fujian *(Fo-kièn)* and Zhejiang *(Tché-kiang).*

Method of manufacture: The manufacture of soy sauce *(du soya),* without being difficult, requires attentive care and practice; Chinese families prepare their soy sauce themselves.

Weigh a certain quantity of black [soy] beans *(haricots noirs),* boil them over a low flame; they must be taken out in time to avoid overcooking. Drain them, then add a certain quantity of wheat or barley flour [the amount is not specified]. Cover the vessel, and leave it for a bit in some warm and humid corner. Fermentation begins, an abundant mold forms, and when it is withered and dried out, wash the beans. Next throw them in a jar with an equal weight of sea salt, three times as much boiling water and some aromatic substances. There is nothing more to do than to place the terrine in the sun; open it during the day and close it at night or when it rains. One month later, the soy sauce is done, which does not prevent many housekeepers from allowing theirs to age thirty or forty days more. Clarify, drain the mass, and put the liquid in bottles.

Description of the finished product: Soy sauce *(Le soya)* is a clear liquid, brownish-black in color; when shaken in a bottle, it should leave a brownish yellow foam on the walls. Its flavor is pleasant and renders it an excellent seasoning.

Soy sauce from Japan is much more esteemed than that of China; its taste, quality, and aroma are so unlike that it is not doubtful that the preparation is different. It appears, besides, that the Japanese use other very common ingredients, they say, in their empire.

Price in Canton (piasters/picul): First grade: 12. Second grade: 10. Third grade: 8. However you can buy a good grade for as little as 5.25 to 7.75 piasters/picul. Churn-ching [Chunking?] sells for 3 piasters a dozen bottles of superior quality soy sauce which is ordinarily sent to British India.

Exportation, destination, and usage: This seasoning has now been adopted throughout almost all of British India, and for the last 20 years [since 1829] it has even been served on the tables of London, Singapore, Pulao Pinang (the first British settlement in Malaya; *Poulo-Pinang),* Manila [Philippines], Batavia [today's Jakarta, Indonesia], and Bourbon [today's island of Réunion / Reunion]–and much is consumed. The usage is expanding in the United States.

A table shows exports of soy sauce (quantity and value) from Canton: In 1844–1,120 piculs worth 9,029 piastres / piasters; 98.9% is sent to England, 0.9% to the USA, and 0.01% to France. In 1845–568 piculs worth 6,380 piasters; 75.7% is sent to England, 13.7% to Denmark, 8.5% to Sweden, 1.6% to the USA, and 0.5% to Germany.

The Chinese consume large quantities of it which they make themselves in their homes; products destined for export come from factories in Henan (a province in central China; W.-G. Honan) and Canton.

Export duties: 4 mèces per picul = 5.05 francs per 100 kg.

Note: This is the earliest document seen (Aug. 2009) concerning soybean products (soy sauce) in Réunion. This document contains the earliest date seen for soybean products in Réunion (1849 or before); soybeans as such had not yet been reported by that date.

Note 2. This is the earliest document seen (April 2007) concerning export duties or tariffs on a soy product–soy sauce exported from China–or soybeans.

Note: This is the earliest French-language document seen (Jan. 2010) that uses the words *chi-you* or *chi-yaou* to refer to soy sauce. Address: Commercial Delegates attached to the French Mission in China.

109. *Maitland Mercury & Hunter River General Advertiser (New South Wales, Australia).* 1850. Shipping intelligence (From the Sydney Morning Herald). April 17. p. 2.
• ***Summary:*** "Imports. April 14.–*Titania,* schooner, 140 tons, Captain Knight, from Hongkong and Manila: 5 packages silks, 40 half-chests cassia, 60 packages matting,... 30 boxes sweetmeats, 20 boxes soy [sauce], 1 package tea,... 2,400 bags sugar."

Note: This cargo was for Caucasian clients.

110. Mason, Francis. 1850. The natural productions of Burmah: or, Notes on the fauna, flora, and minerals of the Tenasserim provinces and the Burman empire. Maulmain [Moulmein], Burma: American Mission Press, Thos. S. Ranney. [xii] + vii + 712 p. Index. 19 cm.
• ***Summary:*** The title page states that Rev. Mason is a corresponding member of the American Oriental Society, of the Boston Society of Natural History, and of the Lyceum of Natural History, New York.

The Preface begins: This work owes its origin to the wants experienced to a translator of the Bible."

In the Preface (which has no page numbers), Mason states that "no pretensions are made in this work to completeness. It is not a book composed in the luxury of literary leisure, but a collection of notes that I have been making during the twenty years of my residence in this

country, in the corners of my time that would otherwise have been wasted." After the Preface there is an Introduction followed by chapters titled "Geology" and "Mineralogy."

The chapter titled "Plants" (p. 543) begins: "Besides the plants that I have examined myself, others are enumerated in this catalogue, that have been collected by Carey, Wallich and Griffith, which I have met with in Roxburgh's 'Flora Indica,' Voigt's 'Hortus Suburbanus Calcuttensis,' Lindley's 'Genera and Species of Orchideous plants,' Bentham's 'Labiatarum Genera et Species,' De Candolle's 'Prodromus Systematis Naturalis Regni Vegetabilis, Pars V.' Wight's 'Illustrations of Indian Botany,' Wight's 'Icones Plantarum Indiæ Orientalis,' and Wallich's 'Plantæ Asiaticæ Rariores.'"

Therefore, all the plants listed in the following pages were observed and recorded by other botanists in "British India" but were *not* observed by Mason in Burmah.

Note 1. The term British India also applied to a small part of Burma (present-day Myanmar) starting in 1824, and by 1886, almost two thirds of Burma had come under British India. This arrangement lasted until 1937, when Burma commenced being administered as a separate British colony.

In the Catalogue of plants, the section titled "Leguminosae, Leguminous plans" (p. 575) includes the following listings (with the name of each plant species also written in the Burmese script):

*Soja hispida*, Monch. (p. 578).

*Cicer arietinum*, Grah., Chick Pea (p. 578).

*Phaseolus mungo*, Lin. Gram (p. 578).

*Psophocarpus tetragonolobus*, D.C., Chevaux de Frize Bean (p. 579).

Note 2. The reference to the soybean, *Soja hispida*, in this book does *not* prove that the soybean was in Burma or cultivated in Burma in 1850. Address: Rev [USA].

111. Crawfurd, John. 1852. A grammar and dictionary of the Malay language: With a preliminary dissertation. 2 vols. London: Smith, Elder, and Co. 21 cm

• ***Summary:*** Vol. I, "Dissertation and Grammar," contains two parts: A long essay about the language (p. i to ccxci), and a "Grammar of the Malay language" (84 p.). On p. clxxxiv is a list of cultivated plants. *Kachang* means "pulse" in both Malay and Javanese. Malay is always written in the Arabic alphabet, to the 28 letters of which 6 are added using diacritical marks to express sounds unknown to the Arabic language. Of the 34 letters, there are only 3 vowels, all long (p. 1). The Arabic alphabet is very ill adapted to pronunciation of the Malay language, whose native sounds "can be expressed with ease and precision by Roman letters, and with a few trifling modifications, so as to furnish one unvarying character for every sound" (p. 2).

Vol. II is titled "Malay and English, and English and Malay Dictionaries" (208 + 201 p.). Abbreviations: J. = Common to the Malay and Javanese. v. = variants / variant of. Soy-related words and terms include: "Kachang (J.). A common term for pulses or leguminous plants." "Kachang-jâpun. The Japan or soy bean, *Soja hispida.*" "Kachang kâdâle (Telinga). Hairy-podded bean, *Phaseolus max.*" "Ragi (J.). Yeast, barm. In Javanese, it more frequently means spiceries."

The following soy-related terms do *not* appear: Bungkil, bunkil, kachap, kechap, kechipir, onchom, tahu, tahua, takoa, takua, taosi, tausi, tapai, tapé, tauchi, tauge, tempe.

Other terms that do appear: "Agar-agar. The name of the alga or sea-weed which is a considerable article in the Chinese trade, *Plocaria candida*" (p. 2). "Bijen (J. wijen). The sesame plant, *Sesamum indicum.*" Note 1. This is the earliest English-language document seen (Jan. 2005) that contains the word "sesame."

"Kachang-china. Chinese pulse, *Phaseolus lunatus;* v. Kachang-mas." "Kachang-goreng. The ground-nut, *Arachis hypogæa;* v. Kachang-tanah and Kachang-miñak." "Kachang-gunung. Mountain pulse, *Hedisarum [Hedysarum] gangeticum.*" "Kachang- ijau. Green pulse [mung bean], *Phaseolus radiatus.*" "Kachang-jâriji. The lablab bean, *Lablab vulgaris.*" "Kachang-kakara, v. Kachang-jâriji." "Kachang-kakara-gatal. Cowitch, *Dolichos pruriens.*" "Kachang-kayu. The pigeon pea, *Cytisus cajan.*" "Kachang-kâchil. Rayed bean *Phaseolus radiatus humilis.*" "Kachang-manila. The Manilla bean [Manila bean] *Voandzeia subterranea.*" "Kachang-mas. Golden bean, or Chinese bean *Phaseolus radiatus;* v. Kachang-china." "Kachang-miñak. Oil bean or ground-nut, *Arachis hypogæa;* v. Kachang koreng and Kachang-tanah." "Kachang-moñat. Monkey bean or snail-flower, *Phaseolus caracalla.*" "Kachang-pendek. Lowly bean, *Phaseolus compressus.*" "Kachang-putih. White bean, *Dolichos katchang.*" "Kachang-tanah. Ground-nut or oil bean, *Arachis hypogæa.*" "Lânga (J. oil). The sesame plant, *Sesamum indicum.*" "Wijen (J.). The sesame or oil plant, *Sesamum orientale.* In Javanese it has the epithet of, alas, 'wild,' or 'of the forest.'"

John Crawfurd lived 1783-1868.

Note 2. This is the earliest English-language document seen (Aug. 2007) that contains the term "pigeon pea."

Note 3. This is the earliest English-language document seen (May 2008) that contains the term "ragi," which is the Malay / Indonesian word for "tempeh starter," made with *Rhizopus* mold grown on soybeans.

Note 4. "Cowitch, *Dolichos pruriens,*" probably refers to the velvet bean, *Mucuna pruriens* (L.) DC. If it does, this is the earliest document seen (April 2007) and the earliest English-language document seen (April 2007) that mentions

this plant. Address: Author of "The History of the Indian Archipelago" [London, England].

112. Mason, Francis. 1852. Tenasserim: or, Notes on the fauna, flora, minerals, and nations of British Burmah and Pegu. With systematic catalogues of the known minerals, plants...; with vernacular names. Maulmain [Moulmein], Burma: American Mission Press, Thos. S. Ranney. xv + 712 p. See p. 578. 19 cm.

• ***Summary:*** The title page states that Rev. Mason is a corresponding member of the American Oriental Society, of the Boston Society of Natural History, and of the Lyceum of Natural History, New York.

In the preface he states that "no pretensions are made in this work to completeness. It is not a book composed in the luxury of literary leisure, but a collection of notes that I have been making during the twenty years of my residence in this country, in the corners of my time that would otherwise have been wasted."

Starting on page 131 he describes the great variety of vegetables which are indigenous or cultivated in British Burmah and its Provinces–most of which he has personally observed. He gives the English name for each known plant, a brief nontechnical description, the scientific name, and the local name for each, in Tavoy or Arracoan, where known. The peas and beans which he describes include the pea *(Pisum sativum),* Goa bean [winged bean] *(Psophocarpus tetragonolobus),* sword bean *(Canavalia gladiata; Dolichos gladiatus),* Indian kidney bean *(Lablab vulgare; Dolichos lablab;* probably lablab bean / hyacinth bean), native bean *(Cyamopsis psoraloides; Dolichos fabaeformis),* black gram *(Phaseolus mungo, melanospermus; Phaseolus max),* melilot *(Melilotus),* agati *(Agati grandiflorum),* chickpea *(Cicer arietinum),* doll or doll bean *(Cajanus indicus),* wild French bean *(Phaseolus trilobus),* and wild dolichos *(Dolichos pilosus).* The soybean is not mentioned in this part of the book. Note 1. This is the earliest English-language document seen (Aug. 2007) that uses the term "sword bean to refer to *Canavalia* species.

However a section titled "Plants" (p. 543) begins: "Besides the plants that I have examined myself, others are enumerated in this catalogue, that have been collected by Carey, Wallich and Griffith, which I have met with in Roxburgh's 'Flora Indica,' and seven other books about Oriental botany whose authors and titles he gives.

In this section, under Leguminosae (p. 575), Mason lists the genus Soja *(Monch.)* and the species Soja hispida *(Monch)* (p. 578). No local name is given. Thus, he apparently had not observed the soybean in Burmah or its provinces by 1852, but he was aware of the plant.

Note 2. This is the earliest document seen (May 2010) concerning soybeans/soya in connection with (but not yet in) Burma.

Note 3. This is the earliest English-language document seen (June 2008) that mentions hyacinth beans together with soybeans.

Concerning the "Earth Nut or Pea Nut" *(Arachis hypogea* Lin.; p. 580), the Burmese name is given as *myæ-bai.* Note 4. This is the earliest English-language document seen (May 2001) that uses the term "Pea Nut" to refer to the peanut.

Note 5. This is the earliest English-language document seen (June 2008) that mentions the word "chickpea" (or chickpeas; spelled as one word). "The chickpea, or gram, is grown extensively by the Burmese, especially in Burmah, and large quantities are imported into the Provinces from Rangoon."

Note 6. This is the earliest document seen and the earliest English-language document seen (Jan. 2009) that mentions the black gram, whose main scientific came is given as *Phaseolus mungo, melanospermus.* Address: Rev., A.M., Tavoy [British Burmah].

113. McCulloch, John Ramsay; Vethake, Henry. 1852. A dictionary, practical, theoretical, and historical, of commerce and commercial navigation. 2 vols. Philadelphia, Pennsylvania: Hart, Carey and Hart. See Vol. 2, p. 201, 536, 18 at end.

• ***Summary:*** Nangasacki (p. 200-01): The Japanese islands are believed to contain 50,000,000 people. All foreigners are rigidly excluded, "with the exception of the Dutch and Chinese; and they are allowed to visit Nangasacki, the former with 2 ships and the latter with 10 junks."

"The Chinese trade with Japan is understood to be conducted from the port of Ningpo, in the province of Chekiang, which is so conveniently situated, that 2 voyages may be performed in the year, even by the clumsy junks of China. The commodities with which the Chinese furnish the Japanese, consist of raw sugar, cow and buffalo hides, wrought silks, consisting chiefly of satins and damasks, eagle and sandal wood, ginseng, tutenague or zinc, tin, lead, fine teas, and, for more than 100 years back, some European broad cloths and camlets. The exports consist of copper, limited to 15,000 piculs, or about 900 tons; camphor, sabre [sword] blades, pearls, some descriptions of paper and porcelain, and some Japan ware, which is either curious or handsome, but not so substantial as that of China."

"The following are the quantities and value of goods exported and imported by the Dutch in their trade with Japan in 1825; the ships employed being one of 600, and one of 700 tons burden. The trade is exclusively carried on with the port of Batavia." A table shows exports to and imports from Nangasacki. Imports from Nangasacki to Batavia, then Holland include: "Sakkie [saké] and soy [sauce]. Value: 14,302 florins.

Soy (p. 536): a species of sauce prepared in China and Japan from a small bean, the produce of the *Dolichos soja.*

It is eaten with fish and other articles. It should be chosen of a good flavour, not too salt nor too sweet, of a good thick consistence, a brown colour, and clear; when shaken in a glass, it should leave a coat on the surface, of a bright yellowish brown colour; if it do not, it is of an inferior kind, and should be rejected. Japan soy is deemed superior to the Chinese. It is worth, in bond, from 6*s*.. to 7*s*. a gallon. It is believed to be extensively counterfeited.–*(Milburn's Orient. Com.)*.

At the end is a long table titled "The new tariff of 1846, together with the tariff of 1842, reduced to ad valorem rates, as far as practicable." On page 18 is "Soy." 1846 = 30. 1842 = 30. Address: 1. Esq.; 2. LL.D, Prof., Univ. of Pennsylvania.

114. *New England Farmer.*1853. State Board of Agriculture: Met January 25, 1853. 5(3):116. March.

• ***Summary:*** "Mr. Wilder presented a dried specimen of a plant covered with seed, which he had received from A.H. Ernst, late President of the Cincinnati [Ohio] Horticultural Society. The plant is the *Cajanus flavus,* near allied to the Lupines. The seed was introduced into the country two years since by one of our ships, which found a Japan vessel in distress, from which the crew, with part of the stores, were taken and carried into San Francisco. This seed was among their provision stores, and a small quantity was brought to Alton, Illinois, by Dr. [Benjamin Franklin] Edwards, and grown by Mr. John H. Lea, a careful horticulturist of that place. The plant presented grew in Cincinnati last summer. Mr. Wilder read a statement from Mr. Teschemaker [Teschemacher, of Boston], which describes this new plant as follows: 'Shrub erect, pubescent, native of the East Indies, Amboyna, Japan, &c. The seeds are good to eat, and when young, very delicate.'"

Note: Since the New England Farmer is published in Boston, Massachusetts, the State Board of Agriculture is probably the board for Massachusetts.

115. *Prairie Farmer.*1853. Japan pea. 13(3):101. March.

• ***Summary:*** *"Cajanus Bicolor.*–The identity of this new pea, of which there has been so much notice taken lately, has been fixed by the botanist to the Massachusetts Horticultural Society, and now we are no longer in doubt as to its character. So many Californian novelties have been lately shown up, that the prudent begin to look with suspicion on new seeds. Mr. J.E. Teshemacher [sic, Teschemacher, botanist at the Massachusetts Horticultural Society; see *Moore's Rural New Yorker* 12 Feb. 1853, p. 54] referred it to the genus *cajanus,* closely allied to the *Lupin* family. As the plant is generally a native of *Amboyna,* in the East Indies, he concludes that it will not stand the winter in the northern states, though according to the experiment of Mr. Ernst, 'they mature fully on the Ohio river.'"

Note: The plant referred to here is actually the soybean, which Mr. Teschemacher incorrectly identified as the pigeon pea *Cajanus bicolor* in Feb. 1853. Address: Chicago, Illinois.

116. *Magazine of Horticulture, Botany, and All Useful Discoveries and Improvements in Rural Affairs (Boston).*1853. Art. II. Massachusetts Horticultural Society. 19:186-89. April.

• ***Summary:*** Page 188: Jan. 22. "Dr. Wight read a letter from Mr. A.H. Ernst, accompanied with seeds of the Japan peas; and also a note from Mr. Teschemacher, upon the same. The Letters are as follows:–"My Dear Sir:–I herewith send for your distribution amongst the members of the M.H. Society, a small parcel of peas.

"The growth of the plant is peculiar, being of an upright and stiff form, somewhat branching; the leaves are large, light green, and downy beneath; the blossom is small and of a lilac color; seed pods numerous, small and wooly,–growing in clusters over the entire plant, proving very productive.

"Its habit of growth is sucb as to fit it to withstand severe storms; and, should it prove valuable as food for cattle, it must commend itself to the agricultural community in field culture.

"In its cultivation it evidently requires room, to give the plant a full development for branching. Its bearing properties are immense. Accompanying the seeds I send a plant, to show its habits of growth and bearing properties. Its origin is said to have been Japan. It was introduced into this country, some two years since, by the agency of one of those calamities which sometimes result in benefit to mankind.

"An American ship encountered a Japan vessel in distress, and the crew were carried to San Francisco, California. Amongst the stores which were transferred was the 'Japan pea,' a few of which found their way into the hands of Dr. Edwards, of Alton, Illinois. He handed them over to Mr. J.H. Ladd, a distinguished horticulturist, who presented the produce to our society. Those now sent you were grown in my grounds,–having fully matured in our climate. Your climate may prove too severe.

"I have sent small packages of seed to kindred associations, with the request that they may be placed in careful hands. It is possible that it may not be anything new with you. I would be thankful for any information you may possess in reference to it.–Very respectfully, A.H. Ernst, Spring Garden, Cincinnati, Ohio, Jan. 11th, 1853."

"'The plant alluded to by Mr. Ernst is *Cajànus bicolor* [sic], a native of East Indies, Amboyna, Japan, &c. Flower small, interior yellow, vexillum purple; erect shrub; pubescent; nearest in alliance to Lupinus. The seeds are good to eat, and, when young, very delicate. On soaking the round seeds for an hour, in moderately hot water, they take

exactly the form and appearance of the common white bean, become quite tender, and have a pure and delicious nutty and oily flavor. *The whole plant, with the seed, is excellent for fattening hogs and cattle.*

"'There is one other species, *Cajàanus flàvus,* common in South America and the West Indies, where it is sometimes used for a fence to sugar plantations. In Jamaica this species is much used for feeding pigeons, and is there called the Pigeon-pea. In Martinique the seed is much esteemed for the table.

"'Being a tropical plant, it would hardly stand our winters. Yet, from the observations of Mr. Ernst, it is not improbable that our climate might admit of an annual harvest of the seed, which seems to be so abundantly produced as to make an experiment highly interesting.– Most truly yours, J.E. Teschemacher, Boston, 19th Jan., 1853.'"

Note: Mr. Teschemacher has confused the pigeon pea with the soybean.

117. Junghuhn, Franz W. 1853. Plantae Junghuhnianae. Enumeratio plantarum, quas in insulis Java et Sumatra [Listing of plants from the islands of Java and Sumatra]. Lugduni-Batavorum (Leiden): A.W. Sythoff. Lipsiae (Leipzig): T.O. Weigel. 570 p. See p. 205, 233. [1 ref. Lat]
• ***Summary:*** Edited by FAW Miquel. Bentham is the author of the Leguminosae chapter, starting on p. 205. The basic entry, in Latin reads: "1. Soja hispida Moench.–W. et Arn. *Prodr.* v. 1. p. 247 (*). Hab. in *Javae* monte *Gunung-Gamping* prope *Jogjakérta* (Jungh.)." It refers to the fact that Junghuhn reported soybeans in Java on Mount Gunung-Gamping near Yogyakarta in 1853.

The asterisk (*) refers to a long footnote which discuses, in Latin, possible relationships between the following species: *Soja Wightii* Grah., *Johnia Wightii* W. et Arn., *Bujacia anonychia* E. Mey, *Soja javanica, Glycine micrantha* Hachet, *Johnia Willdenowii* Hook., and *Johnia Petitiana* A. Rich.

Note: The great naturalist Junghuhn died in April 1864, apparently in Java. His life had been devoted to the cultivation of chinchona, from which quinine was extracted. His successor was Van Gorkom. Address: Indonesia, Netherlands, and Germany.

118. Staunton, George T. ed. 1853. The history of the great and mighty kingdom of China, and the situation thereof. Compiled by the padre Juan Gonzalez de Mendoza. And now reprinted from the early translation of R. Parke. *Works Issued by the Hakluyt Society (London)* Vol. 14. lxxxiii + 172 p. See p. 95. Reprinted in 1970. [15 ref]
• ***Summary:*** This is a new edition of *The Historie of the Great and Mightie Kingdome of China, and the Situation Thereof,* edited by Sir. George T. Staunton. It was first published in 1588 in London in English, then in 1596 in Spanish.

Chapter 7 (p. 95) states that in the year 1585 three Chinese merchants visited Mexico and brought with them curious things: "The desire of gain hath caused them to traueile to Mexico, whither came the yeare past in anno 1585 three merchants of China, with verie curious things, and neuer staied till they came into Spaine and into other kingdomes further off."

Note 1. Prof. Ted Hymowitz believes that, because of this new information, soybeans were probably introduced to the New World by at least 1585. The first Spanish galleon to make a round trip from Acapulco to Manila was in 1565. Thus, it is not too far fetched to think that impressed Chinese seamen or Chinese merchants returned to the New World bearing soybeans.

Note 2. Bart is the abbreviation for Baronet, a member of a British hereditary order of honor, below that of Barons, made up of commoners, designated by "Sir" before the name and "Bart" after. Address: Sir, Bart, England.

119. Simmonds, Peter Lund. 1854. The commercial products of the vegetable kingdom, considered in their various uses to man and their relation to the arts and manufactures; forming a practical treatise & handbook of reference for the colonist, manufacturer, merchant, and consumer... London: T.F.A. Day. xix + 668 p. See p. 313. Index. 23 cm.
• ***Summary:*** In the section on "Pulse" we read (p. 313). "The well known sauce, Soy, is made in some parts of the East, from a species of the Dolichos bean *(Soja hispida),* which grows in China and Japan. In Java it is procured from the *Phaseolus radiatus.* The beans are boiled soft, with wheat or barley of equal quantities, and left for three months to ferment; salt and water are then added, when the liquor is pressed and strained. Good soy is agreeable when a few years old; the Japan soy is superior to the Chinese. Large quantities are shipped for England and America. The Dolichos bean is much cultivated in Japan, where various culinary articles are prepared from it; but the principal are a sort of butter, termed *mico,* and a pickle called *sooja.*

"1,108 piculs of soy were shipped from Canton in 1844, for London, British India, and Singapore. 100 jars, or about 50 gallons of soy, were received at Liverpool in 1850. The price is about 6s. per gallon in the London market."

One page earlier, the section on "Pulse" states (p. 312): Of leguminous grains there are various species cultivated and used by the Asiatics, as the *Phaseolus Mungo* [mung bean] *P. Max* [soya bean], and *P. radiatus* [probably azuki bean], which contains much alimentary matter; the earth-nut *(Arachis hypogaea),* which buries its pods under ground after flowering."

"Captain H. Biggs [sic, Bigge], in a communication to the Agri.-Hort Soc. [Agricultural & Horticultural Society]

of India, in 1845 [sic, Aug. 1844], states that of the esculents a large white pea forms the staple of the trade of Shanghae [Shanghai], or nearly so, to the astonishing amount of two and a-half millions sterling. This he gives on the authority of the Rev. Mr. Medhurst, of Shanghae, and Mr. Thoms [sic, Thom], British Consul at Ningpo. These peas are ground in a mill and then pressed, in a somewhat complicated, though, as usual in China, a most efficient press, by means of wedges driven under the outer parts of the framework with mallets. The oil is used both for eating and burning, more for the latter purpose, however, and the cake, like large Gloucester cheese, or small grindstones in circular shape, is distributed about China in every direction, both as food for pigs and buffaloes, as also for manure."

Note 1. The "large white pea" is clearly the soybean.

Note 2. This is the earliest document seen (Aug. 2001) that uses the spelling "Shanghae."

In the chapter titled "Oleaginous plants" we read (p. 512): "In Japan a kind of butter, called *mijo,* [sic, *miso]* is obtained from a species of the Dolichos bean *(Dolichos soja).*

Also discusses: Almonds and almond oil (p. 510, 533). Wheat gluten (221, 234, 264). Hemp and hemp oil (p. 510). Sesame or teel, sesame oil, black til, and gingelie oil (p. 511, 533-34). "The export of linseed and rapeseed cakes from Stettin" (p. 564).

Note 3. Peter L. Simmonds lived 1814-1897.

Note 4. This is the earliest English-language document seen (July 2003) that uses the words "gingelie" or "teel" to refer to "sesame."

Note 5. This is the earliest English-language document seen (Sept. 2006) that uses the word "Oleaginous" or the term "Oleaginous plants" in connection with the soybean. Oil derived from the soybean is also mentioned. Address: England.

120. Hildreth, Richard. 1855. Japan as it was and is. Boston, Massachusetts: Phillips, Sampson and Co.; New York: J.C. Derby. xii + 576 p. Folded map. Index. 21 cm. Facsimile edition reprinted in 1973 by Scholarly Resources (Wilmington, Delaware).

• ***Summary:*** Richard Hildreth (lived 1807-1865) never traveled to Japan, but he read widely from the writings of those who did. He summarizes them and quotes them in this book, which is basically a history (in chronological order, by the date of Hildreth's source).

In Chapter 32 (1690-1692), in the section on tea, the following quotation (probably from Engelbert Kaempfer) appears (p. 312): "'The common sauce for these and other dishes is a little *soy* [sauce], as they call it, mixed with *saki [sake],* or the beer of the country.'"

In Chapter 39 (1775-76), in the section on imports and exports, the following summary appears (from C.P. Thunberg) (p. 390-91): "The chief articles of export were copper, camphor and lackered [sic, lacquered] goods; porcelain, rice, saki, soy,* were also exported" (Footnote: *"This sauce, used in great quantities in Japan and exported to Batavia by the Dutch, whence it has become known throughout the East Indies and also in Europe, is made from the soy bean *(Dolichos Soia)* [sic], extensively used by the Japanese in the making of soup [sic]. The soy is prepared as follows: the beans are boiled until they become rather soft, when an equal quantity of pounded barley or wheat is added. These ingredients being mixed, the compound is set away for twenty-four hours in a warm place to ferment. An equal quality of salt is than added, and twice and a half as much water. It is stirred several times a day for several days, and then stands well covered for two or three months, when the liquid portion is decanted, strained, and put in wooden casks. It is of a brown color, improves with age, but varies in quality, according to the province where it is made. The Dutch of Deshima cork up the better qualities in glass [sic, porcelain] bottles, boiling the liquor first in an iron kettle, to prevent fermentation, by which it is liable to be spoiled)." Address: Author, Boston, Massachusetts.

121. Miquel, Friedrich Anton Wilhelm. 1855. Flora van Nederlandsch Indie (Flora Indiae Batavae) [Flora of the Netherlands Indies. Vol. I, part 1]. Amsterdam and Utrecht: C.G. van der Post. 1116 p. See p. 196-97 (Phaseolus species) and p. 221-24 (Glycine and Soya species). [9 ref. Dut]

• ***Summary:*** Miquel's Soya species include: 1. Soya hispida Moench, 2. Soya Wightii Grah. (named Glycine javanica by Linnaeus and Soya javanica by Grah.), 3. Soya angustifolia Miq. 4. Soya hamata Miq.

Glycine species include: 1. Glycine labialis Linn., 2. Glycine mollis Wight et Arn.

Note: This is the earliest document seen that mentions *Soya angustifolia.*

According to Merrill (1917), Miquel (p. 197) named a narrow-leafed form from Java *Phaseolus radiatus.* He erroneously thought it was the soybean. Note: It may have been the azuki bean.

Miquel was born on 24 Oct. 1811 at Neuenhaus, Germany, and died on 23 Jan. 1871 at Utrecht, Netherlands. A botanist, he was the son of a country physician. His University studies and subsequent academic career took place in the Netherlands. "Trained as a physician at the University of Groningen, Miguel specialized in botany and was director of the Rotterdam botanic garden (1835-1846), professor of botany at Amsterdam (1846-1859) and at Utrecht (1859-1871), and director of the Rijksherbarium at Leiden (1862-1871). His numerous (296 items in his bibliography) botanical publications deal mainly with the floras of the former Netherlands East Indies, Surinam, and Japan... Miguel was also the founder of the University of Utrecht herbarium."

An illustration facing the title pages shows a portrait of Georgius Everhardus Rumphius, blind and white-haired in his old age, holding a hranch on a tahle.

Also discusses: *Psophocarpus tetragonolobus* [winged hean] (p. 181). Address: Hoogleeraar in de Plantenkunde te Amsterdam.

122. Crawfurd, John. 1856. A descriptive dictionary of the Indian islands & adjacent countries. London: Bradbury & Evans. 459 p. Reprinted in 1971 by Oxford University Press, with an introduction hy M.C. Ricklefs.

• ***Summary:*** This hook is ahout the region now (May 2010) known as Southeast Asia, and especially ahout the Malay Archipelago (today's Indonesia and Malaysia). Its main focus is geography, history, language, culture, and colonial affairs, but there is some information about food and agriculture.

The section titled "Pulses" (p. 361) states: "The generic name in Malay and Javanese for all leguminous plants, is kachang, hy adding an epithet to which we have the name of the species. Several species are regular ohjects of cultivation, as Phaseolus max, lunatus and radiatus; Dolichos kachang; Lahlah vulgaris; Soja hispida; Cytisus cajan, and Arachis hypogæa. In Java, the greater numher of these are cultivated in the dry season from irrigated land, which during the wet had yielded a crop of rice; that is, they form one of two crops from the same land within the year. The last-named plant, the ground nut, is raised in inferior dry lands, and is the chief source of the lamp-oil consumed by the natives. Most of the cultivated leguminous plants may be judged by the epithets annexed to them to be exotics; thus, Phaseolus lunatus, is called Kachang China, or Chinese pulse; and Soja hispida, the soy-bean, Kachang-Jâpun, or Japanese pulse; Phaseolus max has a Talugu or Telinga name annexed to it, kâdâlé."

Note: Crawfurd seems to he confused ahout Phaseolus max, an early and outdated name for the soyhean, which is now (Feb. 2004) called "Kachang kedele" (rarely "kadele," never "kadale") in Indonesia.

The section on "Oil" notes "in Malay miñah, and in Javanese lânga, both of them words of extensive currency throughout the Malay and Philippine Archipelagos. The plants from which fatty oils are chiefly extracted are the coco-palm [coconut], the ground pea [peanut], the sesame, and the palma-christi; the first for edihle use and the three last for the lamp... Animal oils are hardly used in any shape; essential oils are obtained from the clove, the nutmeg, the kayu-puti (Melaleuca cajeput) and in great abundance and cheapness from the Malay camphor-tree (Dryobalanops camphora)."

The section titled "Arachis" (p. 13, ahout the peanut) states: "The Arachis hypogæa, or ground pea, is known in the Malayan countries under the several names of kachang-tanah, kachang-China, and kachang-Jâpun, meaning ground, Chinese, and Japan pulse. The two last of these names would seem to imply, what is probable, that the plant is an exotic, and was introduced either from China or Japan, with both of which the inhabitants of the Archipelago had maintained a commercial intercourse hefore the arrival of Europeans in India. With the exception of the coco-palm, it is, of all the oil-yielding plants, the most extensively cultivated in the Archipelago."

Note: This is the earliest English-language document seen (Sept. 2006) that contains the terms "oil-yielding" or "oil-yielding plants" in connection with seeds.

Other food-related entries include: Agar-agar, Kaempfer (Engelhert), nutmeg, onion (Allium), opium, orange, potato, Rumpf / Rumphius, safflower, and sago. John Crawfurd lived 1783-1868. Address: F.R.S. [London, England].

123. Faulkner, Alexander. 1856. Faulkner's dictionary of commercial terms: With their synonyms in various languages. Bombay, India: Printed at L.M. D'Souza's Press. iii + 158 + vii p. 18 cm. [1 ref]

• ***Summary:*** "Soy. A peculiar savoury sauce, made from the hean of the *Soja,* a species of *Dolichos,* growing in the Eastern parts of Asia. Genuine soy is well flavoured, thick, brown, and clear; and when shaken in a glass it should have a coat on the surface of a bright yellowish-brown colour. It is obtained from Canton; but the best is exported from Japan, by way of Batavia [Dutch East Indies]. Waterston."

Also discusses: "Ground nuts.–Guz. (Guzerattee) [Gujarati], Hind [Hindi], *Bhoysing.* Groundnuts are now extensively cultivated in the Concans on account of the oil which they afford. They are occasionally exported to England and France.

"Ground nut oil.–Hind. *Bhoysing ka teil.* It is the oil obtained from ground-nuts by expression. It is largely exported from Bombay to France and England."

Note: The Concans or Co'ncan was an extensive maritime district of southwestern India in the province of Bejapore extending 220 miles along the shore from Damaun to Malabar, bounded on the west by the Indian Ocean and on the south by Canara and Sattara [Satara]. Between 16º and 20º north latitude. On today's map, it would be along the coast south of Bombay. A long range of mountains, named the Western Ghats, runs right along the shore of western India from the Gulf of Khambhat to near the southern tip of the continent (Cape of Comorin).

124. *American Farmer.* 1857. The Japan pea. 12:207. Jan.
• ***Summary:*** "A correspondent of the N.Y. *Tribune,* writing from Chester county [probably in southeastern Pennsylvania], says: 'Sir: The extensive circulation of your paper makes me desirous of calling, through it, the attention of agriculturists and others to the merits of the Japan Pea, or *Cojanus bicolor* [sic, *Cajanus bicolor].* It is a native of East Indies and Japan, and has had but a limited trial among agriculturists here yet, but still enough to demonstrate its perfect adaptation to our climate and soil, its great productiveness, its excellence and wholesomeness as an article of diet, and its easiness of cultivation. I have sold all that I have raised the present season at $4.50 per bushel, and I think they have been more profitable than three crops of Indian corn.

"They may be planted at about the same time as corn... they appear well adapted for ship's stores, for which they are used by nations that cultivate them, and I would recommend a trial of them for the use of the military and naval departments of the government, as occupying much nutriment in a small space and requiring no other preparation for cooking than soaking about twenty-four hours in cold water.' [Some of these peas can be had at the *Farmer* office]."

Note: This is the earliest document seen (Oct. 2003) that gives a price for soybeans ($4.50 per bushel) in the USA, including early seed catalogs–worldwide.

Note 2. Prof. Ted Hymowitz of the Univ. of Illinois observed (personal communication, 21 Feb. 1997) that this is the earliest document seen stating that a significant quantity of soybeans was sold commercially. The author, whose name we do not know, was therefore the earliest known American soybean seedsman or seed dealer. Address: Chester County.

125. *Courier (The) (Hobart, Tasmania, Australia).* 1859. Agricultural and scientific inquiries: East Indian pulses (Letter to the editor). April 11. p. 2.
• ***Summary:*** "M.J. No doubt many valuable vegetable substances, which are grown in and used by the... countries of the Southern Hemisphere, might either be successfully cultivated here or profitably imported."

"The most important of these pulses appears to be the soja hispida, or bhoot, which contains a very large amount of nitrogen, phosphorous, sulphur, and iron."

Note: This is the earliest document seen (March 2010) concerning soybeans (soja hispida) in connection with (but not yet in) Australia, or Oceania.

126. Mason, Francis. 1860. Burmah, its people and productions, or notes on the nations, fauna, flora, and minerals of Tenasserim, Pegu and Burmah... 2nd ed. Rangoon, Burmah: Thos. Stowe Ranney; London: Trubner & Co.; New York, NY: Phinney, Blakeman & Mason. 17 + 913 p. Indexes. 23 cm. First published in 1850 under the title *The Natural Productions of Burmah.*
• ***Summary:*** The first edition of this book was published in 1850 under the title "The natural productions of Burmah..." A closely related edition was published in 1852 under the title "Tenasserim: or, Notes on the fauna, flora, minerals, and nations of British Burmah and Pegu." Note: As of 1972 Tenasserim is a division of southern Lower Burma.

The information on soya in this 1860 edition is basically the same as that in the 1852 edition. Soja or soy is listed in the comprehensive index only on p. 768. In the chapter on Botany, which describes plants the author has observed in Burmah, the soybean is not mentioned in the sections titled "Vegetables" (p. 463-74, though various peas, beans, and legumes are described on pages 466-468), "Cereals" (p. 474-477), "Medicinal plants" (p. 479-509, including many seasonings, spices, and herbs), or "Plants pertaining to economics" (p. 509-525).

Among the plants the author has read of but not observed personally, *Soja hispida* Monch is listed briefly on p. 768; *Glycine labialis* is listed on p. 766.

Also discusses: Pea nut (ground nut, earth nut, *Arachis hypogea.* Burmese: *myæ-bai.* p. 457, 769. "Ground nuts are abundant in the bazars, and are consumed in large quantities by the natives. The plant is raised very extensively by the Red Karens"). Goa bean *(Psophocarpus tetragonolobus.* Burmese: *pai-myeet, pai-hsoung-wa.* p. 466, 768; Chevaux de Frize Bean, edible roots and young pods). Sedge root *(Cyperus,* p. 473, 820; the roots, found among vegetables, taste like filberts). Coix millet (Job's tears, *Coix lacrima, Coix indica?* Burmese: *ka-le-thee.* p. 476, 817; edible seeds). Bhang *(Cannabis sativa,* p. 487-88, 775). Sesamum *(Sesamum indicum,* p. 504, 793). Edible moss (a sea weed, *Fucus amylaceous,* p. 507-09). Bead plants (Job's tears

grown for seeds, *Coix,* p. 522-23). *(Pueraria tuberosa,* p. 766). *(Amarantus oleraceus,* p. 779).

In a chapter titled "Face of the Country" (p. 1-16) the author discusses what later became the geographical divisions of Burma: Pegu, Irrawaddy, Mergui [Magwe], Tenasserim, Palouk, Tavoy, Maulmain, Sitang, Shwaygyeen, Toungoo, Sagain [Sagaing], Rangoon, and Mandelay [Mandalay, the new capital of Burmah in 1860]. He also gives a detailed history of the country and its ethnic groups (the Talaing, the Burman, the Karen, and the Shan), and discusses demonology, Budhism [Buddhism], glossology and philology [linguistics], mammals, birds, fish, reptiles, insects, mollusks, crustaceans, annalids, radiates, plants, and minerals. Francis Mason lived 1799-1874. Address: Rev., Toungoo [British Burmah].

127. Unger, F. 1860. On the principal plants used as food by man. *Report of the Commissioner of Patents, Agriculture.* p. 299-362. For the year 1859. See p. 318. Translated from the German.

• ***Summary:*** Page 318 states: *"Soja hispida,* Monch. *(Soja japonica,* Sav.), or Soy, from Japan, is cultivated in Southern Asia and Europe.

Note 1. The author is using the word "Soy" to refer to the soybean plant rather than to soy sauce.

"What the previously mentioned legumens [legumes] are to the colder portions of the earth the Ground nut *(Arachis hypogaea,* L.) is to the warmer zone. This plant was known neither to the ancient Egyptians and Arabians nor to the Greeks. The latter certainly did not understand this plant under the name of *arachos* [written in Greek letters], which was probably a species of *Vicia.* It has been cultivated for a long time on the west and east coast of Africa, and only quite recently introduced into the Mediterranean regions. A Hindostan [Hindustan] name alone exists for it in Asia. In modern times only, it has been cultivated generally in China and Cochin China, which countries it has reached in some unknown way. On the other hand, six species of *Arachis* certainly belong to the *Flora* of Brazil, and the older authors also mention the cultivation of *Arachis hypogaea* under the names of *Mandubi, Anchic,* and *Mani,* on which account there is little reason to doubt its American origin. The thick tuberous seeds are frequently eaten raw, but are very palatable when roasted. The oil from it is excellent, and is much esteemed in India."

Also discusses "the bean *(Vicia faba,* Linn., *Faba vulgaris,* Mönch.)," lupines *(Lupinus hirsutus, L. albus,* and *L. termis),* lentil *(Ervum lens),* pea *(Pisum sativum),* Chick-pea, Flat-pea *(Lathyrus sativa),* and kidney bean *(Phaseolus vulgaris)* (p. 316-17).

Note 2. This is the earliest English-language document seen (June 2008) that uses the term "Chick-pea" (or "chick-pea" or "chick pea"). We read: "The Chick-pea *(Cicer arietinum,* L. {Greek name}, Theophrastus), is an important kind of pea to the East. The Jews, Greeks, and Egyptians cultivated it in ancient times, and it was also used as an object of devotion, at an early period, even in India, as is shown by the Sanscrit [Sanskrit] names. The common class of Greeks even now make use of it, both raw and roasted, during the winter months, and employ it as a substitute for coffee. It is also cultivated frequently, at the present day, in Egypt, as far as Abyssinia, and, according to Th. Kotschy, is one of the most generally distributed of cultivated plants on the heights of Lebanon as well as in Spain. This plant is represented as almost growing wild in the Caucasian countries, in Greece, &c, and is also found run wild here and there in the fields of Middle Europe." It was "introduced into the model farm of Charlemagne" (p. 317). Address: Dr., Germany.

128. Rigg, Jonathan. 1862. A dictionary of the Sunda language of Java. Batavia, Java: Lange & Co. xvi + 537 + v p. 27 cm. Constituting: *Verhandelingen van het Bataviaasch genootschap van kunsten en wetenschappen.* Vol. 29.

• ***Summary:*** The term "Sunda Isles" once referred to the Malay Archipelago; Java, Sumatra, Borneo, and Sulawesi were called the "Greater Sunda Islands." This Sundanese-English dictionary includes the following soy-related words: "Kachang, a pea, a bean, pulse. *Dolichos* and *Phaseolus* of which the species are very numerous" (p. 182).

"Kadalé, a variety of pulse frequently planted" (p. 183).

Kéchap, Catchup, a dark coloured sauce prepared by the Chinese" (p. 212).

Also mentions: "Kachang tanëuh, ground nut, Arachis hypogæa, so called from the seed vessels returning into the earth, and becoming a sort of granulous root" (p. 183). Ragi, which acts as a ferment in preparing Tapai (p. 391). "Tahi-minyak, oil-cake. The refuse of making oil from the ground-nut or kachang taneuh. This oil cake is much used as a valuable manure, especially for sugar cane" (p. 473). "Tapai, a preparation of boiled ketan rice, in which *Ragi* has been mixed and set to ferment for a couple of days. *Tapai* is given as a treat at all native entertainments" (p. 483). About 150 different words for different kinds of rice are also given. Address: Member of the Batavian Society of Arts and Sciences [Jakarta, Dutch East Indies].

129. Bentham, George; Mueller, Ferdinand. 1864. Flora Australiensis: A description of the plants of the Australian Territory. Vol. II. London: Lovell Reeve & Co. 521 p. See p. 242-45. [5 ref. Eng]

• ***Summary:*** The authors made the first major additions to the genus Glycine, all from Australia. They include only the following 6 species in the genus Glycine: (1) *Glycine falcata,* Benth. Found in Northern Australia by F. Mueller; in Queensland by D'Orsay, and in South Australia by Bowman, and Neilson.

(2) *G. clandestina,* Wendl. Bot. Beob. 54. [Wendland, J.C. 1798. *Botanische Beobachtungen...* p. 54] Found in Queensland by Robert Brown, and Dr. Leichhardt; in New South Wales by R. Brown, C. Stuart, Dr. H. Beckler, and F. Mueller; in Victoria by R. Brown, Adamson, and F. Mueller; in Tasmania by R. Brown, and J.D. Hooker; in South Australia by Dr. H. Behr, and F. Mueller; in Western Australia by Maxwell, and James Drummond.

(3) *G. latrobeana,* Benth.; G. tabacina, Benth. Found in Victoria by Latrobe, Adamson, and F. Mueller; in Tasmania by J.D. Hooker; in South Australia by F. Mueller.

(4) *G. tabacina* Benth. Found in Queensland (at Bustard Bay) by Banks and Solander; in New South Wales by R. Brown, A. Cunningham, C. Stuart, and Beckler; in Victoria by Robertson, and F. Mueller; in South Australia by F. Mueller; in Western Australia by Mr. Augustus Oldfield. "The species is also in New Caledonia, the Feejee [Fiji], and other islands of the South Pacific.

(5) *G. sericea,* Benth. Found in New South Wales by J. Dallachy, and Wheeler; in Victoria by F. Mueller.

(6) *G. tomentosa,* Benth. Found in Northern Australia by F. Mueller, and R. Brown; in Queensland by Banks and Solander, R. Brown, McGillivray, and F. Mueller; in New South Wales by Neilson. "We have the same species from the Philippine Islands and from S. China."

Note 1. Hermann (1962) states: "It was not until 1864 that the first major addition to the genus was made. This was by Bentham, who treated the genus in Australia as comprising six species, all of them still valid although two of his names *(Glycine sericea* and *G. tomentosa)* must be dropped as being later homonyms... Bentham's *Glycine falcata* of 1864 was the last of the true *Glycine* species to be described."

Note 2. This is the 2nd earliest document seen (March 2010) concerning soybeans (but only wild perennial relatives of soybeans) in Fiji; cultivated soybeans have not yet been reported in this country.

Note 3. This is volume 2 of a 4-volume set, which contains no formal bibliography. Most of the citations refer to herbarium collections, which are described by Bentham in the preface to volume 1 (1863). The chief foundation of this work is "the vast herbarium of Sir William J. Hooker, with a few smaller collections under his charge at Kew." It contains rich stores of Australian plants. The Australian herbarium of the late Robert Brown is an "extraordinary collection, the main foundation of our knowledge of Australian vegetation." These specimens are now the property of Mr. J.J. Bennett, Head of the Botanical Department of the British Museum. The Banksian herbarium collected by Banks and Solander [who sailed with captain James Cook] about 90 years ago, is also at the Botanical Department of the British Museum. Rich herbaria were collected at the public expense by the late A. Cunningham in his various expeditions. This collection is "second only to R. Brown's in the influence it has had, by its variety and extent, on our knowledge of Australian botany." Address: 1. F.R.S., P.L.S.; 2. M.D., F.R.S., L.S., Government botanist, Melbourne, Victoria, Australia.

130. Burr, Fearing, Jr. 1865. The field and garden vegetables of America: Containing full descriptions of nearly eleven hundred species and varieties; with directions for propagation, culture, and use. Boston, Massachusetts: J.E. Tilton. xv + 667 p. See p. 499-500. Illust. Index. 20 cm. [25* ref]

• ***Summary:*** Pages 499-500 state: "Japan. *Hov. Mag. [The Magazine of Horticulture, Botany, and Rural Affairs.* By C.M. Hovey. Boston [Massachusetts]. Monthly. 1834 to the present time].

"Cajanus bicolor. The Japan Pea is a native of the East Indies, and also of Japan, as implied by the name. The plant makes a strong, erect growth, with numerous spreading branches; the leaves are large, light green and downy beneath; the flowers are small, yellow at the centre,–the upper petal purple; the seed-pods are small and downy, and are produced in profuse abundance,–growing in clusters over the entire plant; the seeds are small, roundish, or pea-form, and of a cream-yellow color when ripe." Note: This is the earliest English-language document seen (Sept. 2004) that uses the term "cream-yellow" to describe the color of soybean seeds.

*"Propagation and Culture.*–It is raised from seed, which, as the plant requires the entire season for development, should be sown as soon as the ground is warm and settled. Make the drills about 20 inches apart, and drop the seeds ten or twelve inches apart in the drills, covering half or three fourths of an inch deep. The plants will blossom the last of July or beginning of August, and the seeds will be suitable for use in their green state, from the 20th of August until destroyed by frost, the crop being seldom fully perfected in the Northern States.

*Use.*–The seeds are the only parts of the plants eaten, and these, while young, are tender and delicate. The ripe seeds if soaked for an hour in moderately hot water, take the form and appearance of the Common White Bean, become quite soft and tender, and have a pleasant, nutty, and oily flavor. The whole plant with the seeds, is also used for feeding stock.

"A variety occurs with green seeds, which is not only considered superior to the Common Yellow-seeded just described, but is two weeks earlier."

Note 1. The plant referred to here is actually the soybean, which Mr. Teschemacher incorrectly identified as the pigeon pea *Cajanus bicolor* in Feb. 1853. Note 2. No reference to the Japan Pea appears in the 1863 edition of this book.

Also discusses: Chufa or earth almond *(Cyperus esculentus,* edible cyperus, nut rush, p. 32. When dried and

pulverized, the tubers "are said to impart to water the color and richness of milk"). Note 3. This is the earliest English-language document seen (Sept. 2002) concerning a non-soy, non-dairy milk–made from chufa or earth almonds. Amaranthus (Chinese amaranthus, Chinese spinach, p. 279-80). Quinoa *(Chenopodium quinoa*, p. 292-93. Varieties: white-, black-, or red- seeded, from Mexico or Peru. Goosefoot). Pea-nut (Ground bean, earth nut, pindar nut, ground-nut, *Arachys hypogea,* p. 544-46. Varieties: African, Wilmington {North Carolina}, and Tennessee). Winged pea *(Lotus tetragonolobus*, Red birdsfoot trefoil, p. 547. Pods 3½ inches long, with four longitudinal leafy membranes, or wings; seeds globular, slightly compressed, yellowish-white. *Use.*–"The ripened seeds are sometimes used as a substitute for coffee; and the pods, while young and tender, form an agreeable dish, not unlike string beans"). Bene-plant (Oily grain, *Sesamum* sp., p. 548-49. This medicinal plant {which is "cooling and healing"} may be used for food or oil. Varieties: biformed-leaved, oval-leaved, trifid-leafed {having three parts}). Address: Hingham [Massachusetts].

131. Knight, Charles. ed. 1867. The English cyclopædia–Natural History. Vol. IV: Soja. London: Bradbury, Evans, & Co. 1291 p. See p. 843.

• ***Summary:*** "Soja, a genus of Plants belonging to the natural order *Leguminosæ.Soja hispida* (Moench), *S. Japonica* (Savi), the *Dolichos Soja* (Linn.), is a native of Japan and the Moluccas, and abundant in the peninsula of India, though probably introduced there. The seeds resemble those of the haricot, French or kidney bean, and are used by the Chinese to 'form a favourite dish, called "ten-hu," or "tau-hu," which looks like curd, and which, though insipid in itself, yet with proper seasoning is agreeable and wholesome' [Don 1832]. The Japanese call the seeds 'Miso,' and put them into soup, of which they sometimes partake three times a day. They likewise prepare with them the sauce termed 'Sooja,' which has been corrupted into 'Soy.' Soy is only sparingly used as a sauce in this country. It has the character of being a useful stomachic, but not more so than any of the other condiments when used in moderation."

Note: The entry for "Soy" says to see "Soja."

Note: Much of the information in this entry for Soja comes from the *Penny Cyclopaedia of the Society for the Diffusion of Useful Knowledge* (London, 1841. See Soja hispida).

Also in this volume: Sesamum (p. 758). Voandzeia (p. 1224).

132. Miquel, Frederich A.W. 1867. Prolusio florae Iaponicae [Essay on the flora of Japan]. *Annales Musei Botanici Lugduno-Batavi (Leiden)* 3:52-53, 99. [5 ref. Lat]

• ***Summary:*** Under Glycine Linn. (p. 52) the author lists one species: "1. Glycine soja Sieb et Zucc. Abh. l.c. IV. 2, p. 119. A *Soja angustifolia* Miq. *Fl. Ind. bat.* I. 1, p. 223... *Siebold legit; "sponte crescentum"; in vallibus m. Kawara Jama ins. Kiusiu legit Pierot, propre Nangasaki [Nagasaki] Oldham n. 368.*

Under Soja Moench (p. 52-53) the author lists one species with 3-4 varieties: "1. Soja hispida Moench., Sieb et Zucc. l.c.p. 119. Maxim. Prim. p. 87. *Dolichos Soja* Linn. *Soja iaponica* Savi."

Variat sub cultura vario mondo, v.c. seminum colore quae autem sub germinatione omina plantulas similes proferunt, teste Sieboldo. Spontanea etam provenit, foliolis latioribus, medio basi leviter attenuato–In regione littorea prope Oko Mura ins. Kiusiu et in fruticetis prope urbem Kokura legit Pierot; aliis locis cultam legerunt Siebold et Buerger [Bürger], prope Nangasaki [Nagasaki] Oldham n. 360.

[Translation: Pierot collected it in the coastal regions on the island of Kyushu near Oko Mura {or Okumura; *mura* = village} and in the shrubbery near the city of Kokura {in northern Kyushu, Japan}; Siebold and Buerger collected it in other places where it was cultivated / grown, and {Richard} Oldham (specimen No. 360) collected it near Nagasaki {located on the far western tip of central Kyushu, near Deshima/Dejima, where Siebold and Buerger usually resided}].

- Kuro mame [Black soybean], No mame [wild soybean], Kuzu, Kokura iap.

*var. praecox* Sieb. [Siebold], humilior, non vel vix volubilis, densius rufo-hirta, foliolis satis variantibus.–Culta.

*var. obtusa* Miq. [Miquel] humilis stricta robusta dense hispida, foliolis late ovalibus utrinque obtusissimus.–Spontaneam legit Pierot ad radicem m. San Saka Toge ins. Kiusiu [island of Kyushu].–Jama [Yama] daisu iap. [Mountain soybean of Japan].

*var lanceolata* Miq., elatior, minus hispida, foliis longe petiolatis, foliolo terminali sublanceolato, lateralibus semilanceatis, mucronatis. In regione littorea prope oppidum Oko Mura ins. Kiusiu [island of Kyushu] detexit Pierot–Kuzu iap.

*Observ.* Cl. Bentham *(Journ. Linn. Soc.* VIII, p. 269) hanc sp. et superiorem coniunxit; nostrae autem plane diversae, a b. Zuccarinio determinate.

Other non-soy genera: Under Pueraria DC (p. 52) he lists *Pueraria Thunbergiana* Benth. Journ. Proceed. Linn. Soc. IX. p. 122.–*Pachyrrhizus Thunbergianus* Sieb. et Zucc. Abh. l. c. IV. 3, p. 237. *Neustanthus chinensis* Benth. Hongk. p. 86. Dolichos hirsutus Thunb. in Linn. Transact. II. p. 339...

Under Phaseolus (p. 52) Linn. he lists *Phaseolus radiatus* Linn., Miq. Fl. Ind. bat. I. p. 197. Ph. Mungo (Linn.) Sieb et Zucc. Abh. l. c. IV. 2, p. 118. Cum pluribus

ut veditur varietatibus cultus. *Assuki* iap. [Japanese adzuki] and *Phaseolus nanus* Linn.

Under Deutzia Thunb. (p. 99) he lists 3 species: crenata, scabra, and gracilis.

Note 1. How Miquel compiled this book (according to Bretschneider 1882): In 1830 the Japanese government forced Siebold to leave Japan, saying that he had a map of the island, which was illegal. "Siebold had forwarded one portion of his vast botanical collections accumulated in Japan to Prof. C.L. Blume in Java, who described some of these plants in the *Museum botanicum Lugduno-Batavorum*, 1849-51... The greater part of his dried plants, however, had been transmitted by Siebold to the Museum of Leyden, and from these materials Prof. Miquel compiled his *Prolusio Florae japonicae [Prolusio florae Iaponicae]*, 1865-67."

Note 2. This is the earliest document see (May 2002) concerning Heinrich Bürger.

Note 3. Richard Oldham (1837-1864) collected plants for the Kew gardens (England) in Eastern Asia in 1861. The Oldham numbers, 360 and 368, refer to the numbers of the specimens in his collection–which is now at the British Museum of Natural History, Kew. Address: Prof. of Botany, Director of the Rijksherbarium in Leiden, Netherlands.

133. Chambers's encyclopædia: A dictionary of universal knowledge for the people: Soy. 1868. London: W. and R. Chambers. See vol. IX, p. 10.

• ***Summary:*** "Soy is a thick and piquant sauce, made from the seeds of the Soy Bean *(Soja hispida)*, a plant of the natural order *Leguminosæ*, suborder *Papilionaceæ*, so nearly allied to the genus Dolichos (q.v.) as to be often included in it. It is a native of China, Japan, and the Moluccas, and is much cultivated in China and Japan. It is also common in India, although, probably, not a native of that country. The seeds resemble those of the Kidney Bean, and are used in the same way. The Japanese prepare from them a substance called *Miso*, which they use as butter.

"Soy is made by mixing the beans softened by boiling with an equal quantity of wheat or barley roughly ground. The mixture is covered up, and kept for 24 hours in a warm place, to ferment. The mass is then put into a pot, and covered with salt, the salt used being in quantity about equal to each of the other ingredients. Water is poured over it; and it is stirred, at least once a day, for two months, after which the liquor is poured off and squeezed from the mass, filtered, and preserved in wooden vessels. By long keeping, it becomes brighter and clearer. A Chinese sauce, called *Kitjap* (Ketchup), is often sold in Britain as soy, but is very inferior to the true soy."

134. Martens, Georg Matithias von. 1869. Die Gartenbohnen. Ihre Verbreitung, Cultur und Benuetzung. Zweite vermehrte Ausgabe [Garden beans. Their distribution, culture, and utilization. 2nd expanded edition]. Ravensburg, Germany: Druck und Verlag von Eugen Ulmer. 106 p. See p. 103-05. With 12 color plates. 28 cm. [94* ref. Ger]

• ***Summary:*** The author discusses the soybean under the name *Soja hispida* Moench, gives a botanical description of the species, then and gives a classification of 13 varieties that he had secured from various sources, of which he apparently grew but one. He grew that one by his window in Stuttgart, having obtained it from the village of Daguiga, near the city of Aigun [or Ai-hun, in northeast Heilungkiang province] on the Amur River. He planted the seeds on May 23 and they were ripe by Sept. 24. He describes their area of distribution in East Asia, from the 50th north latitude in Siberia down to the Moluccas near the equator, but notes that their center of cultivation is Japan, where they are made into miso (a type of butter), and a sauce (named "Soja") that stimulates the appetite. He considers these two delicacies fit for gourmets and epicures. The sauce was introduced to Europe by the English. In China, the beans are cooked to a white, thick paste *(Brei)*, tofu *(Teu hu)*, one of the most popular foods there.

"In Europe, with suitable care, soybeans can be made to ripen/mature as far north as 53° north latitude, near Berlin. Thus, during the last continental blockade [first, of the British, by Napoleon, based on his 1806 Berlin Decree and 1807 Milan Decree; then in 1807 the British retaliated with their own sort of blockade], which is still an infamous memory, in the lands that at that time were part of the French empire, the soybean was prized and cultivated for a while as a coffee substitute *(als Kaffeesurrogat)*. Later the milk vetch *(Kaffeewicke; Astragalus baeticus* L.), the chufa or earth almond *(Erdmandel; Cyperus esculentus* L.), and other coffee substitutes were used, but they have all been long since forgotten–except for chicory" *[Cichorium intybus;* the thick roots of this perennial herb are dried, ground, and roasted, then used to flavor or adulterate coffee].

Martens divides the species into 3 subspecies based on the form of the seed, under which the varieties are named according the color and size of the seed. In this, he creates an entirely new system for classifying and naming soybeans.

I. *Soja elliptica* Martens. Seeds oval. 1. *S. elliptica nigra.* Seeds black and elongated; obtained through his son from Shanghai and Paris. 2. *S. elliptica castanea.* Seeds brown and elongated; obtained from Chefoo (China), Venice (Italy), and Berlin. 3. *S. elliptica virescens.* Seeds greenish yellow and elongated; obtained from Shanghai and Paris. 4. *S. elliptica lutescens.* Seeds yellow; brought by Mr. Schottmueller from Chefoo as "true Chinese oilbeans."

II. *Soja sphaerica.* Seeds globose/spherical. 5. *S. sphaerica nigra.* Seeds black, large; obtained from Yokohama and Nagasaki, Japan. 6. *S. sphaerica minor.* Seeds black, small; obtained from Japan and Sumatra. 7. *S.*

*sphaerica virescens.* Seeds greenish; obtained through his son from Yokohama as "Ao mame" and from Shanghai. 8. *S. sphaerica lutescens.* (The *Soja pallida* of Roxburgh). Seeds pea-colored to pea-yellow, large; obtained from Dr. Schuebler in Oslo (Christiana), Norway, as "New Japan peas," under which name they have been recommended and popularized in the United States. 9. *S. sphaerica minima.* Seeds yellow, small; obtained through his son as "Shiro mame" from Yokohama.

III. *Soja compressa.* Seeds compressed. 10. *S. compressa nigra.* Seeds black and flat, the largest of all soybeans; obtained as "Kuro Mame" from Yokohama. 11. *S. compressa parvula.* Seeds black, small; obtained via Schotmueller from Chefoo. 12. *S. compressa virescens.* Seeds greenish; obtained from Chefoo and from Berlin as *Soja ochroleuca* Bouché. 13. *S. compressa zebrina.* Seeds brown banded with black like a zebra; obtained from the Berlin Botanic Garden.

Note 1. This is the earliest document seen (Aug. 2002) which states clearly that soybeans have been (or can be) used as a coffee substitute *(als Kaffeesurrogat).* It is also the earliest German-language document seen (March 2001) tbat mentions soy coffee.

Note 2. This is the earliest document seen concerning soybeans in Norway. It is not clear whether or not the soybeans were being grown in Norway at this time.

Note 3. This is the earliest German-language document seen that mentions tofu, which it calls *Teu hu.*

Note 4. This is the earliest document seen that (Aug. 1999) that divides the species into 3 subspecies based on the form of the seed, under which the varieties are named according the color and size of the seed. Martens is the first to use a number of such terms in connection with the soybean, such as "nigra" "castanea," "virescens," "lutescens," "elliptica," "Soja elliptica," "Soja pallida," etc.

Note 4. This is the earliest document seen (Feb. 2007) that uses the word "nigra" to refer to black soybeans.

Note 5. This is the earliest document seen (July 2001) in any language that contains the word "Chefoo," a port city in Shandong province, presently named Yantai (Wade-Giles: Yen-t'ai), and long associated with soybeans and soybean cake.

Note 6. Also discusses *Psophocarpus tetragonolobus* Dec. (p. 101). Address: Doctor der Naturwissenschaften, Germany.

135. Yeats, John. 1870. The natural history of commerce. With a copious list of commercial terms and their synonyms in several languages. London & New York: Cassell, Petter and Galpin. xvi + 436 p. See p. 191. Index. 19 cm.

• ***Summary:*** In Part II: The Commercial Products of the Vegetable Kingdom, in Chapter 1 on Food Plants, in section 7 (p. 191) on Miscellaneous Food Plants, we read: "Soybean *(Soja hispida;* natural order *Leguminosæ).*–A sauce or catsup, as thick as treacle and of a clear black colour, called Soy, which is much esteemed, is made from the beans of this plant by the Chinese, and sent to us from India in considerable quantities. From 500 to 600 gallons are annually imported."

Note 1. This is the earliest English-language document seen (Feb. 2007) that contains the word "soybean" (or "soybeans"), written as one word.

The soybean seems to be a little-understood afterthought in this book. In this chapter it is grouped with onion, truffles, morel, and carrageen or Irish moss. It is not listed under soy, Soja, Dolichos, or Glycine in the chapters on leguminous plants (p. 137) or oleaginous plants (p. 204). Nor is it listed in the index nor in the lengthy etymological appendix.

Note 2. The soy sauce described by Yeats as "catsup, as thick as treacle and of a clear black colour" might be a sweet soy sauce from the Dutch East Indies. It is certainly not the more widely used Japanese soy sauce (shoyu).

The author, a Doctor of Law (LL.D.) is also a "Fellow of the Geological Society of London, of the Royal Geographical Society, Member of the Society of Arts, etc. Assisted by several gentlemen."

Also in Part II, p. 207 we read: "Sesame oil... is frequently used for the adulteration of balsams and volatile oils." Address: Peckham, London, England.

136. Slowgo. 1872. Japan pea. *Southern Cultivator* 30(1):63-64. Jan. [1 ref]

• ***Summary:*** "Editors Southern Cultivator:–'The Japan Pea is a native of the East Indies and also of Japan, as implied by the name. The plant makes a strong erect growth, with numerous spreading branches; the leaves are large, light green and downy beneath; flowers small, yellow at the centre–the upper petal purple; the seed pods are small and downy, and are produced in profuse abundance, *growing in clusters over the entire plant;* the seeds are small roundish, and of a cream yellow color when ripe. It is raised from seed, which as the plant requires the entire season for development, should be sown as soon as the ground is warm and settled. Make drills at 20 inches, and plant at 10 or 12 inches, covering ½ to 3/4 inches. The seeds will be suitable for use in a green state, from * * * until destroyed by frost–the crop being seldom fully perfected in the Northern States. The seeds while young are tender and delicate. The ripe seeds if soaked for an hour in moderately hot water, take the form and appearance of the common white bean, become quite soft and tender, and have a pleasant, melting and oily flavor. The whole plant with its seeds, is also used for raising stock.'

"I send the above extract from Burr's Field & Garden Vegetables of America [probably 1865], thinking it may interest some of your readers.

"A gentleman who has tried the pea, writes me that it is to be planted after the spring fully opens–that the peas are fine for hogs–especially for stock; and that the bush or vine is fine for forage, and should be cut when the fruit is in its last dough state. The pea grows erect, heavy and spreading–stalk erect and heavy and spreading–foliage thick, leaves large for the stem, bush growing 3 to 4 feet high." [Signed, Slowgo, Port Gibson, Mississippi].

The Editors of *Southern Cultivator* [which at this time was published in Athens, Georgia] add: "We are inclined to think, from trial on a small scale, that the Japan pea is a valuable plant as a stock pea and for making hay. It withstands drought well, and is easily cut with a scythe or mowing machine." Address: Port Gibson, Mississippi.

137. Balfour, Edward. 1873. The Cyclopaedia of India and of eastern and southern Asia, commercial, industrial, and scientific; products of mineral, vegetable, and animal kingdoms, useful arts and manufactures. 2nd ed.: Soy [sauce]. Madras, India. Printed at the Scottish and Adelphi presses. See vol. 5, p. 517. 26 cm. Reprinted in 1985 by International Book Distributors, Dehra Dun, India. [6 ref]
• ***Summary:*** The section titled "Soy" (p. 517), which is about soy sauce, states: "Tsiang-yu, Chinese. Soya [sic, shôyu], Japanese. This well-known sauce is made from the Soja hispida which grows in China and Japan. In Java it is procured from the Phaseolus radiatus, the green gram, haree moong or putchay payroo of India. The beans are boiled soft with equal quantities of wheat or barley, and left for three months to ferment; salt and water are then added when the liquor is pressed and strained, 1,108 piculs of soy were shipped in Canton in 1844, for London, British India and Singapore; 100 jars, or about 50 gallons of soy were received at Liverpool in 1850. Its price is about 6*s* per gallon in the London market, and the Japan soy is superior to the Chinese. Genuine soy is well flavoured, thick, brown, and clear; and when shaken in a glass, it should have a coat on the surface of a bright yellowish-brown colour. It is obtained from Canton; but the best is exported from Japan, by way of Batavia."

"Good soy is agreeable when a few years old, the Japan soy is superior to the Chinese. Large quantities are shipped for England and America. The Dolichos bean is much cultivated in Japan, where various culinary articles are prepared from it, but the principal products are a sort of butter termed mico, and a pickle called sooja. The flavour and ingredients of soy vary considerably, even among the people who make it, and much of that exported is supposed to be more or less adulterated."

Note: This is the earliest document seen (Oct. 2001) concerning adulteration of (or with) a soy product–in this case of soy sauce.

"Peas and beans form important objects of culture, and the condiment called soy (a word derived from the Japanese soya), is prepared chiefly from a species of Dolichos. One of the commonest modes of making this condiment is to skin the beans, and grind them to flour which is mixed with water and powdered gypsum, or turmeric. The common Chinese eat few meals without the addition of one form or other of the 'bean' curd, or 'bean' jelly. The soy was at one time largely used as a condiment in the several countries of Europe but has latterly been displaced with others."

The next entry is "Soy Bean, Anglo-Jap. *Soja hispida"* (which see).

Soy is not mentioned at Bean Curd, Beans, Legumes, or Leguminosae. Address: L.R.C.S.E., Inspector General of Hospitals, Madras Medical Dep. [India].

138. Balfour, Edward. 1873. The Cyclopaedia of India and of eastern and southern Asia, commercial, industrial, and scientific; products of mineral, vegetable, and animal kingdoms, useful arts and manufactures. 2nd ed.: Soja, Soja hispida. Madras, India. Printed at the Scottish and Adelphi presses. See vol. 5, p. 458. 26 cm. Reprinted in 1985 by International Book Distributors, Dehra Dun, India. [2 ref]
• ***Summary:*** "Soja, a genus of plants belonging to the natural order Leguminosae. Soja hispida *(Moench)*, S. japonica *(Savi),* the Dolichos soja, *(Linn.),* is a native of Japan and the Moluccas, and abundant in the peninsula of India, though probably introduced there. The seeds resemble those of the haricot, French or kidney bean, and are used by the Chinese to form a favourite dish called 'ten-hu,' or 'tau-hu,' which looks like curd, and which, though insipid in itself, yet with proper seasoning is agreeable and wholesome. The Japanese call the seeds 'miso,' and put them into soup, of which they sometimes partake three times a day. They likewise prepare with them the sauce termed 'sooja,' which has been corrupted into 'soy.' Soy is only sparingly used as a sauce in Great Britain. It has the character of being a useful stomachic, but not more so than any of the other condiments when used with moderation.–*Eng. Cyc."*

"Soja hispida, Moench, W.&A., Grah. *S. japonica,* Savi. *Dolichos soja,* L., Roxburgh. *Garu kulay,* Bengali. Sahuca bean, English. Soy-bean, English. *Bhut,* Punjabi.

"This plant grows in the N.W. Himalaya, in Nepal, at Taong Dong, in China, Japan and the Moluccas. It is found in the Sutlej valley between Rampur and Sungnam at an elevation of 6,000 feet. It is cultivated in many parts in the north of India. This is the well-known Chinese bean, which constitutes such large article of trade between the northern and southern parts of China. Of all vegetable substances, it is richer in nitrogenous or flesh-forming matter than any yet discovered, The Sahuca bean, is the white Soja hispida. *India Museum."*

Note: This is the earliest English-language document seen (Aug. 2003) that uses the word "nitrogenous" in connection with the soybean–to refer to its protein. Address:

L.R.C.S.E., Inspector General of Hospitals, Madras Medical Dep. [India].

139. Douglas, Carstairs. 1873. Chinese-English dictionary of the vernacular or spoken language of Amoy, with the principal variations of the Chang-chew and Chin-chew dialects. London: Truebner & Co. xix + 613 p. 28 cm.
• ***Summary:*** The Preface notes that the written language of China is uniform throughout the whole of China, but it is pronounced differently when read aloud in the different parts of China. Various spoken languages of China have already been studied by Western residents in China: the Mandarin, the Hakka, the vernaculars of Canton and Amoy, etc. The Amoy vernacular is believed to be spoken by 8-10 million people. Chinese characters are not used in this dictionary.

Abbreviations (at start of parentheses): R. = Reading or literary style as to sound or meaning. C. = Chang-ebew dialect. Cn. = Chin-chew dialect.

Soy-related terms include: chiap (R. id.), (Cn. tsap; p. 46 L.2) "juice, sap, gravy, etc. kôe-chiap, brine of salt or pickled fish, &c." kê (Amoy = kôe; p. 201 L.7) "Pickled fish or shell fish." kê-chiap (implied; p. 46 L.2).

hû (p. 156 R.3) tâu-hû "bean-curd shaped into squares (from the pulpy 'tâu-hoe'), but not yet pressed. See tâu.

kôe-chiap (p. 242 L.4) "Brine of pickled fish or shell fish."

tâu (p. 480 L.3) "pease or beans, pulse." tau-khe "bean-cake from north China used as manure." tâu-iû "soy [sauce]." tâu-chiù "a thick sauce made from pulse." tâu-sî "salted beans" [soy nuggets]. tâu-hoe "soft bean curd not yet pressed or shaped." tâu-chiû or tâu-hû "bean-curd shaped but not yet pressed." tâu-hû-phê "bean curd made into thin sheets [yuba] for wrapping around eatables."

Note: This is the earliest English-language document seen (Oct. 2008) that uses the term *tâu-hû-phê* to refer to yuba.

te tâu-hû "to shape the pieces of 'tâu-hoe' into pieces of 'tâ-hû.'" tâu-koa "bean-curd that has been pressed in a cloth." tâu-jú "bean-curd that has been pressed in a cloth then cut into smaller pieces and salted." tâu-kiâm or tâu-che or tâu-thâu "refuse from manufacture of bean curd" [okara].

Note 1. A new, revised edition of this work was published in 1899 in London by Presbyterian Church of England. A supplement by Douglas and Barclay was published in Shanghai in 1923. In some cases, the 1923 edition is bound at the back of the 1873 edition. The 1873 edition is dedicated to Rev. James Legge, D.D., a Christian missionary and Chinese scholar.

Note 2. This is the earliest English-language document seen (Oct. 2001) that mentions okara, which it calls "refuse from manufacture of bean curd," along with its Chinese vernacular names.

Note 3. This is the earliest English-language document seen (Oct. 2001) that uses the term "cake" or "bean-cake" to refer to ground, defatted soybeans.

Note 4. the earliest English-language document seen (Feb. 2004) that uses the many terms such as "tâu-hoe," "tâu-hû-phê," "tâu-koa," or "tâu-jú" to refer to the many uniquely Chinese varieties of tofu.

Note 5. This is the earliest English-language document seen (Jan. 2006) that contains the terms "kôe-chiap" or (by implication) "kê-chiap" to refer to pickled fish or shell-fish. These terms are said by some to be the ancestors of the Malay word *ketjap / kecap* meaning soy sauce.

Note 6. Schlegel (1894, p. 143 footnote) gives the character for *Kê-tsiap* but the 1873 ed. of Douglas' dictionary gives no Chinese characters for any of the words defined. Address: Rev., M.A., LL.D. Glasgow, Missionary of the Presbyterian Church in England.

140. Renard, Édouard. 1875. La pêche et la pisciculture dans l'Extrême Orient [Fishing and fish culture in the Far East]. *Bulletin de la Societe d'Acclimatation* 22:281-99. June. [Fre]
• ***Summary:*** Contents: Malaysia and the Indian Archipelago *(Archipel Indien;* probably Dutch East Indies). Cochin China. China. Japan.

Mr. Dabry de Thiersant (p. 292) has written a magnificent work about fish farming *(la pisciculture)* in China, where all fish are classified into two large categories: (1) The cyprinids (family Cyprinidae, *Kia-Yu)* such as carp, etc., which are herbivores and which they raise in artificial ponds and in regular ponds *(les pièces d'eau, dans les étangs).* (2) Marine fish, and even some that live in fresh water, such as pike and perch, are called *Ye-Yu* or wild fish *(poissons sauvage).* These latter are often the bane of Chinese aquaculturists, who use every possible means to get rid of them when they are accidentally introduced into their fish ponds *(viviers).*

Note: This is the earliest European-language document seen (Nov. 2002) concerning fish farming or aquaculture; however soybeans are not mentioned.

In Japan, people of the upper classes (the officers, feudal lords *[daimyo],* etc.) eat carp entirely raw. Removed from the water, it is served on the table on bamboo leaves–still alive. What are our colleagues at the Society for the Protection of Animals going to say about such a barbaric process? When all the meat has been cut from the bones so that only a skeleton is left, these thin slices of fresh carp meat, dipped in shoyu *(trempées dans la soya),* constitute one of the most savory dishes of Japanese epicures *(Lucullus,* p. 295).

Note: Lucullus, a Roman general who lived 117-58 B.C., was known for the splendor of his banquets.

Also discusses: Sea vegetables in Japan–kombu, fucus, and agar (Isinglass) (p. 296-97). Address: France.

141. Gericke, J.F.C.; Roorda, T. 1875. Javaansch-Nederduitsch Handwoordenboek [Javanese-Low German concise dictionary]. Amsterdam, Netherlands: Johannes Mueller. 1051 p. See p. 378, bottom right. Foreword by A.C. Vreede. Also in 2nd edition, 1901. p. 695. [Dut; Jav; Mal]

• ***Summary:*** This is the second earliest document seen that mentions tempeh, which is defined as "Fermented soybeans or presscake (bunkil) baked or fried in flat pressed cakes. It is well-liked as a side dish with rice."

This is the earliest Dutch-language document seen that mentions tempeh, which it calls "témpé."

In the 1901 edition, under the heading témpé is a textual reference to "Tjentini I, 295," which refers to Volume I of LOr 1814, a 5 volume manuscript of the Centini stored in the Leiden Oriental Department of the Leiden University Library. Address: Indonesia and Netherlands.

142. Lith, Pieter Antonie van der. 1875. Nederlandsch Oost-Indië beschreven en afgebeeld vor het Nederlandsche volk [Dutch East Indies described and illustrated for the Dutch people]. Doesborg, Netherlands: J.C. van Schenk Brill. 452 + 12 p. See p. 131. Illust. Index. 29 cm. [Dut]

• ***Summary:*** One page 131 we read of "hills of Soja" *(heuvelen van Soja).* Sesame oil is mentioned on p. 412. Pieter Antonie van der Lith lived 1844-1901. Address: Leiden, Netherlands (Hoogleerar aan de Rijks-instelling voor Indische taal-, land- en volkenkunde te Leiden, Officer van de Orde de Eikenkroon).

143. Roorda van Eysinga, W.A.P. 1877. Maleisch-Nederduitsch woordenboek, ook ten dienste van hen, die geen Arabisch karakter gebruiken [Malaysian-Dutch dictionary, for those who know how to use Arabic characters]. Amsterdam: G. Theod. Bom. 156 p. [Dut]

• ***Summary:*** Page 53: katjang, *puelvrucht; boonen* [legumes, beans].

Page 54: kedjap, ketjap, *met de oogen wenken; wenk* [to wink with the eyes].

Page 55: ketjap, see kedjap.

144. Corroy, M. 1878. Alimentation des chevaux et mulets importés en Cochinchine [The feeding of horses and mules imported into Cochin China]. *Bulletin du Comite Agricole et Industriel de la Cochinchine* 1:449-58. For the year 1877. Series 2. See p. 456-58. [1 ref. Fre]

• ***Summary:*** Section 7, titled on *Pois noirs (Glycine soja)* [Black soybeans] (p. 456-58) is undoubtedly referring to black soybeans. It was observed that they are fed to animals in northern China, but only as a supplement to their rations. It was found they made a better feed if they were first cooked.

M. Pierre, director of the botanical garden and of the Mares Farm in Cochin China, found in comparing the soybean cultivated in India and Java, and a black variety from China, sufficient differences to justify the distinction made by Miquel for a *Soja angustifolia.* The variety from China had, in effect, a less pronounced hispid character, with oval folioles, more often very little acuminate, and with fruits (seeds) being larger and more flattened, less long and more falcate or falciform.

"To sum up, we would like to see the ration of horses imported to Cochin China established on the basis of the chemical analysis we have given above, and that we have borrowed, for the most part, from the book titled *l'Hygiène vétérinaire appliquée [Applied veterinary Hygiene],* by Mr. Magne.

Note: *Webster's Dictionary* defines these botanical terms as follows: (1) hispid (derived from the Latin *hispidus;* probably akin to the Latin *horrere,* and first used in 1646) as "rough or covered with bristles, stiff hairs, or minute spines." The soybean has hispid leaves.

(2) foliole (derived from the French, from the Late Latin *foliolum,* diminutive of *folium* leaf–more at blade) as "1: Leaflet 2: a small leaf-shaped organ or a part resembling a leaf."

(3) acuminate (first used in 1646) as "tapering to a slender point."

(4) falcate (derived from the Latin *falcatus* from *falc-, falx* sickle, scythe, and first used in about 1726) as "hooked or curved like a sickle." Address: Vétérinaire en premier, Directeur du jardin botanique et de la ferme des Mares (Head veterinarian, and director of the botanical garden in Saigon, and of the Mares Farm).

145. Haberlandt, Friedrich. 1878. Erste Abtheilung [Part 1, pages 6-7 (Document part)]. In: F. Haberlandt. 1878. Die Sojabohne [The Soybean]. Vienna: Carl Gerold's Sohn. ii + 119 p. [4 ref. Ger]

• ***Summary:*** "Different authors have given the soybean many different names. It gets its most extensive and earliest recognition in the famous work of Kaempfer, *Amoenitatum exoticarum politico-physico-medicarum,* which comprises 5 volumes and was published in 1712 in Lemgo [Germany, in today's North Rhine-Westphalia]. The work includes a detailed description of Kaempfer's travels in Persia and Central Asia. He calls the soybean by that vernacular name "Daidzu" or "Mame," a name still common today in Japan, which means legumes, so called because of its superiority. He describes it as an upright type of bean with pods that resemble those of the lupine and a white seed like larger peas: 'Four feet long but more luxuriant or lush *(üppiger)* than *Phaseolus,* it winds straight up with its many-branched, unevenly round and rough stem. The leaves look like those of the green bean except that the underside is more bristly. The small flowers, somewhat gathered on short stems,

bloom in August. They are bluish-white, small, and similar to the lentil, with a straight flag and barely spread wings *(mit gerader Fahne and kaum ausgebreiteten Fluegeln).* The stems that bear the abundant pods are long and bristly, similar to the pods of the lupine. They contain 2 or sometimes 3 seeds and resemble in shape, size, and taste the garden pea. But they are somewhat compressed with a protruding hilum *(Nabel).*

Linné [Linnaeus] chose for this legume the name *Glycine Soja.* In his *Icones plantarum rariorum,* N.J. Jaquin [Jacquin] gives its name as *Dolichos Soja* and gives an illustration, which however is inferior to the one by Kaempfer. Dr. Ph. von Siebold and Dr. J. Zuccarini cite it in their *Florae Japonicae familiae naturalis* (vol. 4, part 2, 1846) as *Glycine Soja.* Other than that, it can be found as *Soja japonica, Savi.* and *Soja hispida, Mönch.*

"De Candolle, in his *Prodromus syst. nat.,* notes that the soybean is distributed across Japan, South India *(Süden Indiens)* [sic, East Indies, *India orient],* and on the Moluccas. Franchet and Savatier state in their *Enumeratio plantarum in Japonia sponte crescentium,* p. 108, that it grows in the mountainous regions of Kyushu [Japan's southernmost main island], the valleys of Kawara, the Janca? mountains, near Nagasaki. Maximovicz [Maximowicz, Maksimovich] mentions in his *Primitiae florae Amurensis,* page 47, that it is cultivated along the upper Amur River, near Aicho, where it covers entire fields. Ditmar found it on 19 July 1856 in Ana [Aua] on the Ussuri River, and in Chinese gardens in bloom on 10 Aug. 1855. Roxburgh pays respect to the soybean in his *Flora indica* and mentions its occurrence in the Moluccas." Address: Hochschule fuer Bodencultur, Vienna, Austria.

146. Baker, J.G. 1879. Leguminosae. In: J.D. Hooker, ed. 1879. Flora of British India. Vol. 2. London: L. Reeve & Co. 792 p. See p. 56-306. Soy on p. 183-84. [8 ref]
• ***Summary:*** An early reference to the soybean as *Glycine Soja.* Under the order Leguminosae, suborder I is Papilionaceae. Under that, Tribe VIII is Phaseoleae. Subtribe I, Glycineae includes the genus Glycine, which has: "Stamens monodelphous. Stipules and bracts minute caducuous. Anthers uniform, all fertile (p. 59).

The genus *Glycine,* Linn. (p. 183-84) contains 3 species: (1). *G javanica,* Linn. Found on the plains of the Western Peninsula [of British India] and Ceylon. Distribution: Tropical Africa, Natal [in today's South Africa], and Java. (2). *G. pentaphylla,* Dalz. Found in Khasia.

(3). *G. Soja,* Sieb. & Zucc. Found in: "Himalayas, tropical region; Kumaon to Sikkim, Khasia and Ava, often cultivated. Distrib. East Asia.

*"Stems* suberect or climbing upwards, densely clothed with fine ferruginous hairs. *Leaves* long-petioled; leaflets membranous, ovate, acute, rarely obtuse, 2-4 inches long. *Calyx* ¼ inch, densely hairy. *Corolla* reddish, little exserted. *Pods* usually only 2-3 developed in the axil of each leaf, linear-oblong, recurved, densely pubescent, 1½-2 inches by 1/3 to 3/8 inches, 3-4 seeded, subtorulose."

John Gilbert Baker, lived 1834-1920. Address: F.L.S., Keeper of the Herbarium, Royal Gardens, Kew, England.

147. Cook, G.H. 1879. The soja bean; a new forage plant. *Rutgers Scientific School, Annual Report* 15:54-58. [1 ref]
• ***Summary:*** "When in Munich last year, I saw the soja bean in cultivation, as a new crop, and probably a desirable addition to our forage products. It was seen in the grounds of the Bavarian Agricultural Experiment Station, and was in very vigorous growth. The gentleman in charge gave me a few seeds; and seeds of several other varieties of the same plant were procured at Vienna by my friend Mr. James Neilson. We have planted them, and gathered crops of the different kinds this year. The following is a translation of the paper sent out from the Bavarian Experiment Station to those who were growing and testing the capabilities of the plant." Note 1. See: Lehmann, Julius. 1878. *"Ueber den Anbau der rauhhaarigen Sojabohne. Zeitschrift des Landwirthschaftlichen Vereins in Bayern* 68:61-64. Feb.

*"On the Cultivation of the Hairy Soja Bean."*–"The exertions made in the last decade to naturalize foreign useful plants in Germany, and by their cultivation to increase the income from farm lands, have so far been without result. This has been the case with sorghum, ramie, Siberian fodder, water rice, &c., for each of which great hopes have been excited; but nothing now remains but the remembrance and the proof of the difficulties in the way of our agriculture.

"Fortunately the success of this pursuit depends less on such attempts, than on increasing the quantity of our well-known crops, by good cultivation and heavy manuring–by careful selection of seed and proper care of the plant. All farmers taking these precautions, and using discoveries in these directions, will surely gain satisfactory profits even without new plants.

"Yet the progressive farmer will be interested and make personal experiments, of these attempts at acclimating, if the plant promises to fill some want. We now seem to have such a one for our increasing cattle raising. We need a fodder for young cattle, for milk cows and for bullocks, whose seeds contain, in proper amount, albumen and fat, with a pleasant taste. In cereals and their brans, and also in leguminous seeds, we have fodder containing albumen but not fat enough. The addition of oil-cake is not entirely satisfactory, because the proportion of fat in it varies, and its cost is too great.

"Two years ago Prof. Haberlandt, of Vienna, an untiring botanical experimenter, introduced to us a plant whose pleasant-tasting seeds are rich in albumen and fat, in very digestible forms. This plant is the hairy soja bean *(Soja*

*hispida, Mönch.)* Prof. Haberlandt found samples of the seed at the Vienna Exposition among the agricultural products of China, Japan, Mongolia, Transcaucasia and India. He says this plant has been cultivated from early ages. It grows wild in the Malay Archipelago, Java and the East Indies, and is cultivated extensively in China and Japan. Its seeds, boiled or roasted, have a pleasant taste, and form an almost daily part of the food in India, China and Japan. The soja is an annual leguminous plant."

"In 1876, twenty experiments were made in various parts of Bohemia, Moravia [both in the Czech Republic as of Jan. 1993], Southern Austria, Styria [a state in Austria, called Steiermark in German], Hungary, and Upper Silesia [a region mostly in southwest Poland]. From the well-ripened seeds of these crops, one hundred and thirty-five trials were made the next year under various climatic influences. Prof. Haberlandt has written us that only twelve of the experiments failed, and most of the results were unusually good.

"According to Professor Haberlandt there are several varieties of the soja, which vary much in their time of ripening. For the climate of Middle Europe the early kind is best. Sown early in May the seeds mature at the end of September or October. Its time of growth is like that of the horse bean. (This is the *Vicia faba,* the horse bean or Windsor bean of Europe, which is cultivated there for feeding domestic animals, and, like it, ripens after harvest.) It differs from this bean in its productiveness and its non-liability to harm from insects. It has harvested from thirty-three to fifty-five bushels of seed, and two and one-third tons of very nutritious straw to the acre."

"Prof. Schwackerhofer of Vienna, has analyzed the original and harvested seed [two crops], and the soja straw, with the following results." A table shows that the original seed contained 30.56% albuminoids and 15.81% fat. The first and second crops contained and average of 34.56% albuminoids and 18.32% fat–both much higher. The soja straw contained 4.43% albuminoids and 2.51% fat.

A second table (p. 58) compares the composition and comparative value per 100 pounds of 12 feed and fodder crops. Soja beans were found to contain 4.8% ash, 34.7% albuminoids (second highest value after cotton-seed cake (decorticated)), 18.3% fat (the highest), 28.3% carbohydrates, and a comparative value of 2.55 (the highest, with clover hay taken as 1.0).

"In this table the soja bean is shown to have the highest value of any of the substances named, and by mixing it with oat straw or cured corn-fodder, it will make a rich and healthful fodder for cattle, and one which can be afforded in greater quantity and at less expense than first quality timothy or clover hay. It would form, too, a proper crop to be in the rotation between corn and wheat, instead of oats or potatoes, as now practiced. It is not subject to the same difficulties in curing as our common field bean, as the beans do not easily shell out, and coarser stalks enable it to be cured [to make hay] like Indian corn. And being a sowed crop, it is cultivated with the minimum of labor."

Note 2. Prof. George Hammell Cook was instrumental in establishing the New Jersey State Board of Agriculture at Rutgers on 7 April 1872; he was appointed its first secretary. Rutgers thus become one of the early state institutions that conducted agricultural research. On 10 March 1880 the New Jersey Agricultural Experiment Station was established at Rutgers College (New Brunswick)–with state funding only (no federal aid). On 2 March 1887 the Hatch Act created state agricultural experiment stations with federal grants. This is the earliest document seen (Jan. 2005) concerning soybean research by a state research institution or agricultural experiment station.

Note 3. This is the earliest document seen (June 2007) concerning soybeans in New Jersey, or the cultivation of soybeans in New Jersey. This document contains the earliest date seen for soybeans in New Jersey, or the cultivation of soybeans in New Jersey (1879). The source of these soybeans was Bavaria, Germany, and Vienna, Austria.

Note 4. This is the earliest document seen (March 2001) describing cultivation of soybeans by a U.S. land grant institution.

Note 5. This is the earliest document seen (Feb. 2008) that uses the word "albumen" (or "albumens") or the word "albuminoids" (or "albuminoid") in connection with soy. The word "albumen" usually refers to the white / protein of an egg, but here it refers to protein of the soja bean "whose seeds are rich in albumen" (protein). The word "albumin" (first used in 1869) refers to any of numerous simple heat-coagulable, water-soluble proteins that occur in muscle, egg whites, milk, and other animal substances, and in many plant tissues and fluids.

Note 6. This is the earliest English-language document seen (July 2009) that refers to soynuts. Discussing the soybean, it says: "Its seeds, boiled or roasted, have a pleasant taste, and form an almost daily part of the food in India, China and Japan." It is also the earliest document seen (March 2001) concerning the etymology of soynuts.

Note 7. This is the earliest document seen (April 2001) that uses the term "hairy soja bean" to refer to the soybean.

Note 8. This is the earliest English-language document seen (Sept. 2006) with the word "soja bean" (or "soja beans") in the title.

Note 9. This is the earliest English-language document seen (Jan. 2002) related to soybeans that uses the word "forage" in the title.

Note 10. This is the earliest document seen (March 1999) that mentions Mr. James Neilson who, in 1878, obtained several soybean varieties in Vienna, Austria, brought them back to the United States, and planted them at Rutgers University in New Brunswick, New Jersey, in 1879.

Note 11. This is the earliest document seen (May 2000) that uses the word "rotation" or discusses crop rotation in connection with soybeans.

Note 12. This is the earliest English-language document seen (Sept. 2001) that mentions the word "carbohydrates" in connection with soybeans.

Note 13. This is the earliest annual report seen (Oct. 2001) that mentions soy.

Note 14. This is the earliest document seen (July 2002) that mentions feeding soybean fodder to milk cows, however none has yet been fed.

Note 15. This is the earliest document seen (Nov. 2005) that mentions cotton-seed cake (any spelling). It is also the earliest English-language document seen (Nov. 2005) that contains the term "cotton-seed cake" or "decorticated" in connection with such cake or meal.

Note 16. This is the earliest English-language document seen (Oct. 2004) that uses the word "cured" in connection with making soybean hay. Address: New Brunswick, New Jersey.

148. Pickering, Charles. 1879. Chronological history of plants: Man's record of his own existence illustrated through their names, uses, and companionship. Boston, Massachusetts: Little, Brown, and Co. 1222 p. See p. 763. [10 ref]

• ***Summary:*** In the section titled "Chronological arrangement of accompanying animals and plants," at the year 1296 A.D. we read: *"Soja hispida* of Japan. Enumerated by the Chinese official 141 as unknown in Cambodia:–'miso' beans are mentioned in 1444 in the annals of the Japanese emperors (transl. Tits. [Titsingh / Titsing] and Klaproth); were observed by Kaempfer v. 837, and Thunberg, under frequent cultivation near Nagasaki and elsewhere; are known to be made into the condiment called 'soia' (Pers.) in English *soy;* also into a white porridge [tofu] in general use among the Chinese and called by them 'teu hu' or 'tauhu' (Loureiro). Westward, S. hispida was observed by Mason in Burmah; by Roxburgh, and Graham, in the gardens of Hindustan. Transported to Europe, it is described by Jacquin rar pl. 145" *[Icones plantarum rariorum].*

Note 1. This may be the earliest document seen (May 2010) concerning soybeans in Burma (later renamed Myanmar), or the cultivation of soybeans in Burma. This document may contain the earliest date seen for soybeans in Burma, or the cultivation of soybeans in Burma (1879). The source of these soybeans is unknown. However, as of Nov. 1994 we have been unable to find verification for Pickering's statement about Mason in the writings of Francis Mason. Finding the earlier citation by Mason may allow us to push back this date.

Note 2. This is the earliest English-language document seen (Feb. 2004) that uses the word "tauhu" to refer to Chinese-style tofu. Address: M.D., Boston, Massachusetts.

149. Voss, Johann Heinrich. 1879. Poetische Werke [Poetic works]. Berlin: Gustav Hempel. 16 cm. [Ger]

• ***Summary:*** This book is divided into 3 parts (Theilen): (1) Luise: A long pastoral poem, (2) idylls *(Idyllen),* and (3) songs *(Lieder).* These are followed by a biography of the poet, then annotations on the first 3 parts. Soy sauce is mentioned in Part II, Idyllen, on page 78. A section titled "Der Abendschmaus" (The evening feast or banquet) contains the line:

"Young Calcuttans... with your sharp soy sauce from Jakarta *(Junge Kalkuten herum, mit scharfer Batavischer Soja)."*

Then, at the back of the book, in the "Annotations to the Idylls *(Anmerkungen zu den Idyllen)"* on page 96, the poet notes: "Soy sauce, a strong sauce, which is prepared in the East Indies from soybean juices, that are simmered then fermented together with brine and spice, is also prepared in Europe from preserved fungi [starter culture]." In German: *"Soja, eine kräftige Tunke, die in Ostindien aus dem gequollenen und in Gährung uebergehenden Sojasafte, mit Salzlake und Gewuerz, in Europe auch aus eingemachten Schwämmen bereitet wird."*

No year of publication is given in this book. It is set in hard-to-read Gothic type [gotische Schrift] (also called black-letter type, Fraktur [die Fraktur], or Sütterlinschrift). The poet was born on 20 Feb., 1751 in Sommersdorf in the area of Wahren near Mecklenburg in what is today eastern Germany. He died in 1826 at the Univ. of Heidelberg. Address: Germany.

150. Carrière, E.-A. 1880. Le soja hispida [The soybean (Soja hispida)]. *Journal d'Agriculture Pratique* 44(14):479-83. April 1. [Fre]

• ***Summary:*** Page 480 notes that in 1874 the *Jardin d'Acclimatation* in France received soybeans from Mexico and distributed them to various societies. Illustrations show: (1) A plant, pod, and seed of *Pois oléagineux de la Chine* (soybean; Fig. 35, by L. Rouyer). (2) A plant and pods of *Soja hispida* (soybean) with many pods clustered around the stem, and a cluster of 7 pods to the upper left of the plant (Fig. 36, by Thiebault). (3) A cluster of three leaves of *Soja hispida d'Etámpes* one-fourth its natural size (Fig. 37).

(4) Two large pods and one seed of *Soja hispida d'Etámpes* (full size; Fig. 38).

(5) A dry plant of *Soja hispida d'Etámpes* with pods on the stems, one-ninth its natural size (Fig. 39).

A table (p. 482) compares the composition of different seeds as analyzed by various chemists. The soybean was analyzed by Levallois of *l'Institut agronomique.*

Pages 482-83: A quotation from *Amoenitatum exoticarum* by Engelbert Kaempfer (1712) mentions miso, soy sauce, koji, and sake.

Page 483 states: "Today the soybean is cultivated in Hungary and probably in Austria. One farmer, Mr. Jules-Robert of Seelowitz, in Moravia [a separate crownland of Austria, but after 1945 part of Czechoslovakia], cultivates it on a very large scale (30 hectares or more each year). He lets some of the plants ripen / mature for harvest as seeds (soybeans); he cuts the others before they mature and mixes them with corn *(maïs),* then ensiles the mixture in a semi-dry state." Note 1. This is the earliest document seen (June 2008) that mentions silage or ensilage in connection with soybeans. It is also the earliest document seen (April 2003) that mentions the use of corn and soybeans together to make silage. All of the early research on the use of soybeans in silage was done in France.

The last paragraph states: "Soybean seeds can be ordered from MM. Vilmorin et Cie, 4, quai de la Mégisserie, Paris."

Note 2. Note 2. This document contains the earliest date seen for soybeans in Mexico (1874). It is not clear whether or not these soybeans were cultivated in Mexico (they may well have been) or where they came from (they may well have come from China on a Manila galleon as part of the China trade).

Note 3. Theodore Hymowitz, Prof. of Plant Genetics, Univ. of Illinois, referring to this reference and to the reference from the year 1651 by Francisco Hernandez mentioning the mung bean, writes (8 May 1989): "The existence of soybeans or mungbeans or even the knowledge of these crops in Mexico at that time is of course no surprise to me. From about 1565 and for the next 250 years ships left Acapulco for Manila (Philippines) and returned. All sorts of goods were moved West to the East and vice versa across the Pacific Ocean. Hernán Cortés [Cortes] (1485-1547, the Spanish explorer and conqueror of the Aztec empire in Mexico) started a plant introduction garden in Mexico City in 1621 and requested that seed be sent to him." Hymowitz added by phone (27 May 1989): "There is no log of what was grown in that garden, but there is the account of Cortés' friend, which is at the University of Illinois rare book room. It is in old Spanish, handwritten."

Note 4. The illustrations in this article were reproduced in many later books and articles by other authors. Address: France.

151. Carrière, E.-A. 1880. Soja hispida [The soybean (Soja hispida)]. *Revue Horticole: Journal d'Horticulture Pratique (Paris)* 52:153-57. April 16. Excerpted from Journal d'Agriculture Pratique, 1 April 1880. [2 ref. Fre]
• ***Summary:*** This is a reprint of an article by the same author first published on 1 April 1880 in *Journal d'Agriculture Pratique* 44(14):479-83. All the five illustrations (line drawings) and one table in the original article are reproduced here. Address: France.

152. *Bulletin de la Societe d'Acclimatation.* 1880. Extraits des procés-verbaux des séances de la société. Séance générale du 16 Avril 1880 [Excerpts of verbal proceedings from meetings of the society. General meeting of 16 April 1880]. 27:185-96. April. See p. 191-92. [Fre]
• ***Summary:*** Mr. Vavin shows the assembly seeds of *Soja hispida* and indicates the remarkable size to which they expand when soaked in water. Mr. Paillieux states that the true name of this plant is *Glycine hispida.* Mr. Vavin replies that, according to Mr. Baillon, 23 varieties *(variétés)* of this plant exist in China, but only 3 of these varieties are known in Europe.

"Our colleagues then express regret that Mr. Blavet, president of the Society of Horticulture of Étampes, who has conducted agronomic trials with soya using seeds provided by the Society for Acclimatization, has not yet sent us a sample of his crop, even though he was able to give 9 liters of seed to Mr. Vilmorin."

Mr. Grisard observes that, according to the observations of Mr. Corroy, director of the botanical garden of the farm at Mares, in Cochinchine (French Indochina), the seeds of soya–at least those which are black–are generally not much relished by livestock.

Mr. Paillieux notes that the seeds of *Glycine* come in different colors–green, yellow, white, black, and red. There are also early and late varieties *(variétés);* only the early varieties will bear mature seed in France. As for the number of varieties, there would seem to be more than 30 in Japan.

153. Paillieux, Auguste. 1880. Le soya, sa composition chimique, ses variétés, sa culture et ses usages [The soybean, its chemical composition, varieties, culture, and uses]. *Bulletin de la Societe d'Acclimatation* 27:414-71. Sept.; 27:538-96. Oct. 28 cm. [73 ref. Fre]
• ***Summary:*** One of the most important and original of the early publications on soya in Europe. Its in-text bibliography on soya was the largest of any published up to that time.

Contents: Part 1: Introduction and extracts on soybeans and soyfoods from 30 articles published previously in the *Bulletin of the Society for Acclimatization* from 1855 to 1880 (pages 414-430). 1. Soybean botany (p. 430-31). 2. The soybean in Japan (p. 431-42): Engelbert Kaempfer and

his writings on miso and shoyu, information on soya from a document titled *Japan at the World Exposition of 1878 (Le Japon á l'Exposition universelle de 1878,* written in French by a Japanese, p. 29-33), recipe for making shoyu in France, tofu. 3. Soya in Cochinchine (French Indochina, p. 442-46): Black soybeans. 4. Soya in China (p. 446-51): Soy oil *(Huile de Soya),* tofu *(le fromage de soya, teou-fou),* soy sauce *(tsiang-yeou;* In London, England, it is sold under the name of "India Soy" at Cross & Blackwell, Soho-Square {p. 451}). 5. Soya in Austria-Hungary (p. 452-71): Starting with soybeans at the World Exposition of Vienna in 1873, includes a long, in-depth discussion (with many excerpts) of Prof. F. Haberlandt's book *Le Soja,* published in Vienna in 1878.

Tables in Part I show: (1) The chemical composition (in both their normal and dry states) of Chinese soybeans *(pois de Chine),* tofu *(fromage de pois),* and tofu curds (p. 427). (2) The yield of tofu. 120 gm of soybeans yields 184 gm of tofu (p. 427). (3) The weight and nitrogen content of the different components when tofu is made from soybeans (p. 428). (4) The Japanese names of 23 soybean *(mame)* varieties and a very brief description of their characteristics (p. 435-36; e.g., 1. *Go-guwatsu no mame* {5th month bean}. 2. *Use mame [sic, Wase mame]* {early}. 3. *Nakate mame* {half season}. 3a. *Okute mame* {late}. 4. *Maru mame* {round}. 5. *Shiro teppo mame* {white, like a pistol bullet} 6. *Kuro mame* {black}. 7. *Kuro teppo mame* {black, like a pistol bullet} 8. *Koishi mame* {small stone}. 9. *Awo mame {Ao,* green}. 10. *Kage mame* {shade, shadow}. 11-15. *Aka mame* {red; 1 of same species, two of different species}. 16-18. *Tsya mame {Cha,* tea colored}. 19. *Kuro Kura Kake mame* {black saddled}. 20. *Aka Kura Kake mame* {red saddled}. 21-23. *Fu iri mame* {striped, variegated, mottled; see Uzura mame = speckled like quail eggs}). This nomenclature was taken from a Japanese work titled: "Explanation, with figures, of trees and plants recently determined / identified."

(5) The romanized Chinese names of six types of soybeans and a French translation of each (e.g., *Houang-teou = Soya jaune)* (p. 447). (6) Two analyses of soybean seeds, reprinted from *Chemischer Ackersmann,* 1872 (p. 458). (7) The chemical composition of three soybean varieties, including Yellow of Mongolia, Yellow of China, and Reddish-Brown of China; the composition of the original seeds and the first generation seed is given for each type (p. 460-61). (8) The chemical composition of reddish-brown, yellow, and black varieties of soybeans (p. 469-70; data from M. Schroeder, Mach, and Caplan, published by F. Haberlandt). (9) Weight of 1,000 seeds for four generations grown out in Vienna. Original seeds: 81.5 to 105 gm. First generation: 110.5 to 154.5 gm. Second generation: 141.8 to 163.6 gm. Third generation: 116.0 to 151.0 gm.

Contents (continued), Part II. 6. The Soybean, by Count Heinrich Attems (p. 538-60): Soybean culture and harvest, uses, and preparation of whole soybeans. Practical soybean culture trials on a grand scale, in the domain of the archduke Albert, an extract from a booklet by Edmond de Blaskovics titled "The Soybean, Its Culture, Use, and Value as Forage" (Vienna, 1880). Excerpts of six articles on soya from the *Wiener Landwirthschaftliche Zeitung (Viennese Agricultural Journal)* (Jan. 1879 to June 1880) (p. 548-54). Excerpts of ten articles on soya from the *Oesterreichisches Landwirtschaftliches Wochenblatt (Austrian Agricultural Weekly)* (March 1879 to Feb. 1880) (p. 554-59).

7. The soybean in France (p. 561-76): History (starting with Buffon, who became director of the *Jardin des Plantes* [Royal Garden, also called Jardin du Roi] in 1739), varieties grown, cultivation, utilization (mainly as forage plant for livestock and as an oilseed for oil and meal), accessory uses (miso, Japanese-style soy sauce *{shoyu},* Chinese-style soy sauce *{tsiang-yeou},* Japanese-style tofu *{tô-fu},* Chinese-style tofu *{téou-fou},* soy nuggets *{téou-che},* and soy coffee *{café de Soja},* white fermented tofu *{fromage blanc},* red fermented tofu *{fromage rouge},* green vegetable soybeans *{des graines fraîches, écossées encores vertes, comme le Haricot flageolet},* whole dry soybeans *{les graines sèches comme le Haricot blanc ordinare}).*

8. Conclusion and tables showing French analyses of soybeans (p. 576-78). Appendixes (p. 579-96): Summaries of letters to the Society describing 27 cultural experiments with soybeans conducted during late 1880 at various locations in France, Switzerland and Algeria. (Note: Though the publication date of this appendix is given as Oct. 1880, some of the letters are dated as late as 21 Nov. 1880). Reprint of a 2-page letter from Eugene Simon, former French consul in China, on soybean farming in China (p. 591-93). Reprint of a description by Eugene Simon, based on the description of a Chinese, of how tofu is made in China (p. 593-94). A French translation of a 1781 article by Isaac Titsingh on preparation of soy sauce in Indonesia (p. 594-95). And some information about soybeans from the ancient Chinese herbal *Pên Ts'ao Kang Mu* (p. 595). Reprints of 2 letters from Eugene Simon in China, on soya and tofu in China. French translation of a 1781 article by Isaac Titsingh on preparation of soy sauce.

Note 1. We find it surprising that this superb work contains no illustrations of a soybean plant, or of any part of the plant, or of any foods made from soybeans; the only illustration (p. 569) is a cross section of an empty pit into which one could put a mixed silage that contained 20% soybean plants.

Note 2. This is the earliest French-language document seen (Dec. 1999) that uses the term *Huile de Soya* to refer to soybean oil.

Note 3. This is the earliest document seen (March 2001) that has a bibliography of more than 50 references concerning soybeans.

Note 4. This is the earliest European-language document seen (Sept. 2004) that mentions the Japanese soybean types *Nakata-mame* or *Okute mame*.

Note 5. This is the earliest French-language document seen (Feb. 2010) that uses the term *tsiang-yeou* to refer to Chinese-style soy sauce. Address: France.

154. *Bulletin de la Societe d'Acclimatation.*1881. Extraits des procés-verbaux des séances de la société. Séance générale du 4 Février 1881 [Excerpts of verbal proceedings from meetings of the society. General meeting of 4 Feb. 1881]. 28:154-64. Feb. See p. 158-60. [Fre]

• ***Summary:*** The Secretary General, M. Geoffroy Saint-Hillaire, who is presiding at this meeting, placed on the table some black soybean seeds which were sent by Mr. Lavalard, an administrator at the Omnibus General Company, which is charged with the direction of the cavalry and its forages. These seeds are accompanied by the following extract of a letter written by a correspondent of Mr. Lavalard.

"Paris, 2 Feb. 1881. In the province of Chihli *(Tchély),* in China, two species of forage grains are cultivated, named *Tsin-Téou* and *Hei-Téou* (white and black peas [actually soybeans]). When these are fed to domestic animals, they readily put on weight and become resistant to fatigue. A peck *[picotin,* about 8 gallons or 8.8 liters] of black soybeans, provided it has been lightly cooked with steam, is sufficient to energize the least energetic runner. It is surprising that one has never tried to acclimatize the black soybean to Europe. This seed, less costly and more nourishing than oats, would be a valuable resource for horses.

"Chihli is at the same latitude as Spain, however the temperature is much different.

"The black soybean *(Le Hei-Téou)* has almost the same virtues as coffee. Several times, I have roasted then ground them; only the bitterness keeps me from using them every day. But I am convinced of their stimulating effect. What's more, it is restorative and refreshing (p. 158).

"The nutritive qualities of the black soybean are considered by the Chinese to be the best available for horses. For the Chinese, soya replaces oats, and appears to produce the same effect on horses. They develop a shiny coat of hair and the appearance of health and vigor.

"The black soybean is also used in the diet of the Chinese. In addition, they make from it an oil used for burning...

"When the soybean is used for a draft ox, it is ground in a mill then soaked in warm water.

Mr. Lavalard adds: "All that I just communicated to you from the letter of my correspondent will seem rather exact, when you read the attached analysis [in tabular form] that I asked Mr. Muentz [Müntz] to conduct: Water 10.14%, ash 5.18%, oil *(Graisse)* 17.00%, nitrogen *(Azote)* 5.87%, protein 36.67%, cellulose 6.00%. Nitrogen-free extract, about 25%.

Mr. Geoffroy Saint-Hillaire observes that the information contained in this letter permits us to recognize easily that the Hei-Téou is a type of soybean *(une espèce de Soja).* He adds that Mr. Paillieux, to whom the seeds have been submitted, thinks that this type differs from those he has been able to study previously.

"According to notes published in the *Bulletin agricole de la Cochinchine* [sic, *Bulletin du Comite Agricole et Industriel de la Cochinchine]* (1878), by Mr. Corroy, Director of the Botanical Garden in Saigon, he has some reservations about accepting the information given about the black soybean. However, it still remains established than the soybean is one of the richest foods, and it is important to try to propagate this plant (p. 159).

"Mr. Paillieux speculates that Mr. Corroy was stopped in the use of soybeans because of the difficulty he encountered in establishing its possible uses. 'As for the information I gave about this plant, adds our colleague, I got it from the Abbot (l'abbé) [Armand] David, who, during his long trips through China, saw horses and mules fed solely with black soybeans, and attested that this diet suited them perfectly'" (p. 160). Address: France.

155. McBryde, John M. 1881. Experiments with corn and other crops. *Report of the Experimental and Other Work of the School of Agriculture, Horticulture & Botany of the University of Tennessee* 2:142-76. See p. 172. For the session 1880-81.

• ***Summary:*** The section titled "Soja bean" (p. 172) states: "This plant *(Soja hispida)* is, according to some, a comparatively recent import from Spain. The plant is really a native of the East Indies [Southeastern Asia, incl. India, Indonesia, Malaysia, and the Malay archipelago], where it is largely grown as a staple article of food. It is beginning to attract attention in several countries of Europe.

"This bean is an essential ingredient of the celebrated Soja Sauce. The seed contains about 34 per cent. of albuminoids and the straw about 9 per cent. It is therefore regarded as 'the vegetable which approaches nearest in chemical composition to animal food (meat) containing, as it does, one-fifth of its weight of fat and about two-fifths of nitrogenous matter.'

"A small quantity of seed was procured last spring and planted on April 27th, in drills 2½ feet apart. They came up very well" and the plants stood the drought well. The yield, in view of the drought and abundant weeds, "was a remarkably good one. The plant is both hardy and prolific, and will probably give a heavy crop in a favorable season."

Note 1. The soybean may have been grown in Spain at this time.

Note 2. This is the earliest English-language document seen (Jan. 2006) that uses the term "Soja Sauce" (or "soja

sauce") to refer to soy sauce.

Note 3. Other crops discusses in this article: Indian corn, dhurra, sorghum, drooping sorghum, Johnson grass or Means' grass, rye, barley, upland rice, millets, buckwheat, teosinte, prickly comfrey, tobacco. Address: Prof. of Agriculture, Horticulture and Botany, Knoxville, Tennessee.

156. *Memoires et Proces-Verbaux.* 1881. Exrait des Procès-Verbaux des séances de la Société des Amis des Sciences, de l'Industrie et des Arts de la Haute-Loire [Extract of the Oral Proceedings of the meetings of the Society de friends of Science, of Industry and of the Arts of Haute-Loire]. 2:452-53. Meeting of 1 July 1880. M. Aymard presiding. [Fre]

• ***Summary:*** The president calls attention to the journal of Mr. Barral and to a new species of oil pea or soybean *(pois oléagineux, le soja hispida),* a legume appreciated for its culinary and forage qualities, and which grows in Japan, the Indies and in the Moluccas. They were planted from April 15 to May 15 and their culture was the same as for haricot beans. The dry plants *(Les fanes)* and the pods of the soybean *(du soja)* make good feed for sheep. In food value, the dry plant closely approaches that of clover. We strongly encourage our agriculturists to cultivate this legume, for they will have a double profit: the seeds which give an excellent dish and, at the same time, a good forage for the sheep. Address: Haute-Loire, France.

157. D'Utra, Gustavo. 1882. Soja [Soya]. *Jornal do Agricultor (Brazil)* 4(7):185-88. Sept. 16. [Por]

• ***Summary:*** The name of this plant comes from the Japanese. The soybean was cultivated at the Bahia School of Agriculture in 1882. He notes that Soja and Daidsu are Japanese names, that the Japanese use soybeans to make a paste called miso, which can be used as a substitute for butter, and a sauce called sooia or soja, which can be used to season meat. Kitjap is a sauce made in Indonesia. Sr. Dias da Silva Junior (the editor of this journal) has distributed soybean seeds free of charge.

Note: This is the earliest document seen (May 2009) concerning soybeans in Brazil or South America, or the cultivation of soybeans in Brazil or South America or Latin America. This document contains the earliest date seen for soybeans in Brazil or South America or Latin America, or the cultivation of soybeans in Brazil or South America or Latin America (1882). The source of these soybeans is unknown. Address: Engenheiro-Agronomo, Rio de Janeiro, Brazil.

158. Mene, Édouard. 1882. Des productions végétales du Japon [The vegetable products of Japan]. *Bulletin de la Societe d'Acclimatation* 29:466-90. Sept. See p. 477-90. [40 soy ref. Fre]

• ***Summary:*** This excellent review of earlier publications and work, which is largely about the soybean, contains 40 references to earlier publications, many of them from the *Journal of the Society for Acclimatization* and from early European botanists. Much of the information is taken from earlier issues of this periodical and from the book *Le Japon a l'Exposition universelle de 1878.*

Contents: The soybean *(Soja hispida, O mame: Daizu,* p. 477). The wild soybean (Glycine hispida, Soja hispida, p. 477; it is found in the wild in the coastal regions of the island of Kyûshû. Called *Tsuru-mame* and *Nô-mame* by Franchet and Savatier. Soybeans in the catalog of the Japanese Universal Exposition of 1878: No. 24–The black soybean *(Kuro-mame),* No. 25–The white soybean *(Shiro-mame),* No. 26–The green soybean *(Ao-mame),* No. 37–The black soybean speckled with white *(Gankui-mame).* Where the soybean is cultivated: Not only on the island of Japan, but also in India, on the island of Ceylon, on the Malacca peninsula (i.e., Malay Peninsula), on the Philippine islands, in Borneo, Java, in the Kingdom of Siam, in Cochin China, at Tong-King [Tonkin, formerly in North Vietnam] and throughput China, but mainly in Mongolia and in the provinces of Honan, Shengking [Liaoning], Shantung, and Shansi.

Note 1. This is the earliest document seen (May 2010) concerning soybeans in Malaysia, or the cultivation of soybeans in Malaysia. This document contains the earliest date seen for soybeans in Malaysia, or the cultivation of soybeans in Malaysia (1882). The source of these soybeans is unknown.

Note 2. This is the earliest document seen (May 2010) concerning soybeans in the Philippines, or the cultivation of soybeans in the Philippines. This document contains the earliest date seen for soybeans in the Philippines, or the cultivation of soybeans in the Philippines (1882). The source of these soybeans is unknown.

Note 3. This is the earliest document seen (May 2010) concerning soybeans in Siam (renamed Thailand in 1938), or the cultivation of soybeans in Siam. This document contains the earliest date seen for soybeans in Siam, or the cultivation of soybeans in Siam (1882). The source of these soybeans is unknown.

Note 4. This is the 2nd earliest document seen (May 2010) concerning soybeans in Siam Vietnam, or the cultivation of soybeans in Vietnam. This document contains the 2nd earliest date seen for soybeans in Vietnam, or the cultivation of soybeans in Vietnam (1882). The source of these soybeans is unknown.

The Chinese exposition (class 73) contains samples of all the varieties of soya cultivated in the provinces of the empire: No. 2991 and 3000–Green, white, black, yellow, striped / streaked / variegated *(panachés),* and red soybeans. Source: Chinese customs at Newchwang. No. 3014-3016–Yellow, black, and green soybeans. Source: Customs at

Tientsin [Tianjin]. No. 3058 to 3061–Yellow, green and black soybeans., from the customs at Chefoo [Yantai]. No. 3091. Yellow soybeans, from the customs at Chinkiang [Zhenjiang]. No. 3103 to 3109–White, red, black, and yellow soybeans from the customs at Shanghai. No. 2135 to 3128–White, black, red, and green soybeans from the customs at Wenchow [Wenzhou]. No. 3152 to 3156–White, green, and black soybeans from the customs at Takow [Kao-Hsiung].

At the Japanese exposition (class 74, condiments and stimulants) are samples of miso and shoyu from Tokyo and the province of Hizen, especially the town of Nagasaki.

The Chinese exposition also contains in class 74 (condiments and stimulants) samples of soy sauce *[soye, soya]* called *Tsiang-yeou* from the Chinese customs at Chefoo, Ning-po, Wenchow, and Canton. The Chinese often add aroma in the form of star anise, green anise, and orange rind. Chinese soy sauce is made with yellow soybeans called *Houang-téou.*

Descriptions of how to make shoyu, miso, tofu, and soybean oil based on earlier European publications (p. 479-83).

In France, Mr. Vilmorin and Dr. Adrien Sicard (of Marseilles), both of whom are involved with soybean cultivation, have prepared soy cheese *(fromage de Soja)* numerous times. Dr. Sicard has made both the white cheese and the red cheese; the latter is rolled in a powder made by grinding red sandalwood *(santal; Pterocarpus santalinus),* mace, and cinnamon (p. 482).

In China, quite a few soy oil factories are found at Calfond in Henan, at Tsinan in Shantung, and at Tayeurn in Shanxi. But the center of soy oil production in China is Ning-po in Zhejiang / Chekiang. From the port of Ning-po and from a port on the island of *Tcheou-chan [Zhoushan?]* a large number of junks, carrying only soy oil, depart. Two other manufacturing centers are Newchwang and Chefoo (p. 483).

There follows a long section on the introduction and acclimatization of the soybean in Europe (p. 484-89) based on earlier European documents.

The next section, about kudzu *(Pueraria Thunbergiana,* p. 489-90) cites 9 early references, including *Le Japon a l'Exposition universelle de 1878,* vol. II, p. 153). Address: France.

159. Kinch, Edward. 1882. Die Sojabohne [The soybean]. *Biedermann's Central-Blatt fuer Agrikulturchemie* 11:753-55. Nov. [Ger]

• ***Summary:*** According to Watt (1890, p. 511): "In 1882, Professor Kinch urged the advisability of renewed efforts [to grow soya] in the Himalayan tracts, and, as a consequence, the government of India directed the attention of local officials to the subject. Seed obtained from the Government Gardens, Saharanpur, were distributed to Madras, the Panjab, Bengal, Bombay, Hyderabad, and Burma, for experimental cultivation. It appears to have been grown from seed obtained from China with a fair amount of success at the Saidapet Experimental Farm in 1882."

"The chemical composition of the bean, according to Professor Kinch, places it above all other pulses as an albuminous food, while that of the straw also surpasses in nitrogen value that of wheat, lentils, and even hay."

Table 1 gives original analyses of the nutritional composition of various soybeans, including: from Japan, pale/colorless from China, yellow from Germany, from India, brown, round black, and oblong black soybeans.

"The average composition of the straw, the pods, and of a type of soybean straw from Japan, which are used as very tasty feeds for horses, cows, and sheep" are given in table 2.

Table 3 gives the nutritional analyses of various soybean products: White miso, red miso, Tofu or *Bohnenkäse,* frozen tofu *(gefrorener Bohnenkäse),* and soybean cake *(Sojabohnenkuchen)* which remains after pressing out the oil *(Abpressen des Oels).*

Table 4 shows the percentage composition of nine different mineral salts in the ash of soybean seeds and straw.

Note 1. This may be the 2nd earliest document seen (May. 2010) concerning soybeans in Burma. It seems likely that soybeans were cultivated in Burma at that time, but that is not certain. This document may contain the 2nd earliest date seen for soybeans in Burma (1882).

Note 2. This may be the second earliest document seen (July 2006) concerning soybeans in Pakistan, however that is not certain. The nation of Pakistan was created out of British India in 1947. In 1882 Panjab (Punjab) was a province in British India. It was divided in Aug. 1947 into East Punjab, India (with about 1/3 the area and ½ the population of the original province), and West Punjab, Pakistan. West Punjab was renamed simply Punjab and is now one of Pakistan's four provinces; its capital is Lahore.

Note 3. This may be the earliest document seen (May 2010) concerning soybeans in Bangladesh. If so, this document contains the earliest date seen for soybeans in Bangladesh (1882). The source of these soybeans is unknown. The province of Bengal in British India was divided on 15 Aug. 1947 into East Bengal (now Bangladesh) and West Bengal (part of India). It is not clear to which part of Bengal these soybeans were distributed.

Note 4. This is the earliest German-language document seen (Feb. 2004) that mentions dried-frozen tofu, which it calls "gefrorener Bohnenkäse." Address: Professor, Cirencester, England.

160. Mason, Francis. 1882-1883. Burma, its people and productions: or, Notes on the fauna, flora, and minerals of Tenasserim, Pegu, and Burma. 2 vols. Rewritten and enlarged by W. Theobald. Hertford, England: Published by

order of the Chief Commissioner of British Burma, by S. Austin & Sons. 19 cm.

• ***Summary:*** The previous edition of this work was published in 1860. This edition is greatly enlarged and expanded. In Volume II (published in 1883), on page 513, in the section on Leguminosae, under *Glycine* we read that *Glycine soja* is cultivated in Ava. "Erect. Flowers in small axillary clusters. Pods 1-1½ in. long, almost falcate. Seeds 3 lines long, slightly compressed, pale-coloured.

"The word 'soja' is a variation of the Japanese 'soya,' whence our word 'Soy,' for a sauce prepared in China and Japan from the seeds of one or more species of *Dolichos* or allied genera."

Note 1. Pickering (1879, p. 763) states: "Westward, S. hispida was observed by Mason in Burmah."

Note 2. This is the earliest document seen (May 2010) that clearly refers to soybeans in Burma or the cultivation of soybeans in Burma. This document contains the earliest clear date seen for soybeans in Burma or for the cultivation of soybeans in Burma (1883). The source of these soybeans is unknown.

Note 3. Ava is a ruined city on the Irrawaddy River, in Sagaing division, 6 miles southwest of Mandalay. Founded in the 14th century, it was the capital of Burma for 400 years. In 1783 it was replaced by Amarapura, but was again the capital from 1823 to 1837.

Ground nuts *(Arachis hypogæa)* [peanuts] are mentioned under "Order Leguminosae" (p. 491). The Burmese name is given as Mye-leh. "Indigenous to South America, but cultivated all over the East for its edible kernels and the oil extracted from them, which is excellent" (p. 500). In the index of vernacular names of Burmese plants, the name of the peanut is given as "Myeh-peh" (p. 713). Address: Rev. D.D., M.R.A.S.

161. Bretschneider, Emil V. 1882. Botanicon sinicum. Notes on Chinese botany from native and Western sources. I. Andreas Cleyer and Engelberth [Englebert] Kaempfer (Document part). *J. of the Royal Asiatic Society, North China Branch. Series 2.* 16:18-230. For the year 1881. See p. 125-26. [1 ref. Eng]

• ***Summary:*** "The first attempt of a European to study the Flora of Japan was made by Andreas Cleyer, a German, who visited Yeddo in 1683 as envoy of the Dutch East-India Company, and who resided in Nagasaki as chief supercargo [in charge of the commercial concerns] of the Dutch factory till 1686. His letters on Japanese plants addressed to Dr. Mentzel have been published in the *Academiæ naturæ curiosorum Ephemerides,* 1686-1700. Cleyer's descriptions as well as the drawings appended have little value."

In the Royal Library at Berlin Bretschneider saw Cleyer's drawings as well as "another volume entitled *Cleyer's Flora Japonica,* containing only 101 coloured drawings of Japanese plants, apparently painted from nature in Japan by Cleyer's order. These have more claim to botanical correctness. Cleyer has himself added some memoranda. The names are given in Japanese letters only. This volume was referred to Dr. Siebold, who in 1856 drew up an Index of the drawings and added the scientific botanical names.

Note: Cleyer's diary was published in German in 1985 under the title *Tagebuch des Kontors zu Nagasaki auf der Insel Deshima, 20 Oktober 1682–5 November 1683,* edited by Eva. S. Kraft.

"A few years after Cleyer had left Japan, another German, an able explorer and botanist, arrived in that country and spent about two years there. Engelberth [Englebert] Kaempfer was born in 1651 at Lemgo (Lippe-Detmold). In 1683 he accompanied a Swedish Embassy to Persia as secretary, but on its return he separated from it and proceeded to the Persian Gulf, where a Dutch fleet was stationed at that time. In 1685 he entered the service of the Dutch East-India Company as a surgeon, and arrived at Batavia [later renamed Jakarta, Indonesia] in 1689. In the following year a Dutch squadron was sent out to Siam and Japan, and Kaempfer was of the party. On the 22nd September 1690 he reached Nagasaki. He had two opportunities of visiting Yeddo, performing the journey thither partly by the overland road, partly by sea. His first stay in Yeddo lasted from March 13 to April 5, 1691; the second from March 31 to April 29, 1692. He left Japan in the same year, returned to Europe in 1694, and died in 1716 in his native country. For further biographical details regarding Kaempfer see Rosny's "Variétés orientales," 1872, p. 98, where an interesting account of his life and scientific works is found. Kaempfer was not only a skillful botanist, but an acute observer in general. He has connected his name imperishably with the history of botanical discoveries in Japan, and the accounts he noted down with respect to the Japanese Empire and other countries he visited will always stand as a model of accurate and judicious information and keen observation. In 1712 he brought out his *Amoenitates Exocticae.* The second fasciculus [fascicle] (p. 466) contains an account of the plants from which paper is manufactured in Japan; in the third fasciculus (p. 605) a treatise on the Tea-shrub is found. Besides this the whole of the fifth fasciculus (p. 707-912) is devoted to the description of more than 500 species of Japanese plants, 31 of which are represented by excellent drawings. The Japanese names of the plants are always given, and Chinese names in Chinese characters are generally added. Although these characters are often wrongly or indistinctly printed, there is no difficulty in deciphering them. Kaempfer's botanical descriptions are generally faithful, in some instances much detailed.

"The Amoenitates Exoticae represents only a small portion of Kaempfer's labours. After his death all his unpublished manuscripts as well as his herbarium, namely

the plants collected in Japan and his drawings of Japanese plants, were purchased by Hans Sloane, the well-known collector and promoter of science, whose immense collection subsequently gave origin to the British Museum. In 1727 Kaempfer's valuable *History of Japan,* etc. was published in English, translated from his original (Dutch) manuscript. In 1791 Sir J. Banks edited a volume with the title: *Icones selector plantarum quas in Japonia collegit et delineavit E. Kaempfer, ex archtyp, in Museo Britannico asservatis.* It contains 50 plates." Address: China.

162. Bretschneider, Emil V. 1882. Botanicon sinicum. Notes on Chinese botany from native and Western sources. I. Philipp Franz von Siebold (Document part). *J. of the Royal Asiatic Society, North China Branch. Series 2.* 16:18-230. For the year 1881. See p. 126-27. [1 ref. Eng]

• ***Summary:*** After describing the pioneering botanical work of Englebert Kaempfer and C.P. Thunberg in Japan, Bretschneider continues: "Much more was done in this respect by Dr. Siebold, the well-known and ardent explorer of Japan.–Ph. Fr. v. Siebold, a German, was born in 1796 in Wuerzburg. After having studied medicine and natural sciences he went to Holland, and entering the service of the Dutch East-India Company, set out for Batavia, where he arrived in 1822. The next year he was sent as a physician and naturalist to Japan. He lived several years in the Dutch Factory at Decima [Deshima] (Nagasaki). In 1826 he had an opportunity of visiting Yeddo [Edo, today's Tokyo]. As the Japanese government suspected him of being in possession of a map of Japan, he was obliged to leave the country in 1830, and returned to Europe, where he employed himself for several years in publishing the results of his researches in Japan. In 1859 he went again to that country, where he lived till 1862. He died at Munich in 1866.

"Siebold had forwarded one portion of his vast botanical collections accumulated in Japan to Prof. C.L. Blume in Java, who described some of these plants in the *Museum botanicum Lugduno-Batavorum,* 1849-51. H. Zollinger published a few years later an Index of Siebold's plants in the Java Herbarium (Buitenzorg). The greater part of his dried plants, however, had been transmitted by Siebold to the Museum of Leyden, and from these materials Prof. Miquel compiled his *Prolusio Florae japonicae [Prolusio florae Iaponicae],* 1865-67.

"Siebold himself, with the assistance of Prof. J.G. Zuccarini of Munich, had commenced much earlier to describe his Japanese botanical collections, but their publications were left in a fragmentary state. The most interesting of them is the *Flora japonica,* sive plantæ quas in Imperio Japonico collegit, descripsit, ex parte in ipsis locis pingendas curavit Dr. Ph. Fr. de Siebold, digessit Dr. Zuccarini, 1835-1844, 127 plates. Miquel attempted to continue this iconographical work and published, from 1868-1870, 23 additional plates.* The original drawings to which Siebold alludes on the title pages (about 600) have been purchased, together with a set of Siebold's dried Japanese plants, from his widow, by the Academy of St. Petersburg [Russia]. The drawings form eight large volumes and are beautifully executed.

"Siebold always tried to ascertain the Japanese names of the plants he gathered, and also noted down the Chinese characters applied in Japan to these plants. He was assisted in this task by native botanists, and we can, I think, assume that his identifications are quite reliable."

Footnote: *"I know only the 127 plates published by Siebold and Zuccarini. Franchet and Savatier, *Enum. plant. Japon. [Enumeratio Plantarum in Japonia sponte crescentium...],* Pref. XIII, state that in all 175 of these plates have been published, but in the second vol. p. 665 that authors assign to Flora japonica 150 plates only." Address: China.

163. Bisschop Grevelink, A.H. 1883. Planten van Nederlandsch-Indië: Bruikbar voor handel, nijverheid en geneeskunde [Plants of the Netherlands Indies: Useful for trade, industry, and medicine]. Amsterdam, Netherlands: J.H. de Bussy. xlviii + 876 p. Illust. Index. 23 cm. [Dut]

• ***Summary:*** Under sub-order *Papilionaceae verae,* the taxonomy of the soybean is outlined on p. 68, then the plant is discussed in detail on p. 98 under the following heading: "XXXVIII. Soya hispida Mönch.–*Dolichos soya* L.–*S. japonica* Savi. Japansche slingerboon Ned. [Dutch].–Katjang Kedeléh jav. [Javanese].–Katjang boeloe mal. [Malay].

Also discusses: *Voandzeia Subterranea* Thouars. *Katjang Manilla* [Katjang Manila; Malay]. (Bambara groundnut, p. 80-81). *Psophocarpus tetragonolobus* DC.–*Lobus quadrangularis* Rumphius.–*Vierhoekige slingerboon* [Dutch]–*Djaat [Javanese]–Botor* [Malay]–*Ketjippeer [Katjang ketjipir]* [East Java]. (Winged bean, p. 81). *Arachis hypogaea* (peanut, p. 101-06). *Amarantus oleraceus* (amaranth, p. 263-65). *Linum usitissimum* (linseed, p. 308). *Cannabis sativa* (hemp, p. 370-73). *Coix lachryma* (Job's tears, p. 411). *Cyperus esculentus* Aardmandelen [Dutch]. Earth-chestnuts [English]. Amande de terre [French] (Chufa, p. 658). *Sesamum indicum* (sesame, p. 675-77). Arnoldus Hermanus Bisschop Grevelink was born in 1811.

164. Schaedler, Carl. 1883. Die Technologie der Fette und Oele: Des Pflanzen- und Thierreichs [The technology of oils and fats: From the plant- and animal kingdoms]. Leipzig, Germany: Baumgartner. Berlin: Polytechnische Buchhandlung. 1108 p. Illust. Index. 22 cm. [Ger]

• ***Summary:*** In Chapter 12, "Descriptions, properties, and confusions of the oils and fats" is a section titled "Papilionaceae (Leguminosae), papilionaceous plants *(Schmetterlingsblüthler).*" The first plant discussed (p. 370) is the soybean: "1. Dolichos Soja Linn = Soja japonica =

Chinese oilbean *(Chinesische Oelbohne), Sao; Sojabohne.* It is native to Japan and China and cultivated in southern Asia. The seeds, which have a piquant *(pikante)* taste and are used as food. The oil, called soybean oil *(Sojabohnenöl),* and incorrectly called "oil of peas" *"(Huile de pois)"* serves as an edible oil.

Also discusses: Margarine (p. 85). Peanuts (p. 360-65. The oil is called *Erdeichelöl, Oleum Arachidis, Huile d'Arachide, Huile de Pistache de terre, Ground-nut oil, Earth-nut oil, Pea-nut oil, Moong-phullie* (Hindostan), *Katjang-tannah* (Java), *Cochang-gorung* (Sumatra), *Mandobi* (Brazil), *Amendoim* (Brazil)). Almonds and almond oil (p. 370-79). Sesame oil (p. 444-50). Chufa *(Cyperus esculentus, Erdmandel, Grasmandel, indianische Süsswurzel,* p. 480-810). Chufa oil *(Cyperi esculenti, Cyperus oil, Huile de souchet comestible).* Linseed oil (p. 494-509). Hemp and hempseed oil (p. 150-52, 535-39). Contains many superb text illustrations, including multi-part illustrations of the plant, seeds, and flowers of the peanut, almond, sesame seeds, and hemp. The soybean is not illustrated.

Note 1. Carl Schaedler was born in 1843.

Note 2. This is the earliest German-language document seen (April 2003) that uses the term "chinesische Oelbohne" to refer to the soybean.

Note 3. This is the earliest German-language document seen (Sept. 2006) that uses the term *Sojabohnenöl* to refer to soybean oil. Address: PhD, Vereideter Chemiker und Sachverstaendiger der Koenigl. Gerichte zu Berlin.

165. Candolle, Alphonse de. 1884. Origin of cultivated plants. London: Kegan Paul, Trench & Co. viii + 468 p. See p. 330-32, 443. Index. 20 cm. (International Scientific Series, v. 49 [i.e. 48]). Translation of Origin des Plantes Cultivees, 1883 ed. 2nd ed. 1886. [15 ref. Eng]

• ***Summary:*** This is the first English-language edition of this landmark work by de Candolle (lived 1806-1893), the renowned Swiss botanist, whose father (Augustin Pyramo de Candolle, lived 1778-1841) was also a famous botanist. The world's first authority on the origin of cultivated plants, Alphonse de Candolle postulates (p. 17) that agriculture arose independently in three regions: "China, the southwest of Asia (with Egypt), and intertropical America."

The section on soy is compiled from 15 earlier publications, which are footnoted. There is no separate bibliography at the back of the book.

"Soy–*Dolichos soja,* Linnaeus; *Glycine soja,* Bentham. This leguminous annual has been cultivated in China and Japan from remote antiquity. This might be gathered from the many uses of the soy bean and from the immense number of varieties. But it is also supposed to be one of the farinaceous substances called *shu* in Chinese writings of Confucius' time, though the modern name of the plant is *ta-tou.* The bean is nourishing, and contains a large proportion of oil, and preparations similar to butter, oil, and cheese are extracted from it and used in Chinese and Japanese cooking. Soy is also grown in the Malay Archipelago, but at the end of the eighteenth century it was still rare in Amboyna, and Forster did not see it in the Pacific Isles at the time of Cook's voyages. It is of modern introduction in India, for Roxburgh had only seen the plant in the botanical gardens at Calcutta, where it was brought from the Moluccas. There are no common Indian names. Besides, if its cultivation had been ancient in India, it would have spread westward into Syria and Egypt, which is not the case.

"Kaempfer formerly published an excellent illustration of the soy bean, and it had existed for a century in European botanical gardens, when more extensive information about China and Japan excited about ten years ago a lively desire to introduce it into our countries. In Austria, Hungary, and France especially, attempts have been made on a large scale, of which the results have been summed up in works worthy of consultation. It is to be hoped these efforts may be successful; but we must not digress from the aim of our researches, the probable origin of the species.

"Linnaeus says, in his *Species,* 'habitat in India,' and refers to Kaempfer, who speaks of the plant in Japan, and to his own flora of Ceylon, where he gives the plant as *cultivated.* Thwaites's modern flora of Ceylon makes no mention of it. We must evidently go further east to find the origin both of the species and of its cultivation. Loureiro says that it grows in Cochin-China and that it is often cultivated in China. I find no proof that it is wild in the latter country, but it may perhaps be discovered, as its culture is so ancient. Russian botanists have only found it cultivated in the north of China and in the basin of the river Amur. It is certainly wild in Japan. Junghuhn found it in Java on Mount Gunung-Gamping, and a plant sent also from Java by Zollinger is supposed to belong to this species, but it is not certain that the specimen was wild. A Malay name, *kadelee,* quite different to the Japanese and Chinese common names, is in favour of its indigenous character in Java.

"Known facts and historical and philological probabilities tend to show that the species was wild from Cochin-China to the south of Japan and to Java when the ancient inhabitants of this region began to cultivate it at a very remote period, to use it for food in various ways, and to obtain from it varieties of which the number is remarkable, especially in Japan."

A general table of species (p. 442-43) shows the origin of cultivated plants. Under "Cultivated for the seeds–Nutritive" is listed: "Soy–*Dolichos soja* Date: A. Origin: Cochin-China, Japan, Java." The date code "A." signifies (see p. 436-37) that this Old-World species has been cultivated for more than four thousand years, according to ancient historians, Chinese works, and botanical and philological indications. Also listed in this general table:

Lupin, Egyptian Lupin, Bambarra Ground Nut, three types of buckwheat, and Kiery *(Amaranthus frumentaceus,* from India).

Plants native to North America: Jerusalem artichoke, mushroom *(Agaricus campestris),* pumpkin and squash, Virginia strawberry. Some other interesting plants: Tea from Assam, China, Mantschuria [Manchuria] (p. 117). Tobacco (p. 139). Cacao *(Theobroma cacao)* from tropical Brazil (p. 313). Arabian coffee from tropical Africa, Mozambique, Abyssinia, Guinea (p. 415).

Soy is listed in the Index in three places as follows: Dolichos Soja, Glycine soya, and Soy.

Note 1. This is the earliest document seen that clearly refers to the cultivation of soybeans in Ceylon (renamed Sri Lanka in 1972).

Note 2. This is the earliest English-language document seen (Sept. 1996) that uses the word "soy" to refer to the soybean. Since 1688, "Soy" has always referred to soy sauce.

Note 3. When de Candolle refers to the scientific name of the soybean as *Glycine soja,* it is not clear whether he is using this term incorrectly as a synonym for the cultivated soybean, or correctly as the scientific name for the wild soybean.

Note 4. On the title page, under the author's name, we read: "Foreign associate of the Academy of Sciences of the Institute of France; Foreign member of the Royal Society of London, Edinburgh [Scotland], and Dublin [Ireland]; of the academies of St. Petersburgh, Stockholm, Berlin, Munich, Brussels, Copenhagen, Amsterdam, Rome, Turin, Madrid, Boston, etc.

Note 5. Also discussed: Bambarra ground nut *(Glycine subterranea, Voandzeia subterranea;* p. 347-48). Quinoa (p. 351-52). Lupin (p. 325-27). Address: Geneva [Switzerland, 1882].

166. Candolle, Alphonse de. 1885. Origin of cultivated plants. New York, NY: D. Appleton and Co. viii + 468 p. See p. 330-32, 443. The International Scientific Series Vol. 48. Translation of Origin des Plantes Cultivees, 1883 ed. 2nd ed. 1886. Reprinted in facsimile in 1959 by Hafner Publ. Co, New York. 19 cm.

• ***Summary:*** This is the first U.S. edition of this landmark work by de Candolle (lived 1806-1893), the renowned Swiss botanist, whose father was also a famous botanist. The section on soy in this edition is identical to (in fact, a facsimile of) that in the first British edition published in London in 1884.

De Candolle, a Swiss botanist, was the first to recognize that information from botany, philology, geography, and archaeology must be integrated if scholars were to understand the origins of agriculture. He tried to determine the regions where most of the world's important crops were first domesticated. Address: Foreign Assoc. of the Academy of Sciences of the Inst. of France.

167. Mene, Édouard. 1885. Des productions végétales du Japon [The vegetable products of Japan]. Paris: Au Siège de la Société Nationale d'Acclimatation. 592 p. Index. 24 cm. [34 soy ref. Fre]

• ***Summary:*** The title page states in small letters: *Extrait du Bulletin de la Société Nationale d'Acclimatation,* indicating that much of the material in this book is based on articles previously published in this French-language Bulletin. However many other early books on Japanese agriculture have also been consulted and are carefully cited.

In the Introduction, the author explains that he was appointed by the Society for Acclimatization to prepare this report on the vegetable products of Japan which had been exhibited at the Universal Exposition of Paris in 1878–in two parts. Those displayed by the Japanese firm Trocadero, and those displayed in the galleries of the palace at Champ-de-Mars. The author and many others were deeply impressed by this exhibition.

Grains (class 69, p. 31): Wheat or rice are mixed with beans or peas and fermented to make shoyu and miso. Shoyu is one of the most widely used condiments in Japanese cuisine. The method of production is described briefly. Among the condiments displayed in class 74 were a number of flasks of shoyu from Tokyo.

Legumes (p. 40-47): Discusses soybeans, tofu, azuki beans *(Phaseolus radiatus* var. *subtrilobata,* p. 42-44; incl. yayenari, red, white, black, and yellowish azuki, Dainagon azuki, azuki flour, an, yokan), shoyu, soybeans *(Pois oléagineux, Soja hispida,* p. 45-46; incl. Kuro-mame {Black soybeans}, various colors and shapes of dry soybeans {green, yellowish, large yellowish, greenish black, brownish red, white, large red}).

There is also a special, long section on soybeans *(Soja hispida. O mame: Daizu;* p. 270-83) and soyfoods. In the Japanese exposition, the display of useful products *(tableau des productions utiles)* designates: No. 24. *Kuro-mame.* Black-seeded soybeans, the size of an average sized haricot bean. No. 25. *Shiro-mame.* White-seeded soybeans, spotted / flecked / speckled / mottled *(tachetées)* with gray. No. 26. *Ao-mame.* Greenish-seeded soybeans. No. 34. *Gankui-mame.* Black-seeded soybeans, flecked with white.

The soybean *(Le Soja)* is cultivated in Japan, India, Ceylon, the Malacca peninsula [today's Malaysia], the Philippine islands, Borneo, Java, the kingdom of Siam, Cochin China, Tongkin *(Tong-King),* and throughout China, primarily in Mongolia and in the provinces of Henan / Honan, Liaoning *(Shenking),* Shandong / Shantung, and Shanxi / Shansi *(Chan-si).*

The Chinese exposition (class 73) contained samples of all the varieties of soya cultivated in all the provinces of the empire. Nos. 2991 to 3000. Green, white, black, yellow,

striped or variegated, and reddish soybeans, provided by the Chinese customs office at Newchwang. Nos. 3014-16. Yellow, black, and green soybeans from the customs office at Tientsin. Nos. 3058-61. Yellow, green, and black soybeans from customs at Yantai / Chefoo. No. 3091. Yellow soybean from customs at Chinkiang. Nos. 3013-19. White, red, black, and yellow soybeans from customs at Shanghai. Nos. 3125-28. White, black, red, and green soybeans from customs at Wenzhou / Wenchow. Nos. 3152-56. White, green, and black soybeans from customs at Kao-hsiung *(Takow).*

The soybean is one of the plants most widely used in Japan and China for both food and industrial purposes. As indicated previously, shoyu, miso, and tofu are indispensable to the Japanese diet. Samples of these products were displayed in the Japanese exhibit in class 74 (condiments and stimulants); they came from Tokyo and from the province of Hizen, mainly from the town of Nagasaki. In the Chinese exhibit, also in class 74, were samples of *(soye)* or *(soya)* which are similar to Japanese shoyu but are called *Chiang-yu (Tsiang-yeou)* in China. They were provided by the customs offices at Yantai / Chefoo, Ning-po, Wenzhou / Wenchow, and Canton. For aroma, the Chinese often add star anise, green anise, and orange peel. Chinese soy sauce is made from yellow soybeans *(Houang-téou).*

Note: This is the earliest document seen (Jan. 2006) describing a soy sauce made with star anise, green anise, orange peel or other spices or herbs outside of Indonesia.

A detailed description of the method for making Japanese shoyu is given, excerpted from the book *Le Japon à l'Exposition universelle de 1878* [Japan at the Universal Exposition of 1878] (1878, vol. II, p. 124). Additional excerpts concerning shoyu, miso, and tofu are taken from: Simon 1862, Kaempfer 1712, *Bulletin of the Society for Acclimatization* 1880 (p. 248), and Champion 1866.

In France, Mr. Vilmorin and Dr. Adrien Sicard (of Marseilles), who are both involved with soybean cultivation, have prepared soy cheese *(fromage de Soja)* numerous times. Dr. Sicard has made both the white cheese and the red cheese; the latter is rolled in a powder made by grinding red sandalwood *(santal; Pterocarpus santalinus),* mace, and cinnamon (p. 276).

One of the most important soy products is the oil, which is obtained from the seeds–especially the large yellow soybeans that the Chinese call *Houang-téou.* The Japanese do not make soy oil *(huile de Soja)* but in China manufacture of this product gives rise to considerable commerce. Fremy (1855) found that soybean seeds contain 18% oil. The oil is a drying oil, yellow in color and with a special odor and a taste of dried legumes, similar to that of peas. It is used in cooking and illumination. In China, quite a few soy oil factories are found at Calfond in Henan, at Tsinan in Shantung, and at Tayeurn in Shanxi. But the center of soy oil production in China is Ning-po in Zhejiang / Chekiang. From the port of Ning-po and from a port on the island of *Tcheou-chan [Zhoushan?]* a large number of junks, carrying only soy oil, depart. Two other manufacturing centers are Newchwang and Chefoo. There follows a detailed description (p. 276-77) of how soy oil is obtained from soybeans.

Another common use is as soy nuggets *(Chi)* which (according to Stanislas Julien) contain soybeans mixed with ginger and salt. Kiu-tsee is a fermented soy product made in Canton; it contains red rice, soybeans, and the leaves of *Glycosmis citrifolia.* The Chinese also make a pasta and a sort of vermicelli from soybean seeds named *Hou-mi-téou.*

The stems and leaves make excellent forage. Black soybean seeds are often mixed with chopped soybean hay and fed to horses and mules in northern China and Manchuria.

In Japanese and Chinese medicine, black soybean seeds, ground and made into a decoction, are used to combat asthma attacks.

There follows a long history (p. 277-83) of the introduction of the soybean to Europe (starting at the Jardin des Plantes in Paris, in 1740 or 1779) and its acclimatization, based largely on articles from the *Bulletin of the Society for Acclimatization.* It includes a summary of the work of Prof. Haberlandt in central Europe.

Also discusses: Japanese plum trees *(Prunus mume)* and umeboshi salt plums (p. 52-54, 466-67). Sesame seeds and sesame oil (p. 54-55). Amaranths (p. 63-64). Job's tears *(Coix lacryma;* p. 214-15). Kudzu, kuzu powder, and kuzu cloth *(Pueraria Thunbergiana;* p. 283-85). Peanuts and peanut oil *(Arachis hypogæa, Tojin-mame;* p. 286-87). Sesame seeds and sesame oil *(Sesamum indicum, Goma;* p. 518-20). Hemp and hemp oil *(Cannabis sativa, Asa;* p. 558-59). Address: Médecin de la Maison de Santé de Saint-John de Dieu [Paris, France].

168. Paillieux, Auguste; Bois, D. 1885. Le potager d'un curieux. Histoire, culture et usages de 100 plantes comestibles, peu connues ou inconnues: Soya [The inquisitive person's kitchen garden. History, culture, and uses of 100 edible, little-known or unknown plants]. Paris: Librairie Agricole de la Maison Rustique. 294 p. See p. 261-65. 2nd ed. 1892. 3rd ed. 1899, p. 575-625. [1 soy ref. Fre]
• ***Summary:*** The five-page section on Soya (p. 261-65) discusses its use primarily as a vegetable. For more about its broader uses, see Paillieux's 1881 book titled *Le soya, sa composition chimique, sa culture et ses usages.* This section discusses: Englebert Kaempfer's writings: "In Japan, this plant is named *Daidsu* and surnamed *Mame,* that is to say a food grain *par excellence."* Cultivation trials with four varieties conducted by the Society for Acclimatization: (1) Soybean from China, cultivated in Hungary, imported by MM. Vilmorin-Andrieux and Co. The seed color is pale

yellow and the hilum is brown. This is the earliest maturing variety we have seen. (2) Soybean of Etampes. These seeds were distributed in 1874 by the Society for Acclimatization. The seeds are light yellow and the hilum is white. The plant is beautiful, very strong and very productive, but a little late in maturing. (3) The green soybean, originating from Japan, has rather roundish green seeds and a brown hilum. Its is not as early as the soybean from China, mentioned above. (4) The light green soybean, with a white hilum, has somewhat flattened seeds. It has come to us from both Japan and China. Its pods mature rather late. Vilmorin is importing more varieties, including a brown one. The variety in their 1880 catalog seemed a bit late.

There follow instructions for planting, cultivating, and harvesting soybeans *(Soya)*. When the soybeans are fully developed, but before the pods begin to dry, they should be picked. At this stage they are as good as fresh flageolets–though the pods are a bit difficult to remove.

In the dried state, soybean seeds make a good food. Their taste is sweet and very agreeable. We have prepared them like ordinary white haricot beans. They should be soaked for 24 hours before cooking in water that is not hard, or in distilled water. For best results, add 3 grams per liter of soda crystals [sodium bicarbonate].

Soya is without doubt the best of all the coffee substitutes. Many housewives serve a mixture of coffee and chicory each morning for breakfast. But [ground] roasted soybeans need not be mixed with anything. It gives a good coffee *au lait* whose aroma resembles that of Mocha–though it is not as strong. The soybean is cultivated in Tyrol [Tirol] and the Istrian Peninsula under the name of "coffee bean," and we suppose this is also the case in Dalmatia and the south of Italy.

Mr. Heuzé in his book *Edible Plants (Plantes alimentaires)* gives the soybean the name *Dolic à café* (the coffee bean) and says that it is cultivated in some points in the departments of Ariège and of Haute-Garonne; we have not been able to verify this. Recently we learned from Mr. Faivre, of Beaune, that the soybean had been introduced, about 12 years ago, at Allery, a commune in Saône-et-Loire [in east central France] by Father Cretin *(M. l'abbé Crétin)*, and that its seeds were used like coffee beans by many families in the country.

Mr. Faivre, an ardent and generous propagator / spreader of soya, sent us some seeds of the plant cultivated at Allery. They are brown and identical to those recently imported by Vilmorin. Finally, the engineer and head of one of our departments wrote us that he enjoys Soya each morning for breakfast, and that he prefers it to Mocha. He recommends roasting the seeds lightly.

If gardeners will set aside a little space for Soya each year in their gardens, they will obtain, at no extra expense, the coffee needed each morning by their families.

There is much more we know and could say about Soya. Worldwide, it occupies a place equal to wheat, corn, and potatoes. Indeed, it makes an excellent forage. It contains 18% oil. The cake, which remains after the oil is extracted, makes a powerful fertilizer. Under various forms, these seeds become part of the daily food of hundreds of millions of people. They are also used to feed animals, especially millions of horses and mules.

As numerous analyses have demonstrated, they constitute the richest and most complete food that one can desire. We recommend to the reader the recent work, done with great care by Pettet and Schou, in *Revue des Industries Chimiques et Agricoles* (1882).

Contents: Introduction. Discussion of individual plants arranged alphabetically by their French names. For each plant is given, below the French name: Scientific name, early sources, and plant family. Some of the plants discussed include: Amaranth *(Amarantus oleraceus)*. *Glycine apios* (legume family). The peanut *(Arachis Hypogaea; Arachide, Pistache de terre)* (p. 20-23). Daikon or Japanese radish *(Raphanus Sativus*, L. var; *Daikon ou radis du Japon)*. Azuki bean *(Phaseolus Radiatus; Haricot radié)* (p. 102-07; The section titled "A Java" mentions seasoning a dish with *Ketjap,* which it calls *la sauce noire,* or "black sauce"). Glutinous yam *(Dioscorea Batatas; Igname)*. Konnyaku *(Amorphophallus Rivieri; Koniaku)*. Kudzu *(Pueraria Thunbergiana; Kudzu)* (p. 154-64). White melon of Japan *(Cucumis Melo; Shiro uri; Melon blanc de Japon)*. Myoga *(Zingiber mioga; Mioga)*. Udo *(Aralia cordata; Oudo)*. White quinoa *(Anserine Quinoa; Chenopodium quinoa; Quinoa blanc)* (p. 242-45). Chufa *(Cyperus esculentus; Souchet comestible, Souchet sultan, Amande de terre)* (p. 256-61). Soya *(Dolichos Soja; Soja hispida Moench; Glycine Soja; Soya)* (p. 261-65). Bambarra groundnuts *(Voandzeia subterranea; Voandzou)* (p. 272-74). Table of contents (by both French name and scientific name). Address: 1. Member of la Société nationale d'Acclimatation; 2. Préparateur au Muséum. Member of the Société Botanique de France.

169. Forbes, Francis Blackwell; Hemsley, William Botting. 1886-1888. Enumeration of all the plants known from China proper, Formosa, Hainan, the Corea, the Luchu Archipelago, and the island of Hongkong; Together with their distribution and synonymy. *J. of the Linnean Society of London, Botany* 23:1-521. See p. 188-189. [14 ref]
• ***Summary:*** Discusses the following Glycine species: 1. Glycine hispida Maxim. Cultivated throughout China and Japan and other parts of Asia. 2. Glycine Soja, Sieb. et Zucc. Grows in Amur, Mandshuria [Manchuria], and Japan. "This may be the wild form of the foregoing cultivated plant, and it is treated as such by most botanists; but as it is so easily distinguished, we follow Maximowicz in keeping them apart."

3. Glycine tabacina, Benth. Described near Amoy in Fokien [Fukien / Fujian province] by Sampson, and at Whampoa [Huangpu] in Kwangtung [province in southeastern China, which contains Canton] by Hance. Grows in New Caledonia, and very widely diffused in Australia.

4. Glycine tomentosa, Benth. Described at Talienwhan in Shingking by Swinhoe, hb. Hance, and at Amoy in Fokien by Sampson, hb. Hance, and at Tamsui in Formosa [today's Taiwan] by Oldham. Grows in the Philippine Islands and Eastern Australia. "[Walpers, in Nov. Act. Nat. Cur. xix., Suppl. i. p. 324, records *Johnia Wightii,* Wight et Arn. = *Glycine javanica,* Linn., a common Asiatic and African plant from Cape Lyngmoon.]"

The frontispiece, facing the title page, is a detailed, fold-out map showing all of China and Corea [Korea], showing Chinese provincial boundaries, and major cities and rivers.

Note: This is the earliest document seen (Jan. 2001) concerning soybeans (but only wild perennial relatives of soybeans) in Taiwan; cultivated soybeans had not yet been reported in this country. No mention is made of soybeans or their wild perennial relatives in Korea or Hong Kong.

See also: The peanut (p. 171) *"Arachis hypogaea...* a South-American plant, is cultivated in China, as in most warm countries.

*Pueraria Thunbergiana* (p. 191-92; long and detailed discussion, with many references). Address: 2. Asst. for India in Herbarium of the Royal Gardens, Kew.

170. Candolle, Alphonse de. 1886. Origin of cultivated plants. 2nd ed. London: Paul, Trench; New York, NY: D. Appleton and Co. viii + 468 p. See p. 330-32, 443. Translation of Origin des Plantes Cultivees, 1883 ed. 2nd ed. 1886. The latter reprinted in facsimile in 1959 by Hafner Publ. Co, New York. Index. 20 cm. [15 ref]

• ***Summary:*** The section on soy in this edition is identical to (in fact, a facsimile of) that in the 1885 edition by the same publisher in New York. The author, a famous Swiss botanist, whose father was also a famous botanist, lived 1806-1893. Address: France.

171. Church, Arthur Henry. 1886. Food-grains of India. London: Published for the Committee of Council on Education by Chapman and Hall, Ltd. 180 p. See p. 140-44. Illust. Index. 27 cm. 35 plates, with Fig. 26 being of the soybean. South Kensington Museum science handbooks. With 23-page supplement, 1901. Reprinted in New Delhi, India in 1983 by Ajay Book Service. [17 ref]

• ***Summary:*** "The soy-bean. *Glycine Soja,* Sieb. and Zucc. *Synonyms*–Soja hispida (Moench.); Dolichos Soja (Linn.); Soja angustifolia (Miq.). *Hind.* [Hindi]–Bhat, Bhatwan. *Punjab* [Panjabi]–Bhút. *Beng.* [Bengali]–Gari-kulay. *Naga*–Tsu-dza.

"This important bean is the seed of Glycine Soja, a small, sub-erect, trifoliate, hairy annual, with pods generally 3 to 4-seeded. It belongs to the natural order Leguminosae, sub-order Papilionaceae, tribe Phaseoleae, and sub-tribe Glycineae; 5 genera are included in this sub-tribe. Glycine contains about 12 species, chiefly Australian, but 3 are Indian, namely *G. javanica, G. pentaphylla,* and our present species.

"The soy-bean forms a considerable article of food in China and Japan. Since 1873 it has been successfully grown, as an experiment, in some of the warmer parts of Europe. It is widely spread in the outer Himalaya, and tropical regions from Kumaun to Sikkim, and the Khasir, and the Naga Hills to Upper Burma. It is often cultivated, rather largely in Busti and Gorakhpur [in today's Uttar Pradesh], Patna, and Purniah [Purnea] Districts [both in today's northeast India].

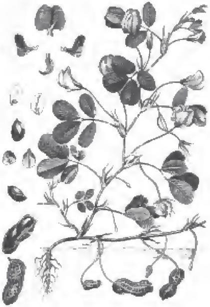
"This crop is generally grown by itself; the seeds are sown from June to September; the harvesting takes place between November and January. It is consequently a kharif crop. The seeds should be placed at a depth not exceeding 1 to 1½ inch; 18 plants may be left, after weeding and thinning, to the square yard. A peaty soil, or one rich in organic matter, suits the plants best; a calcareous soil is also favourable to its growth. Sulphate of potash is a good manure, nitrogen may be supplied either as nitrate of soda or, in the case of soils poor in organic matter, in the form of rape or mustard cake, but it is rarely needed, while large applications of nitrogenous manure exert a distinctly injurious effect upon the yield of beans. So far as we know, this very important, vigorous, and productive pulse is not attacked by any insect or parasitic fungus."

A full-page illustration (p. 141) shows the upper part of a soy-bean plant, with flowers and a lengthwise cross section of one of the pods.

"Very few vegetable products are so rich as this bean at once in albuminoids and in fat and oil, the former constituent amounting to 35 per cent., and the latter to 19. The cultivation of the pale large-seeded varieties should be extended."

A table titled "Composition of soy-beans" (p. 143) shows that the seeds contain 35.3% protein, 18.9% fat, 4.6% ash, 11.0% moisture. "The nutrient-ratio is here about 1:2, while the nutrient-value is 105. Potash forms nearly one-half, and phosphorus-pentoxide one-third of the ash of the soy-bean. Ripe soy-beans require long soaking, preferably in warm water, in order to render them soft.

"In China and Japan three preparations are extensively made from the soy-bean. Soy sauce is the best known of these, but more important are the soy or bean cheeses, and a kind of paste. The beans are sometimes pressed for the sake of the oil they yield; the residual cake forms an extremely rich cattle food, containing as it does 40 per cent. of flesh-formers and 7 per cent. of oil. The soy-bean may also be



grown as a fodder plant. If cut just when the pods are fully formed it makes an excellent hay, superior to that of the lentil."

Note 1. This is the earliest English-language document seen (Feb. 2004) that uses the word "cheeses" or the term "bean cheeses" or (by implication) "soy cheeses" to refer to tofu.

Note 2. This is the earliest document seen (Feb. 2004) concerning soybeans in Bengal (and therefore probably in today's Bangladesh). *Webster's New Geographical Dictionary* (1988) defines Bengal (earlier Bengal Presidency) as a former province in northeast British India, and now a region encompassing West Bengal, India, and Bangladesh. The capital was Calcutta, located on the Hooghly River about 90 miles from its mouth. Calcutta is now the capital of West Bengal, India. Dhaka (Dacca) is the capital of Bangladesh. Bangladesh was formerly East Bengal (part of India, 1700s-1947), then East Pakistan, 1947-1971. It became Bangladesh in 1971.

This one of the earliest document seen (March 2001) that clearly refers to soybeans growing in Burma, but it is not clear whether these are cultivated or wild soybeans.

Page 127 discusses "The Pea-Nut. *Arachis hypogaea,* L." Six local vernacular names are given. "This plant is probably of American origin, although it has long been cultivated in India, on the West Coast of Africa, and in many other tropical countries. There is a similar plant, *Voandzeia subterranea* [Bambara groundnut], allied to Vigna, which grows under the same conditions." The composition of pea-nuts (in 100 parts and in 1 pound) is given. "Half the weight of pea-nuts is oil... Pea-nuts, after the greater part of the oil has been extracted by pressure, yield a cake well adapted for feeding cattle." An excellent full-page illustration (line drawing, p. 126) shows the pea-nut plant with seeds growing under ground and details of flowers and seeds.

Note 3. This is the earliest document seen (March 2001) that mentions *Voandzeia subterranea. Webster's Third New International Dictionary* has an entry for "voandzeia: [NL, from Malagasy *voandzou].* A genus of tropical creeping herbs (family Leguminosae) with trifoliate leaves and small axillary flowers." We later learn that one species, *Voandzeia subterranea* (L.) Thouras, is called the Bambara groundnut. The Bambara are a Negroid people of Upper Niger.

Note 4. This is the earliest English-language document seen (Oct. 1999) that contains the term "nitrate of soda" (as a fertilizer) in connection with soy-beans. It was later renamed "sodium nitrate."

This is the earliest document seen (Oct. 2002) that uses the word "kharif" to refer to the rainy season in South Asia. Address: Prof. of Chemistry, Royal Academy of Arts, London.

172. Lanessan, J.-L. de. 1886. Les plantes utiles des colonies françaises [Useful plants of the French colonies]. Paris: Impremerie Nationale. 990 p. See p. 710. [Fre]
• ***Summary:*** Dau-nanh is the name of the soybean in Cochin China. Gives a botanical description of "*Dolichos Soia* or *Soja* L.–Annual, erect, fuzzy stalk, simple with ascending branches; ternate, oval velvety leaves; purplish flowers in simple bunches, axillary; calyx with five sharp divisions, the upper ones shorter;... oblong wings; slightly carinate; ten stamens, nine shorter; hispid hanging pod; whitish oval beans.

"In Japan they prepare with these beans and some meat broth a sauce of great renown, *Sooju* or *Soja,* that the Chinese and Vietnamese also use to stimulate their appetite. They also make a white purée resembling coagulated milk, called *Teu-bu* [tofu] in China, where it is highly appreciated. Although it is rather insipid, it is neither disagreeable nor indigestible."

Note: Meat broth is not used in preparing shoyu, which acquires a hearty, meaty flavor through the fermentation process. Address: Professeur Agrege d'Histoire Naturelle a la Faculte de Medecine de Paris, France.

173. Lecerf, Ch. 1888. Sur la valeur alimentaire du Soya hispida [On the nutritional value of the soybean]. *Bulletin de la Societe de Medecine Pratique de Paris* p. 442-49. Meeting of April 26. Presided over by M. Laburthe. [Fre]
• ***Summary:*** Because of the difficulty many people have in tolerating gluten bread, we are anxious to find another food free from sugar and amylaceous materials for diabetics. I thought it would be interesting to do some trials on the use of the seeds of a bean used often in China, Japan, and Malaysia.

I had the occasion to study this bean under the direction of my master, Mr. Muntz, when I was at his laboratory at the Agronomic Institute *(l'Institut agronomique).* I wish to speak of soybeans *(Soya).*

In 1855, Mr. de Montigny, struck by the considerable nutritional value of soybeans, imported some to France, and submitted them to the Society of Acclimatization *(la Société d'acclimatation),* hoping that our farmers would make the best of this legume that is the foundation of the food of the poor classes of China and Japan. In these countries, the soybean equals the potato in our countryside, in consumption. We shall see, in a bit, that the bean of this legume (sub-order *papillonacée* [sic, papilionaceæ]) is richer by far in nutritious elements than the tuber of Parmentier [the potato].

Since this attempt [by Mr. Montigny in 1855], many agronomical trials have been conducted, at different places in our territory [France and its colonies], and they have proven that the acclimatization of this plant, in France, is possible. They have also permitted us to hope that the climate of our regions is analogous to that of the Chinese

and Japanese provinces where the soybean *(le Soya)* is cultivated on a large scale. Unfortunately, these trials had the goal of feeding animals rather than the introduction of this bean into the human diet.

However, eight years ago, Count Attems, who was busy with the cultivation of soybeans in Austria, wrote: "We fool ourselves when we think that soybeans are only an advantageous pasturage, or when we believe that they constitute a delicate dish only for the table of the rich. Soybeans have also been discovered for the large class of less idle consumers, for the country folk and the workers; and although it is a plant of ancient Asia, future generations will make a great case for them and without a doubt will call them "Haberlandt's bean" *(Haricot de Haberlandt)* in recognition."

Professor Haberlandt, who tested the cultivation of soybeans following the Exposition of 1873, published his results in 1878 and became the popularizer of their cultivation and use in Austria. Here is this author's [Haberlandt's] opinion on the nutritive value of this bean:

"I think that soybeans are a food too concentrated to be prepared alone and that, consequently, it is better to mix them with other foods, especially those containing starch... They can furnish armies with provisions of little volume, and enter with good right, as the best equivalent, in pea sausages."

In France, although many notes relative to the cultivation and use of soybeans have been addressed to the Society of Acclimatization, I believe that the first, if not the only monograph that was made of it, is that of Mr. Paillieux. This work was published in 1881; I have borrowed from him numerous times. As for me, it was in 1883 at the Agronomical Institute that I came to know soybeans, following the analyses and experience of Mr. Muntz, and of my dear friend, the late Levallois, from whom the Academy of Sciences received last April 3rd a posthumous communication on the composition of the beans that he harvested at the agronomic station in Nice, of which he was the director.

The name *Dolichos soya* was given by Linnaeus to this Chinese bean that Moench later named *Soya hispida.*

In Japan, they call it *Daïzu Mame,* that is, food seed *par excellence.* In China, it is known under the name *Yéou-téou;* its cultivation there is less important than in Japan, although it enters largely into the food of the working class and is used, as in Japan, for the commercial / industrial preparation of a variety foods.

The soybean is also cultivated and consumed in India, the Himalayas, Ceylon, Tonkin, Cochin China, and the Dutch possessions in Malaysia. In these different lands, it is eaten in its natural state *(en nature),* and used to make many food products, on the one hand the daily food of the poor, on the other condiments sought after by the rich.

Because of the high content of fatty materials in soybeans (17-18%), its flour emulsifies with water, giving with oil a certain quantity of *légumine* [a protein found in soybeans]. The mixture, passed through a cloth, yields, as a filtered liquid, a true milk *(vrai lait),* used like that of cows, goats, or sheep. This is the milk *(le lait)* of the Chinese.

This milk is used to prepare a cheese (named *Téou-fou* in China, *Tou-fou* in Japan), that resembles a white cheese known, in France, under the name of *fromage à la pie.* The lightly heated milk is coagulated when it is warm with the help of a few spoonfuls of liquid nigari / pure sea water *(d'eaux mères de sel marin).* The curds *(caillé)* thus obtained are allowed to drain, then submitted to the action of flowing water. Note: The drained curds are first pressed to make tofu, then cut into cakes, which a placed into a container of cold, circulating water.

According to Mr. Champion, in China a piece of tofu *(fromage de pois)* as big as a fist sells for a cent *(un centime).* For many people of the working class, it constitutes the morning meal, either in a liquid state [as soymilk], or coagulated and fresh [as curds], or in a dried state [probably as pressed or firm tofu, or possibly as yuba] and fried in oil extracted from soybeans.

According to the analyses of Mr. Fremy, the soybean contains 18% of this oil, which is in the first rank among the 15-20 types of oils that the Chinese possess. It is of excellent quality and for Europeans, has the sole drawback of retaining the aftertaste of the raw bean.

In Canton, soybeans figure in the composition of a solid ferment, *Kiu-tsée,* that the Chinese use to make an artificial wine and their brandy *(eau-de-vie).* Continued.

174. Lecerf, Ch. 1888. Sur la valeur alimentaire du Soya hispida [On the nutritional value of the soybean (Continued–Document Part II)]. *Bulletin de la Societe de Medecine Pratique de Paris* p. 442-49. Meeting of April 26. Presided over by M. Laburthe. [Fre]

• ***Summary:*** Continued from page 444: Finally, this bean is the base of a sort of sauce that has now jumped the boundaries of Asia and whose consumption is widespread among the well-to-do classes *(les classes aisées)* of North America, England, and Holland. This is the *Tsiang-yeou* of the Chinese, the *Shoyu* of the Japanese, the *Ketjap* of Batavia and Java, the India-Soy of the Americans and the English, and the *Zoya* of the Dutch. This product is a liquid of a darker or lighter brown, depending on the quality, obtained by the fermentation of cakes *(gâteaux* [of koji]) made of grilled barley and boiled soybeans. These cakes, after fermentation, are dissolved in water with salt, and left alone for 2 and even 3 years [for a 2nd fermentation], then pressed in sacks. The liquid that flows out is *Shoyu;* it has a taste and a smell that are reminiscent of meat extracts. In Japan it replaces butter, oil, fat and meat sauces. Everything–vegetables, fish, noodles–is ordinarily seasoned

with *shoyu*. It is the object of an important industry: in Nagasaki, there are more than 10 factories that produce 1,200,000 kg/year for consumption. The most sought-after quality is that of Tokio (Yédo). It is from this city that originates the sketch that I have the honor to present you.

Composition: According to analyses communicated by Mr. Pellet to the Academy of Sciences in May 1880, here are the composition of two soybeans, the first from China and the second harvested in France. Table 1 (p. 445) gives the percentage of macro- and micronutrients in each. The Chinese soybeans contain 16.4% lipids *(matières grasses),* 35.5% protein *(matières proteiques),* and 4.8% ash *(cendres)* vs. 14.12%, 31.75%, and 5.15% for the French. Table 2 (p. 446) gives the composition of the ash for the two soybeans as follows: phosphoric acid, potash, lime / limestone, and magnesia. It shows that the phosphoric acid and potash represent about 75% of the weight of the ash. Table 3 (p. 446) compares the composition of 100 soybeans harvested at Nice and analysed by Levallois, with the composition of 100 grains of wheat analysed by Isidore Pierre. The soybeans contain about 2.8 times as much nitrogen (protein).

To the analyses done by Mr. Pellet, we must add some slight corrections: according to the analyses made by Mr. Muntz, at the Agronomic Institute *(l'Institut agronomique),* the starchy and sugary materials [carbohydrates] have been increased to 6.40%, the nitrogenous materials [protein] to 36.67% and the fatty materials to 17.00%.

The sugary material, contained in the soybean *(Soya),* constitutes a particular sugar that, like cane sugar, only reduces to Fehling's solution / liquid after having been inverted by sulfuric acid, as Levallois discovered as well.

Its rotary power is much higher than that of cane sugar. Exact degree measurements are given.

Let us now compare the compositions of wheat, beans, potatoes, according to Boussingault, with that of soybeans. Table 4 (p. 446-47) gives percentages of starch and sugared principles, nitrogenous materials, fatty materials, water, potash, and phosphoric acid.

This comparison shows the superiority of soybeans over these vegetable products, even over wheat, for if the ash of it appears richer in phosphoric acid, we must take into account that wheat furnishes 2.41% ash while soybeans give more twice the weight of ash, 5.15%.

The liquid prepared with soybeans in Japan, *shoyu,* was analyzed at the official laboratory in Tokio (no. 1 [on table 5]). I duplicated the analysis (no. 2) to reassure myself that shipment [to France] had not altered its composition. Table 5 (p. 447) shows, nearly identical values for the two sauces, in terms of density, dry extract, ash, nitrogenous materials, salt (NaCl), phosphoric acid, and potash.

As these analyses show, *shoyu* contains about a third of its weight in solid matter, half of which is formed of minerals. Of the latter (minerals), table salt (NaCl) is found in the proportion of 9/11 [i.e., 82% of the minerals is NaCl], phosphoric acid 2%, and potash 3%. Nitrogenous materials represent about a tenth of the total solid matter.

Conclusions: The analyses that I just cited make the considerable value of soybeans from a nutritional point of view stand out. Its richness in protein *(matières protéiques),* in fact [make it] a vegetable meat *(une chair végétale),* and this meat would be superior, as a concentrated food, to [real] meat. In fact, here is a comparison of percentage compositions *(compositions centésimales)* of soybeans and beef that has had its fats and oils removed [probably in the laboratory]. Table 6 (p. 447) compares water, protein, fat, potash, and phosphoric acid.

These figures need no commentary; they are quite eloquent by themselves and make comprehensible how in Japan a handful of this bean suffices to nourish a vigorous man.

One could, advantageously use soybean flour as a powerful food, in a small volume, with debilitated individuals. It is, like milk, a type of complete food, joining the plastic element, represented by protein, the respiratory element, fat, and salts, in which phosphoric acid and potash dominate.

The almost total absence of starchy materials, and the insignificant quantity of sugar that this grain contains, indicates it quite naturally as the best base for bread or rusks for the use of diabetics.

I have the honor to present to the Society some samples of bread and rusks made with soybeans.

Finally, *Shoyu,* that combines a significant proportion of nitrogenous materials [protein] with a rather strong quantity of sodium chloride, could be usefully administered to consumptives [people having tuberculosis], who would find there, beside highly nutritious materials, to compensate for / offset the weakening caused by the loss of salt *(déchloruration)* to which they are subject.

Note: This is the earliest document seen (March 2010) which is of practical importance concerning the use of soy in diabetic diets.

Discussion: Mr. Roussel–Could Mr. Lecerf please give us some information about the cultivation of soya and tell us if this plant can be acclimatized in France.

Mr. Lecerf–The Soya grows rather well in the same geographical area as corn / maize. The essential requirement for it to bear seeds, is that neither light nor heat be obstructed. Fertilizer is not necessary for it. Even fresh manure is harmful to it, it grows well in all types of terrain, and all atmospheric variations support its growth.

It is planted from the middle to the end of April. It yields about 600 to one [600 seeds from every seed planted]. It is harvested about the end of October. One indispensable precaution is to space the plants from 0.25 to 0.5 meters apart, according to the richness of the soil, by

putting several seeds in the same hole, but not to let them develop as a single clump.

Mr. Duchaussoy–I am very happy with the communication by our colleague. I have cultivated Soya for several years. The first year, the harvest had been average, but the second year I harvested almost nothing. I attribute this to the cold, humid weather. Has Mr. Lecerc not observed that the odor of the Japanese *liqueur* [soy sauce] recalls that of the extract of belladona? [deadly nightshade, which is dark purple; he is being sarcastic].

Mr. Lecerf–The odor of this *liqueur* made from Soya, which the Japanese call Shoyu, is somewhat reminiscent of buckwheat bread, or better still of meat extracts.

Mr. Bardet–I would like to ask Mr. Lecerf if it is not possible to modify the color of the bread [which is too dark], and if there is no butter in the bread [i.e., did he add some butter to his soy bread to make it taste better, or is he "buttering up" the whole subject].

Mr. Lecerf–This bread, being made with only soy flour, could not have its color modified by the addition of other types of flour, which would detract from its value as a bread that contains little or no starch.

Mr. Léon Petit–The bread that was presented to us had an excellent flavor. Mr. Lecerf has accomplished a true *tour de force* in masking the bitter taste, so difficult to avoid when one uses Soya flour–a taste due to the oil contained in the seeds.

175. Petit, Léon. 1888. L'huile de soya. Son emploi en médecine comme purgatif à petite dose [Soy oil. Its use in medicine in small doses as a purgative]. *Bulletin de la Societe de Medecine Pratique de Paris.* p. 449-52. Meeting of April 26. Presided over by M. Laburthe. [Fre]

• ***Summary:*** Kaempfer first introduced soybean seeds into Europe from Japan, where they are used to make *miso* and *shoyu* (a black and limpid liquid). These two are indispensable condiments in the Japanese diet. They also make a vegetable cheese, tofu, which is usually eaten fresh, and of which the people are very fond.

In Cochin China, soya occupies a major place in the culinary art. The Chinese do not consume milk; instead, they crush the soybean and obtain from it a liquid, rich in casein and oils, which they use like we use the milk from cows' goats, or sheep. From it, they also make white cheeses, red cheeses [fermented tofu], and a sauce, *Tsiang-Yéou (jiangyou* or soy sauce), which are greatly appreciated. For my part, I have had the occasion to taste this condiment several times and I admit that I do not share, in its regard, the enthusiasm of the Chinese. Much more, *soya* enters in the preparation of a ferment used for making spirits and wines.

Nothing could be easier than obtaining soybeans; in France, they germinate as easily as haricots. They contain 30-35% protein and make excellent forage.

The soybean has been tested as a forage plant, either alone or mixed with hay, oats, barley, sugar beets, etc. Mr. Paillieux, a distinguished agriculturalist, even conducted various trials in using the soybean for human food.

He cooked the seeds, like one cooks haricot beans, after they had been soaked in distilled water. He also roasted soybean seeds to make a sort of coffee. He successfully reproduced the various Japanese and Chinese food preparations. He even tried to make a flour by grinding the beans, but this flour degenerated [rancidified] because of the large quantity of oil and fat that it contains.

It is possible that if this oil were extracted, the soybean oilcake *(le tourteau de Soya)* could be ground / reduced into flour which would contain more than 40% nitrogenous materials [protein] and would have no bad [after]taste. But unfortunately, this flour would have a rather high net cost, because of the manipulations that its production would necessitate, unless a use for soybean oil, which is the object of an enormous traffic in China, is found. This very limpid oil, which has a beautiful yellow color like olive oil, leaves a little acrid taste in the mouth which is not disagreeable. It possesses very obvious drastic qualities. I had a liter at my disposition, and I observed that with a minimum dose of 10 gm, you obtain a very energetic purging [like diarrhea], without any type of abdominal pain / colic *(colique).* I hope, before long, to receive a certain quantity of soybean oil that I shall place at the disposition of those of our colleagues who would like to test it as a purgative.

Note: The writer is the only person ever to ascribe a "purging" or "purgative" property to soy oil.

There follows a question and answer session. Mr. Terrier asks: Can Mr. Lecerf provide us with some information about the use of this oil in China and Japan? Mr. Petit responds: I believe that the Chinese and Japanese use this oil only for therapeutic purposes. Soy sauce *(La liqueur de Soya)* is widely employed in England as a condiment. Mr. Lecerf adds: I know nothing about how the Chinese and Japanese use soy oil as a medical substance; but, as I said, this oil is of the highest rank among the oils consumed throughout China. I would say to Mr. Petit that the *India Soy,* which the English consume, is a product which contains only a small proportion of soybeans; it is made with considerable quantities of barley and rice [sic], and it comes from China. However *Shoyu,* which I present to you, is originally from Edo [Tokyo, Japan]. Like that from Batavia [Jakarta] (Ket-Jap [ketjap, kecap]), it is made with from equal parts wheat and soybeans *(Soya).*

Mr. Gillet de Grandmont asks: Very precise and extensive information on the cultivation of soybeans can be found in the *Annals [Bulletin] of the Society for Acclimatization.* This bean, which I have tried to use for food, does not soften easily upon cooking; it always retains a very disagreeable, acrid taste. I could hardly stand it, except consumed in the form of a salad after cooking.

Mr. Lecerf replies: In the fresh state [as green vegetable soybeans], soybeans are not hard and their taste is even agreeable. In the dry state, it is easy to render them less tough, by adding a small quantity of sodium bicarbonate [baking soda] to their cooking water, and by taking care to soak them in water 24 hours in advance. Address: M.D., 2 Rue Casmir-Delavigne, Paris.

176. Filet, G.J. 1888. Plantkundig woordenboek voor Nederlandsch-Indië. 2nd ed. [Dictionary of plants for the Netherlands Indies. 2nd ed.]. Amsterdam, Netherlands: J.H. de Bussy. See p. 127, no. 3127. 23 cm. First ed. was 1876 (362 p.) published in Leiden by G. Kolff. [Dut]

• ***Summary:*** Each plant is given a number, starting with 1 for "Aantigan." The short passage on the soybean reads: "3127. *Kadeleh of kadaleh S. M. & J. [S. = Sundaneesch. M. = Maleisch. J. = Javaansch] = Soya hispida Mönch, Nat. fam. der Papilionaceæ. Gr. [Groeiplaats] Op Java en elders in tuinen, uit Japan overgebracht; zaadplant. Gebr. [Gebruik] De zaden dienen tot bereiding der Soya of Kétjap."*

This can be translated as follows: "No. 3127. Named kadeleh or kadaleh in Sundanese, Malayan, and Javanese. Scientific name: Soja hispida Moench. Member of the natural family Papilionaceæ. Places of growth: On Java and elsewhere in gardens, imported from Japan; a seed plant. Uses: The seeds are used for the preparation of soy sauce or ketjap."

Note: Filet lived 1825-1891. The only other species of the genus Soja mentioned in this book is Soja Wightii *(Tjijhe-badak),* No. 8846 (p. 297). Address: Oud-Officier van Gezondheid van het N.-I. Leger.

177. Wigman, H.J. 1889. Dure rijst en voorziening in de behoeften van de bevolking [Expensive rice in supplying the needs of the population]. *Tijdschrift voor Land- en Tuinbouw en Boschkultuur in Nederlandsch Oost-Indie* 4(10):382-85. Jan. 1. [Dut]

• ***Summary:*** Discusses the possible, yet unlikely, shortage of rice, and what to do in case the food supply has to be supplemented with other food crops. Crop failures in south China and British India, and a cattle disease in Java (which has reduced the number of buffaloes that could work the rice fields) are listed as the causes. Specifically mentioned as possible supplementary crops are corn *(Maïs,* which is easily and widely grown in West Java), *Manihot utilissima* (cassava or manihot, which yields abundant fruit, but is quite low in nutritional value), and soya beans. According to Wigman, soya is one of the best foodstuffs in terms of food value, especially for a population that eats hardly any meat.

Not long ago, experiments were conducted in Europe with the cultivation and acclimatization of *Soja hispida.* But despite the great energy that went into them, these had only limited success, and then only in southern Europe. Chemical analyses showed that the plant had great nutritional value.

The soya bean is eaten by the indigenous people of Java when it is still unripe [as green vegetable soybeans?], which does not enhance its food value. One disadvantage of the soya bean is that it is so hard that it needs to be soaked and cooked for a long time before it is edible. Nevertheless, although the beans are not as soft as our stomach would like them to be, our brown brothers who are plant eaters have strong stomachs, and they can digest a lot of foodstuffs that we would never even consider eating.

There are two varieties of soya, one with black beans and one with yellowish white. The latter, when planted in Java, is harvested 100 days after being planted. The experiments done with soya on sawahs (wet rice fields) showed a low yield. Manioc gave higher yields, but soya is superior in nutrients.

Government officials should plan for the future and possible food shortages, since the natives don't do this. It is important to know what to feed the indigenous people if rice crops fail. Note: Wigman was editor of Teysmannia (Batavia). Address: Dutch East Indies.

178. T. de L. (Terrien de Lacouperie). 1889. Ketchup, catchup, catsup. *Babylonian and Oriental Record* 3(12):284-86. Nov. [11 ref]

• ***Summary:*** "My attention was called lately by my friend Col. Sir Henry Yule, to this word for which a Chinese origin has been suggested." After arguing in detail that W.H. Medhurst's *English and Chinese Dictionary* (Shanghai 1847) cannot be trusted, he concludes: "The Cantonese *Kwai-tchap* might be the antecedent of the English word, but it results from the unsatisfactory evidence of various sorts here adduced, that the etymology is altogether theoretical. My impression is that the word may have a Chinese origin, but not from China. It may have come from Australasia or the Malay peninsula, where the Chinese colonists of southern China are so numerous. The expression may have been made there, with a local acceptation unknown in the mother country."

Note: *Webster's Dictionary* defines catsup (pronounced KECH-up or KACH-up, derived from the Malay *kêchap* = a spiced fish sauce, and first used in 1690) as "a seasoned tomato puree." Under ketchup, *Webster's Dictionary* simply states "var. of Catsup" without giving a year of earliest known usage.

179. Forbes, Francis Blackwell; Hemsley, William Botting. 1889-1902. Index flora sinensis: Enumeration of all the plants known from China proper, Formosa, Hainan, the Corea, the Luchu Archipelago, and the island of Hongkong; Together with their distribution and synonymy. 3 vols. London: Taylor and Francis. Illust. 22 cm.

• ***Summary:*** The contents of this book is identical to the three articles that appeared in the *Journal of the Linnean Society,* vols. 23, 26, and 36. Glycine species were discussed in Vol. 23. See p. 188-189.

180. G. [Greshoff, M.?]. 1890. De Soja-boon en hare beteekenis als voedingsmiddel voor Nederlandsch-Indie [The soybean and its significance as a food for the Netherlands Indies]. *Tijdschrift voor Land- en Tuinbouw en Boschkultuur in Nederlandsch Oost-Indie* 5(10):347-56. Jan. 1. [5 ref. Dut]

• ***Summary:*** In the Netherlands Indies, the soybean *(De soja),* which is called *katjang kadeleh* and *katjang djepoen,* plays a very important role in the production of the sauce known as *ketjap.* However real soy sauce *(soja)* is of much greater importance to the Japanese and Chinese. The Chinese have carried their tradition of soy sauce usage and consumption abroad. The natives of Java use unripe beans, whereas the Chinese use well-ripened beans.

Chemical analyses over recent years have proven the superior nutritional value of the soya bean. No other legume has given such a favorable analysis. This shows how the experience makes the right choice ages before theory had its say about such things. It is as if every reputable chemical food analyst has to issue their own personal analysis of the soya bean in order not to embarrass themselves. According to the Japanese Yossyda [Yoshida?], there are 100 varieties of soya in cultivation in his homeland. Geerts describes 16 different kinds in his monograph. Analyses are given of several soybean varieties. The first, by Geerts and Dewars (Dutch) analyzed 7 varieties: yellow soybeans from Japan *(Wase-mamé)* and China, black soybeans from Japan *(Kuro-mamé)* and China, green soybeans from Japan *(Ao-mame),* Nakaté from Japan, a yellow soybean cultivated in south Russia. One analysis is given by Meissl and Böcker (German), and one by Church (British). Then seven analyses by Church are given of other common legumes from India. Then follows Church's analyses of rice, Indian wheat, corn / maize *(Djagoeng [jagung]),* and common sorghum *(Sorghum vulgare; Djagoeng tjeutriek)*–followed by a short explanation.

Experience has shown that in colder climates, the starch content of soybeans rises, while the content of other nutrients drops. This is why major areas of soybean cultivation (as promoted for 15 years by Haberlandt) have been limited to central Europe.

The soybean is said to contain an enzymatic substance which rapidly converts starch to sugar, and to which the high value of soy sauce is attributed. But tests have yet to prove this. Then follows an essay on the caloric value of soy compared to other foods, and how to calculate this correctly. Church's methods of determining the nutrient value of foods are described as too limited.

Among vegetable foods, the soybean is very digestible. According to the latest research by Ladd, comparing the digestibility of various proteins *(eiwitstoffen),* soybean is 75% versus 64% for flour and 54% for grains. Because soya is very low in starch, it is a perfect food for diabetics. At a recent congress for doctors in Paris, soy bread was promoted and given much attention. Prof. Stokvis told the congress how a baker named Koehler bakes soy bread and soy cookies of high quality.

The soybean is also appropriate, because of its nutritional composition, as a food for children and the sick. It is up to an enterprising person to bring it onto the market. Also, soy sauce would be a good commercial product if manufactured in Europe. But the most important point is that soya is an excellent food and, as such, is not given the recognition it deserves in the Netherlands Indies. It is an inexpensive vegetable meat. It deserves to be cultivated, because it can serve as a good, low-cost source of protein for a large number of people. It is appropriate for use in institutions, orphanages, and the army and navy, and deserves experimentation on a large scale. The indigenous people of the Netherlands Indies are used to eating the bean unripe, and not very well cooked–and they are persistent in serving it like this, which has led to the rejection of soy in many important circles.

*Glycine soja* is a very good secondary crop, next to rice. There is no need to emphasize this, since the Inspector of the Civil Medical Service has brought to the attention of the Netherlands Indies government and its officials, in a very professionally written piece, the advantages of soya cultivation.

"I can't give you any indications about the basis on which the soybean ("katjang kadeleh") will best thrive. There are so many questions concerning the growth and function of the so-called root nodules *(wortelknolletjes)* of the *Papilionaceae* and the microorganisms that live therein. It has been determined that these plants, which include the soybean *(de soja)* are capable of creating free nitrogen and assimilating it."

Note 1. This is the earliest document seen (June 2007) concerning soybean root nodules and nitrogen fixation in Europe.

The author closes with the wish that the import of soya will prove to be a blessing for Java. [Note 2. This could mean either importation of soybeans from China, or more widespread introduction of soybean culture to Java, or import from Java to the Netherlands.] For about a year he has been trying to bring soy to the attention of the Netherlands, an attempt he wants to repeat again under the favorable auspices of a small official publication circulated to those who are interested.

Note 3. Paerels 1913 (p. 288) and Kempski 1923 (p. 79) both cite F.A. von Stuerler as the author of this article,

but at the end of the article, the author's name is written simply as "G." On the same line is written: "B. Nov. 1889."

Note 4. This is the earliest Dutch-language document seen (Feb. 2001) that has the word "Soja" (or "Soja-boon" or "Sojaboon") in the title.

Note 5. This is the earliest Dutch-language document seen (Aug. 2003) that uses the word *eiwitstoffen* (or *eiwitstoff)* to refer to proteins in connection with soybeans.

181. T. de L. (Terrien de Lacouperie). 1890. Etymology of ketchup. *Babylonian and Oriental Record* 4(3):71-72. Feb. [1 ref]

• ***Summary:*** This is a response to a letter from Rev. Hilderic Friend, who was a missionary in China and who wrote a work on the Folklore of Plants. Friend denies the Chinese origin of the word ketchup, though the Chinese spelling is kwai-tchap. "In perusing the sections about meals and plants in the anonymous work, *A comparative vocabulary of the Barma, Maláya, and T'hai* (of J. Leyden; Serampore, 1810) since my note was published, I have found two terms, Nos. 2199 and 1144, where appear words which may be connected with the antecedent of *ketchup,* if not its antecedent itself. In Siamese *luk kachap* (read *katchap)* where *luk* is the auxiliary numerative, is a sort of sweetmeat; and *p'hak kachiap,* same remarks about reading and *p'hak,* is a species of *crotalaria.*

"Should this surmise be verified, the word originated in Siam has received its Chinese garb from the Chinese there; it has been spread by them in the Indian Archipelago, and even carried as far as China and Japan. The Europeans, then, must have learned it in Indonesia."

182. McCarthy, Gerald. 1890. The best agricultural grasses. *North Carolina Agricultural Experiment Station, Bulletin* No. 73. 97 p. Oct. 15. See p. 45, 64-68, 70.

• ***Summary:*** "Soja Bean–*Glycine hispida.* The soja bean, or as it is sometimes called, Japan pea, is indigenous to South-eastern Asia, and is a near relative of the cow pea. Though this bean has been known in the Southern States for a long time, its cultivation has never become very extended. The beans are regarded as a staple food in Japan, but in this country they are scarcely edible, probably because they are not properly cooked. The soja bean is a tender annual, and its habit of growth, use and value, is much like the cow pea.

"This bean is usually sown in drills two feet apart, and on good soil has yielded as high as forty bushels per acre. This yield of vine fodder is less than that of the cow pea, and the fodder is more difficult to cure. Cattle are not so fond of it as of cow-pea hay. It makes good ensilage. This plant requires as good soil and treatment as are usually given to field beans."

Table I titled "Flowering period, use, &c., of grasses" (p. 64) states that the soja bean flowers in July, prefers medium soil, gives an average yield of 4-6 tons/acre on good soil, and is used for meadow (not pasture).

Table II titled "Seeds" (p. 65) states that there are, on average, 2,800 seeds/ounce, and 90% of these are vital [viable]. An average of 60-100 lb of commercial seed is required to plant 1 acre. There are 60 lb per bushel.

Table III titled "Proximate composition and feeding value of hays containing 14 to 14.3 per cent. water" (p. 66) analyzes 28 types of hay. According to analyses by the South Carolina Agricultural Experiment Station, the proximate composition and feeding value of soja bean hay is: albuminoids 14.05% total, 9.28% digestible. Crude fiber: 24.03% total, 14.09% digestible. Nitrogen free extract: 38.00% total, 23.18% digestible. Fat 2.09% total, 0.40% digestible. Nutritive ratio 1:4.1. Relative feeding value per ton: 15.09. The author then defines several key terms: "The nutritive ratio is the sum of the per cent. of digestible fiber and digestible nitrogen free extract added to the per cent. of digestible fat, multiplied by 2½, and the total divided by the per cent. of digestible albuminoids. A well balanced ration has a ratio of 1:5.

Footnote (p. 67): In Table 3, since "few of the plants included have been analyzed by American chemists, and for the sake of uniformity [Emil] Wolff's analyses have been very largely used." "The relative feeding value has been obtained by multiplying the number of pounds of digestible fat and digestible albuminoids in one ton of hay by 4½ cents, and the number of pounds of digestible fiber and nitrogen free extract by 0.9 cent. These values owe also to German experimenters."

Table IV titled "Digestion co-efficients" [coefficients] (p. 67) gives values 8 types of hay. For soja bean vines: Albuminoids 64, fiber 58, non-nitrogenous extract 61, fat 24.

Table V (p. 68) shows the dry substances contained in 2,000 pounds of air-dry hay composition and feeding value of 27 types of hay containing 14 to 14.3 per cent. water. One analysis by the South Carolina station is given. The cash value of the fertilizing matter contained in one ton of soja bean hay is $9.36, about average.

Table VI titled "The theoretical value of hay" (p. 70) gives values for 28 plants. For hay made from soja bean vines: Feeding value per ton: $15.09 (4th highest among all 28 plants tested, after lucerne $16.74, Japan clover $16.17, and cow pea vine $15.89). Net manurial per ton: $7.48 (3rd highest after cow pea vine $8.82, and lucerne $8.28). Total relative cash value per ton: $22.57 (4th highest after lucerne $25.02, cow pea vine $24.71, and Japan clover $23.88).

Note: This is the earliest English-language document seen (Oct. 2006) that contains the term "cow pea vine" (or "cow pea vines"). Address: Botanist, Raleigh, North Carolina.

183. Schlegel, G. 1890. Re: Dr. Vorderman's comments on tofu (Letter to the editor). *T'oung Pao (General Newspaper)* 1:273. Oct. [Eng]

• ***Summary:*** Dr. Vorderman writes from Samarang [Semarang], Central Java: "The better I get acquainted with the Chinese, the more I am astonished at the relative height they have reached in (medical) practice." He discovered that their well-known *beh ko* (Cc = Chinese characters given) is exactly the same preparation as our malt-extract, and is often prescribed for poor patients in the same way.

"Without knowing any thing of the theory, they prepare leguminous curds: *Tau-hoo* (Cc for doufu/tofu) and *Tau-koa* (Cc for *dougan* or pressed tofu) from Kedelei-beans (Phaseolus mas [sic, max]) by precipitating the legumine with calcined gypsum, which gypsum is imported in a crude state from China to Batavia [Jakarta, West Java, Indonesia], and is there called *Batu tau* (Malay *batu* = 'stone' and Chinese *tau* = 'bean')."

Note: This is the earliest English-language document seen (Feb. 2004) that uses the word "Tau-hoo" or "Tau-koa" (or "tau hoo" or "tau kua") to refer to Chinese-style tofu. Address: Semarang, Central Java.

184. Boerlage, J.G. 1890. Flora van Nederlandsch Indie [Flora of the Netherlands Indies (Indonesia)]. Leiden: E.J. Brill. See Vol. 1, p. 370-71. Index. 22 cm. [3 ref. Dut]

• ***Summary:*** There are about 12 species of Glycine in tropical Africa, Asia, and Australia. The genus *Glycine,* according to the opinion of Bentham and Hooker, consists of two sub-genera: 1. Glycine, in the limited sense; 2. Soya, which is distinguished by its wide, sickle-shaped pod. In the past, writers considered both a genus. The approximately four varieties found in the Dutch Indies belong to the second subgenus, which was described by Miquel, also under the name of *Soya* Savi. Both kinds, which can be found in Miquel's *Flora* under the name of *Glycine,* are classified in the genus *Teramnus* Sw. by Bentham and Hooker. Address: Dr., Conservator aan 's Rijks Herbarium te Leiden.

185. Gorkom, K.W. van. 1890. Supplement op De Oost-Indische Cultures, in betrekking tot handel en nijverheid [Supplement to East-Indian crops: In relation to commerce and industry]. Amsterdam, Netherlands: J.H. de Bussy. vii + 303 p. See p. 283-87. Supplement to the 1884 publication of the same title. 25 cm. [2 ref. Dut]

• ***Summary:*** The section titled "Kadelé" (Soybeans) discusses the cultivation of soybeans (also called *katjang djepoen* [Japan beans], Soya, *Glycine hispida,* or *kadelé boontjes)* on Java and the experimental culture in Europe. Interest is shown in the cultivation of soybeans as a food for diabetics.

Soya is cultivated in Java both for its seed and for its green leaves which are used as animal feed. The small soy beans are roasted by the indigenous people or, in the form of cakes / patties *(tetempé* [tempeh]), eaten like bean-cheese *(boonen-kaas* [tofu]). *("De kadele boontjes worden door de inlanders geroosterd of, in den vorm van koeken (tetempé), als boonen-kaas gegeten").*

The author considers that Indonesian soy sauce *(kétjap)* is inferior to Japanese soy sauce. Nutritionally, soya is rich in proteins *(proteïnestoffen)* (± 38%) and fat (± 21%), and low in starch and sugar.

In Germany and Austria, many years have been spent in developing and cultivating varieties of soybeans adapted to the European climate. Dr. Haberlandt, professor at the University of Vienna, distinguished himself for this work, even to the extent that a variety was named after him. In the experimental gardens at the National Agricultural in Wageningen [Netherlands], a field of soya is cultivated, but the results are not yet satisfactory. Yields are low, especially during the dry and warm summers, when the plant flowers abundantly, but the seeds don't have time to develop properly. The author hopes that through continued experiments, a suitable variety will be developed.

The soya bean has received attention from the medical profession because of its composition. Dr. Le Cerf of Paris was one of the first to try using soya with diabetic patients. He introduced soya bread instead of an almond bread and was successful with it. Dr. Stokvis, a professor in Amsterdam, recommended soy bread (see *Nederlandsch Tijdschrift voor Geneeskunde* No. 10), and the chemical analyses published by Mr. L.C.W. Cox in the same journal (issue No. 19) supported the recommendation. Patients were content with the bread, although they did not find it very appetizing. The author states that if rye or wheat flour could be used together with soy flour, they would yield a very digestible and nutritious food. For this reason also he recommended experiments aimed at acclimatizing soya to Europe.

Dr. Sollewijn Gelpke has published a work titled "The Yield and Cultivation of Dryland Crops," in which he writes that the cultivation of soya is quite easy and in Java takes place on sawahs (wet rice fields) and clay, in contrast to peanuts *(katjang-tanah),* which is grown on tegals and sand. [Note: A tegal is a dry (not irrigated) field, near the rice fields, but used for vegetables and other secondary crops.] Soya beans are sun-dried, soaked in water for 24 hours, then sown on land that has first been flooded with water. Otherwise they are sown by poking holes in the ground and dropping in the seeds. Gelpke says that soya is so appealing to the indigenous people that, if the soil is hard, he just opens the surface with a crowbar and sows his seeds. This way of cultivation is seen especially on the heavy clay soils of Java.

In the Netherlands it is not well known that soya is cultivated in Java, because it could be imported for less money than is currently the case. The author has samples of

the beans and has noticed that the seeds from European experiments are smaller in size than those grown in Java.

Various laboratory analyses are given. It is noted that a soya flour coming from Hungary is used for the production of soy bread, baked by Mr. Koehler of Amsterdam. Mr. Cox studied this bread. The author believes that the sugar content of this bread is high enough to make it unsuitable for diabetic patients, and notes the presence of starch and dextrin. Morawski and Harz have confirmed that ripe soya beans don't contain starch, whereas unripe beans do.

Note 1. Kempski (1923) says: "see van Gorkom's Oost-Indische Cultures, neu herausgeg. von Prinsen-Geerligs, Verlag de Bussy, Amsterdam, 1913, Vol. III, p. 283/86."

Note 2. This is the earliest Dutch-language document seen (Aug. 2003) that uses the word *proteïnestoffen* (or *proteïnestoff)* to refer to proteins in connection with soybeans. Address: Dr., Former Head Inspector of Crops, Dutch East Indies (Oud-Hoofd-Inspecteur der Cultures in Nederlandsch Oost-Indië).

186. Watt, George. 1890. A dictionary of the economic products of India. Vol. 3. London: W.H. Allen & Co.; Calcutta, India: Office of the Superintendent of Government Printing. 534 p. See p. 509-11. Index (in Vol. 7). 25 cm. [14 ref]

• ***Summary:*** Contents related to the soy bean: *Glycine* (p. 509-10). *Glycine hispida,* Maxim. (p. 510-11): Synonyms, vernacular, references, habitat, oil, medicine, food and fodder, chemistry, the bean, oil.

Under Glycine: "Reference having been made to the authorities of the Calcutta Herbarium on the subject of G. soja, Sieb. et Zucc., being, as shown in the Flora of British India, a native of this country, Dr. Prain kindly went into the subject very carefully. He writes: 'We have not, from any part of India, any specimens of G. soja proper. The Khasi Hills plant is more erect, more hispid, and has larger legumes than the Himalayan, and indeed resembles G. hispida, Maxim., quite as much as it does the Indian cultivated "G. soja," which, indeed, it connects with G. hispida. It is, in fact, the plant most like the wild G. soja, S. et Z., which no one ever professes to have found wild in India, while it is also the one most like G. hispida, Maxim. (which has never been found wild anywhere). It is the plant collected by Dr. Watt and myself in the Naga Hills.'

"The writer noted on his Naga Hill specimens that they were found in a semiwild state, and that the plant was known to the Angami Nagas as *Tsu Dza,* a name not unlike soja. Throughout India, the soy bean is cultivated, black and white seeded forms being met with, which vary to some extent, but all preserve the specific characters of G. hispida. Plants raised at Saharanpur from Japanese seed have larger and broader leaves than the usual Indian forms. The fact that this cultivated plant possesses, even among the aboriginal tribes, names which are original, i.e., in no way modern derivatives, points to an ancient cultivation, if, indeed, it may not be accepted as an indication of its indigenous nature. (Editor.)"

"Vern[acular]–Bhat, bhatwan, ram kurthi (Hind. [=Hindi or Hindoostanee]); Bhut (Punj. [= Panjabi]); Gari-kulay (Beng. [=Bengali]); Hendedisom horec (black-seeded), Pond disom, horec (white-seeded variety) (Santal); Tzu-dza (Naga); Bhatnas, bhatwas (Nepal); Seta, kala botmas (Parbat.); Musa, gya (Newar); Khajuwa (Eastern Terai); Bhut (Kumaun).

References: The author cites 17 early references concerning soya and, using information from these. : This brief bibliography on soya is one of the best and worst seen. Its is good in that it cites a host of previously uncited publications. It is bad in that the references are so abbreviated as to often be incomprehensible; and some of them are incomplete or incorrect.

Habitat: "Extensively cultivated throughout India and in Eastern Bengal, Khasia hills, Manipur, the Naga hills, and Burma, often found as a weed on fields or near cultivation."

Medicine: "A decoction of the root is said to possess astringent properties." Food and fodder: "The Soy-bean forms an important article of food in China and Japan. Since 1873, it has been successfully grown in the warmer parts of Europe. It is also widely spread, in a cultivated state, over a great part of the Himálaya [Himalaya] and the plains and lower hills of India. On the plains the crop is generally grown by itself, as a *kharif* crop; the seeds are sown from June to September, and the harvesting takes place from November to January.

"The bean is eaten in India in the localities where cultivated. The Rev. A. Campbell states that in Chutia Nagpur it is generally used roasted and ground as *satu,* or simply roasted in the form of *atá.* In other parts of the country it is also eaten in the form of *dal.* In China and Japan three preparations are made from the soy-bean, namely soy-sauce, soy-cheese, and a kind of paste. The last two of which are manufactured by crushing and pressing the seeds."

Note 1. An extensive "List of works consulted" (bibliography) appears in Vol. I (1889, p. xiii-xxii), followed by a list of contributors (p. xxiii-xxvi) and list of abbreviations (p. xxvii-xxxiii).

Note 2. This is one of earliest documents seen (March 2005) that clearly refers to the cultivation of soybeans in Burma.

Sir George Watt lived 1851-1930. This 7-volume work, published from 1889 to 1896, is arranged alphabetically by product. An extensive bibliography is in vol. 1, and the index comprises vol. 7. Address: M.B., C.M., C.I.E., Reporter on Economic Products with the Government of India.

187. J.P. 1891. Le soja aux îles de la Sonde [Soya in the Sunda Islands (Java)]. *Bulletin de la Societe d'Acclimatation* 38:462. Oct. [Fre]

• ***Summary:*** The seeds of the soybean *(de Soja), Soja hispida,* the Japanese legume, are rich in albuminoids and fats, yet they contain very little starch or sugars. Their composition is very similar to foods of animal origin, and soy flour is very valuable for making bread for diabetics–who are not supposed to eat starches or sugars.

"Mr. Cornellisen, inspector of the medical service in Java, has just recommended to the Dutch authorities that they propagate the soybean crop as much as possible in Malaysia. These beans *(fèves),* which can potentially take the place of meat, should be a powerful aid to indigenous people weakened by a diet that is exclusively vegetarian and lacking nitrogenous material *(matière azotée).* Soya is already cultivated in several parts of Java, and the nature of its nitrogenous material, composed not of gluten like cereals but rather of legumin and vegetable casein similar to milk casein, allows one to make, with its fermented flour, highly nutritious cheeses."

Note: In the last paragraph, it is not clear to which food the author is referring; it could be fermented tofu or tempeh, although neither is now made from soy flour.

188. Clercq, F.S.A. de. 1892. Inlandsche plantennamen [Indigenous plant names (in the Dutch East Indies); Glycine Soja (kadeleh)]. *Teysmannia (Batavia [Jakarta])* 3:341-459. See p. 349. [2 ref. Dut]

• ***Summary:*** "Kadele is Javanese and Sundanese. In Malaya it is kedelai." Diacritical marks are included. Address: Indonesia.

189. Farneti, Rodolfo. 1892. Frutti freschi e secchi ortaggi [Fresh fruits and dry vegetables]. Milan, Italy: Fratelli Dumolard Editori. xxiii + 712 p. Illust. 19 cm. [10+* ref. Ita]

• ***Summary:*** "Alterazione e falsificazione delle sostanze alimentari e di altre importanti materie di uso comune. Manuali."

Page 487 has a section titled "Soja–La soja o fagiolo Chinese (Dolichos Soja, L. o Glycine Soja, Benth)." The soybean is said to have originated in Cochin China, Japan, and Java. Many varieties are cultivated on a large scale in China and Japan. The chemical composition of 4 varieties (tumida pallida [white or pale yellow], tumida castanea [brown], tumida atrosperma, and platicarpa melanosperma [black]) is given. Address: Italy.

190. Giles, Herbert Allen. 1892. A Chinese-English dictionary. London: Bernard Quaritch; Shanghai, Hongkong, Yokohama & Singapore: Kelly and Walsh, Ltd. xlvi + 1416 p. 31 cm. [4 ref. Eng; chi]

• ***Summary:*** This massive volume, weighing almost 12 lb, contains more than 1,450 pages and 13,848 Chinese characters. Contents: Dedication (to the Honourable C.P. Chater). By the same author (17 books). Preface: Number of characters, the characters numbering, duplicate characters, phonetic arrangement, orthography, the tones, the dialects (Beneath the number attached to each character will be found its rhyme (R) as given in the *P'ei-wên-yün-fu.* The romanization of each character is given in Cantonese, Hakka, Foochow, Wênchow, Ningpo, Peking, Mid-China, Yangchow, and Ssuch'uan {Szechwan} dialects, as well as in Korean, Japanese, and Annamese, each being distinguished by its initial letter), the definitions, the entries, etymology, grammar, difficulty of Chinese, personal. Philological essay (incl. tones, ranging from 4 to 9, in ten dialects). Table of sounds.

Examples of soy-related characters:

*Chiang* (p. 122, No. 1220). "A soy made by mixing salt with bean-flour. Sauce. Pickled food." Fourteen compounds using this character are given, including: Bean sauce, soy. Pickled bean curd [fermented tofu]. Bean sauce. Soy [sauce] is of two kinds, the clear and the thick. Dry relishes. Soy colour–a dark reddish drab. He won't use money for vinegar to buy soy.

*Ch'ih* (p. 205, No. 1996). "Salted fruits, etc., dried and used as relishes." Four compounds incl.: Salted beans. Soy, sauce.

*Fu* (p. 458, No. 3686). "Rotten; putrid; worthless." Eleven compounds and sayings include: Bean curd, see No. 11,417. Bean curd officials–a term of contempt applied to certain of the poorer classes of official servants who are compelled to feed largely on this cheap food. Also explained as flabby or unenergetic officials. A Mongol name for cheese. A kind of milk made from beans *(rufu* = milk + fu) [Note: Probably fermented tofu, *not* soymilk].

*Huang* (p. 522, No. 5124). Yellow. Compounds: Yellow beans [soja].

*Mao* (p. 778, No. 7,679). "Hair, down, feathers." But the word "Hairy beans" = edamame does not appear here.

Shih (p. 988, No. 9999). See No. 1996.

*Ta* (p. 1,036-37, No. 10,470). "Great." But the word "Great bean" = soybean does not appear here.

*Tou* (p. 1,127, No. 11,417). "Beans; pulse." See also No. 11,412. Thirty compounds, incl.: Bean-sprouts. Bean-curd. A cheap restaurant (a bean-curd restaurant). Bean-cake. Bean oil. Big bean, black bean, or yellow bean = the soja bean *(Glycine hispida,* Max.), used for making bean-curd, soy, oil, etc. Ground-nuts.

*Yu* (p. 1,316-17, No. 13,409). "Oil, fat, grease." 45 compounds incl. Sesamum-seed oil. Linseed. Wood oil. An oil factory. Oil dregs. But "bean-oil" = soybean oil does not appear here.

Note 1. This is the earliest English-language document seen (Aug. 2007) that contains the term "sesamum-seed

oil." Note 2. Herbert Giles lived 1845-1935.

Note 3. Unfortunately, the pronunciation of the compounds is not given (as in Mandarin).

Note 4. This is the earliest English-language document seen (April 2001) that uses the term "Bean sauce" to refer to soy sauce.

Note 5. This is the earliest English-language document seen (Oct. 2001) that uses the term "bean-flour" to refer to soy bean flour.

Note 6. This is the earliest English-language document seen (Feb. 2007) that uses the term "pickled bean curd" to refer to fermented tofu.

Note 7. This is the earliest English-language document seen (Oct. 2002) that uses the term "Wood oil" to refer to what would later be called "China wood oil" or "tung oil," a pale yellow drying oil obtained from the seeds of tung trees (any of several trees of the genus *Aleurites),* and used mainly in quick-drying varnishes and paints, and for waterproofing. Address: H.B.M. [Her Britannic Majesty's] Consul at Ningpo [Zhejiang province, China].

191. Klinkert, Hillebrandus Cornelius. 1892. Nieuw maleisch-nederlandsch zakwoordenboek [New Malay-Dutch pocket dictionary]. Leiden, Netherlands: E.J. Brill. 400 p. 19 cm. [Dut]

• ***Summary:*** This dictionary writes Indonesian and Malay words using Latin characters and defines them in Dutch. Soy-related entries include: (1) bidjan, widjen, or lenga (sesame). (2) katjang (bean), including katjang botor, katjang hidjau (small green beans [mung beans]), katjang kedelai [soybean], katjang parang (sword-shaped), katjang peroet-hajam (very long and thin), katjang tanah (peanut), katjang goreng (fried peanuts). (3) kedelai (the name of a legume with black seeds, from which soya etc. is made. In Java, called *kedele).* (4) ketjap (soy = *soija).* (5) ragi (a type of yeast = *gist).* (6) tapé (Jav. tapeh = *tapai).*

The following soy-related words do NOT appear: tahu or tao-hoe (tofu). taoge (sprouts). tautjo (Indonesian miso). tempe (tempeh). Note: H.C. Klinkert lived 1829-1913. Address: Leiden, Netherlands.

192. Paillieux, Auguste; Bois, D. 1892. Le potager d'un curieux: Histoire, culture et usages de 250 plantes comestibles, peu connues ou inconnues. Dieuxième édition [The inquisitive person's kitchen garden: History, culture, and uses of 200 edible, little-known or unknown plants. 2nd ed.]. Paris: Librairie Agricole de la Maison Rustique. xii + 589 p. See p. 502-49. Illust. Index. 24 cm. [2 ref. Fre]

• ***Summary:*** Contents of section on soy: Introduction: Work of the Society for Acclimatization with soy, structure of this book, excerpts on soy from past issues of the *Bulletin the Society for Acclimatization.* Botany of the soybean. 1. Soy in Japan: Kaempfer's writings, including miso and shoyu, Japan at the World's Fair of 1878, miso, shoyu, tofu. 2. Soy in Cochin China: Black soybeans, various foods. 3. Soy in China: Soy oil, tofu and fermented tofu, soy sauce, other uses. 4. Soy in Austria-Hungary. 5. Soy in France: Historical, varieties, cultivation, utilization.

The author's full name is Nicolas-Auguste Paillieux (lived 1812-1898; he died on 8 Feb. 1898 at age 85). An illustration (non-original line drawing; p. 503) shows a mature soybean plant bearing many pods, plus a close-up of three pods to the lower right of the plant (from an original in J.R.F. 1882). Note: Desire Bois lived 1856-1946.

Also discusses (listed alphabetically): arachide (peanuts, p. 26-28), haricot mungo (azuki, p. 201-09), kudzu or ko (p. 271-84), quinoa (p. 460-66), souchet comestible (chufa, p. 498-502, with illustration). Address: 1. Member of the Societe Nationale d'Acclimatation 2. Asst. de la Chaire de Culture, Museum d'Histoire naturelle de Paris.

193. Schaedler, Carl. 1892. Die Technologie der Fette und Oele des Pflanzen- und Thierreichs. 2 vermehrte und verbesserte Auflage [The technology of oils and fats from the plant- and animal kingdoms. 2nd ed.]. Leipzig, Germany: Baumgaertner's Buchhandlung. xiv + 1373 p. Illust. 22 cm. [Ger]

• ***Summary:*** In Chapter 16, "Descriptions, properties, and confusions of the oils and fats" is a section titled "Papilionaceae (Leguminosae), papilionaceous plants *(Schmetterlingsblüthler)."* The first plant discussed (p. 525) is the soybean: "1. Dolichos Soja Linn = Soja japonica, Soja hispida = Chinese oilbean *(Chinesische Oelbohne), Sao; Sojabohne.* It is native to Japan and China and cultivated in southern Asia. The seeds, which have a piquant *(pikante)* taste and are used as food. The oil, called soybean oil *(Sojabohnenoel),* and incorrectly called "oil of peas" *("Huile de pois")* serves as an edible oil.

The composition of the soybean is given, according to Meissl and Böcker. The starch content depends on the degree of ripeness of the beans, according to O. Harz; completely mature seeds contain very little starch, while unripe seeds contain more of it.

The ether-soluble portion of the bean consists of about 90% neutral triglycerides *(Neutralfett)* and 5-10% cholesterol *(Cholesterin),* lecithin, wax, and gum *(Harz).*

Also discusses: Margarine (p. 157, 1325-29). Peanuts (p. 511-20. The oil is called *Erdeichelöl, Madrasöl, Oleum Arachidis, Huile d'Arachide, Huile de Pistache de terre, Ground-nut oil, Earth-nut oil, Pea-nut oil, Moong-phullie* (Hindostan), *Nelay-cadalay* (Tamil), *Katjang-tannah* (Java), *Veru-sanaga Feling, Cochang-gorung* (Sumatra), *Mandobi* (Brazil), *Amendoim* (Brazil)). Almonds and almond oil (p. 526-36). Sesame oil (p. 611-17). Chufa *(Cyperus esculentus, Erdmandel, Grasmandel, indianische Süsswurzel,* p. 655-56. The oil is called *Oleum Cyperi esculenti, Cyperus oil, Huile de souchet comestible).*

Linseed oil (p. 672-90). Hempseed oil (p. 721-24). Contains 463 superb text illustrations, including multi-part illustrations of the peanut plant, seeds, and flowers, Underwood's peanut picker (wooden machine), Crooker's wooden separator for peanuts, and a metal peanut sheller. Also a multi-part illustration of the almond seed and flowers. The soybean is not illustrated.

Note: Carl Schaedler was born in 1843. The author of the first edition of this book, Paul Lohmann, who had exactly the same position at the same place in Berlin as Schaedler, died shortly before this second edition was published. Thus, Dr. Schaedler finished preparing it for publication. Address: Vereideter Chemiker und Sachverstaendiger der Koenigl. Gerichte zu Berlin.

194. Watt, George. 1892. A dictionary of the economic products of India. Vol. 6:1. Pachyrhizus to rye. London: W.H. Allen & Co.; Calcutta, India: Office of the Superintendent of Government Printing. 594 p. Index (in Vol. 7). 25 cm. [65* ref]

• ***Summary:*** For *Phaseolus mungo* (green gram) (called *mung* in India), see p. 187-93. Varieties include Var. glaber, Var. Wightianus, Var. radiatus (called *urd* or *mash* in India). Since *mung* belongs to the same species as *urd / mash,* "the resemblance between the two is very great. The most popular distinction between the two, as met with in the field, lies in the fact that *mung* had dark green, and *urd* yellowish green, leaves, but the chief difference is in the shape of the grain, that of the latter being much larger and longer than that of *mung." Mung,* which is cultivated throughout India, comes in three colors, with green *(harri-mung)* being the typical and most common.

For *Prunus amygdalus* (almond), see p. 342-44. For *Pueraria tuberosa,* see p. 363.

For pulses (leguminous seeds), se p. 364-68. They include *Cajanus indicus* (pigeon pea, *arhar dal* in Hindi & Bengali), *Cicer arietinum* (the common gram or chicken-pea, *chena* or *chola* in Hindi & Bengali), *Dolichos biflorus* (the horse gram, *kurti-kalai* in Bengali, *kulthi gahat* in Hindi), *Dolichos lablab* (the Indian bean, *sim* or *makham-sim* in Bengali, *sim* in Hindi), *Glycine hispida,* Maxim. (the soya bean, *gari-kulay* in Bengali, *bhat* or *bhatwan* in Hindi), *Lathyrus sativus* (the jarosse or gesse, *khesari* in Bengali), *Lens esculenta* (the lentil, *masuri* in Hindi), *Phaseolus actinifolius (moth* or *mothi* in Hindi), *Phaseolus mungo* and var. *glaber* (green gram, *mung* or *mug* in Hindi), *Phaseolus mungo* var. *radiatus (mash-kolai* in Bengali, *urd mash* in Hindi), *Phaseolus trilobus (mungani* in Bengali), *Phaseolus vulgaris* (the kidney bean, French bean, or haricot; cultivated for the sake of its young pods by Europeans; scarcely, if ever, used by the natives). *Pisum arvense* (the grey pea or field pea, *desi mattar* in Hindi & Bengali), *Pisum sativum* (the common pea, *mattar* or *gol mattar* in the North-West Provinces), *Vigna Catiang (chowli* in Hindi, *barbati* in Bengali, and *urohi mahorpat* in Assamese). Note: This is the earliest English-language document seen (June 2008) that uses the scientific name *Lens esculenta* to refer to lentils.

Concerning the soya bean (p. 365-66): "This plant, densely clothed with fine ferruginous [rust colored] hairs, is sub-erect. It is met with in the tropical regions and the outer Himálaya, from Kumáon to Sikkim, and the Khásia and the Naga Hills to Upper Burma. Dr. Stewart mentions a field of *bhat* having been observed in Bisahir in the Panjàb, at an altitude of 6,000 feet. Dr. Roxburgh first saw it grown from seed received from the Moluccas in 1798.

"DeCandolle [De Candolle] considers Soya, and apparently correctly, as a native of Cochin China, Japan, and Java. But he remarks that 'it is of modern introduction into India.' 'There are no common Indian names' for it. This seems to be a mistake; the plant is well known in India under the names given above. In Manipur and the Naga Hills it is one of the most abundant of pulses. In the Naga Hills it is known as *tsu dza,* a name not unlike *Soja,* but at the same time it may be related to the old Chinese name *Shu.* The Soya most likely reached India from China, passing by way of the mountain tracts of Assam. The importance of these hills in settling questions of the nativity of cultivated Indian and Chinese plants has not been fully appreciated, and we might fairly anticipate that many statements at present accepted as facts will be considerably modified with an extended knowledge of the wild and cultivated plants of the Assam and Chinese frontier. Soya is an important article of food in Tibet. It is made in India into a sauce called 'Soy.' The advisability of extending its cultivation on the Himálayan tracts was pressed on the Government of India in 1882 by Professor Kinch, and the attention of local Governments also was called to it, but it does not appear to have made much progress." Address: M.B., C.M., C.I.E., Reporter on Economic Products with the Government of India.

195. Vorderman, Adolf G. 1893. Analecta op bromatologisch gebied. I. [Writings on foods: Mold-fermented foods. I.]. *Geneeskundig Tijdschrift voor Nederlandsch-Indie* 33(3):343-99. Sept. See p. 350-360. [Dut]

• ***Summary:*** The Dutch microbiologist discusses bean sprouts (p. 350-54; *taôge),* light-colored, brown and black soybeans (p. 354-56; *kadelé poetih, merah, item [Bat. maleisch], Licht gekleurde, bruine en zwarte soja-boontjes),* tofu (p. 356-57; *tao-hoe),* firm or pressed tofu (p. 357-59 *(tao-koa)),* ragi (p. 359-60; a traditional tempeh inoculum, though he does not mention tempeh), tapej (p. 360; [tapeh], Tsao in Chinese), arak (p. 369-78). Plates at the end show microorganisms for ragi, tapej, sugarcane brem, and rice wine.

Note: This is the earliest document seen (April 2001) that contains the term *tao-koa*. Address: Inspect. burg. geneesk. diest voor Java en Madoera (Civil Medical Service in Java and Madura).

196. *St. Louis Post-Dispatch (Missouri).* 1893. Use of the soya bean. Nov. 12. p. 20.

• ***Summary:*** "The use of the Soya bean in the dietary of diabetics has recently attracted much attention. Heretofore the bean has been used only for culinary purposes, the Japanese using a liquid called sooju [shoyu] or soja [soy sauce], a condiment which they prepare by fermenting the seeds of the Soya bean. The Japanese name of the plant is Daidsu [Daizu]. Linnaeus, the great botanist, called it *Dolichos Soja."*

The Japanese call the beans Mame, and make 'miso' or sooju from them. The preparations are used principally in cooking meat. In China an emulsion [soymilk] is made from the oil of the beans [sic, from the whole beans]. It forms a white liquid and is drunk in the districts in which milk is too dear for the poor to buy it. The Chinese also make a kind of cheese [tofu] from the beans. Soy sauce is exported to and used in many European countries. The Dutch call it 'Zoya.' In the East Indies it is known as 'Ket Jay' [sic, 'Ket Jap'] (probably the source of 'catchup' or 'ketchup'). This liquid is obtained by fermentation of cakes of roasted barley and boiled soya bean. After [the first] fermentation salt is added. The whole is kept for two or three years and then the sauce is squeezed out of the mass.

"Bread and biscuit, made from the flour of the beans, have been highly recommended for diabetics on account of the low proportion of starch and the high proportion of fat and proteid. They are said to be pleasant to the taste. Dr. W. Hale White, writing from Guy's Hospital, London, where he has used the bread and biscuit for some time, says: 'They are to patients suffering from diabetes not only a good substitute for gluten bread, but they form a pleasant change from it, and many patients much prefer the taste of them to gluten bread.'"

197. Westeroode, W. de Wolff van. 1893. Inlandsche plantennamen [Indigenous plant names (in the Dutch East Indies); Glycine Soja ("kadeleh")]. *Teysmannia (Batavia [Jakarta])* 4:23-30. See p. 25-26. [Dut]

• ***Summary:*** Mentions Glycine Soja ("kadeleh"). The Ngoko-Javanese is *"kadele"* or *"kedele,"* the *kromo-"kedang-soel"*, the same in East as in Central Java. The soy (kedele) beans deserve a precise pharmacological investigation in view of the surprising results given by the soy product ketjap [Indonesian soy sauce] against persistent malaria, which cannot be cured by other means. Address: Indonesia.

198. Schlegel, Gustave; Cordier, Henri. 1894. The Chinese bean-curd and soy and the soya-bread of Mr. Lecerf. I. Tofu. *T'oung Pao (General Newspaper)* 5:135-46. March. [11 ref. Eng]

• ***Summary:*** "Of late these Chinese preparations have again attracted the notice of Europeans. The *Temps* in France published last November a note upon the subject after an article in the *Avenir de Diego-Suarez* of 2 March 1893, and Dr. Vorderman, of the civil medical service in Java and Madura... We will add to these notices what is written about the subject by the Chinese themselves.

"I. Tao-fu or Bean Curd. According to 'Collected Omissions of *Sieh-choh'* nothing had been ever heard of the confection of bean-curd before or after the period of the three dynasties of antiquity (B.C. 2205-250), and it was only mentioned for the first time in the work of *Liu-ngan [Liu An]* king of Hoai-nan [Huai Nan] of the Han (second century before our era) Cf. Mayers, Chinese Readers Manual, No. 412, Cap. 24."

"The *Tao-fu* or Bean-curd was also called 'Leguminous milk', and was prepared by boiling curds or milk from beans.

"It is further related that when *Shi-tsih* [pinyin: Shi Ji] was governor of *Ts'ing-yang* [pinyin: Qing Yang] (Latitude 30°45', Longitude 115°26') he, in order to purify himself and to rouse the population, did not permit himself the use of meat, but bought every day in the market several pieces of bean curd, so that the townpeople called these curds 'The little slaughtered sheep.'

"The bean of which this curd is prepared is known in science by the name of *Soja hispida*, and has been imported in the form of a meat-sauce from Japan to Europe under its japanese name of *Sho-yu*, the corrupted japanese pronunciation of the chinese *tsiang yu* or 'relish-oil' which this sauce bears in some parts of China, and which has been further corrupted by the Dutch into *Soja*, by which name (also written *soya* and *soy)* it became known all over Europe. We will return to this by and by.

"According to Dr. Vorderman (loc. cit. p. 354) the soy-beans are distinguished in light-colored (cream-color, straw-yellow, light ochre-yellow and amber-yellow), brown and black. The first two sorts are roundish, the last either roundish or oblong, as they come from the one or the other variety of the plant. Accordingly, the plant with roundish seeds is called *Soja hispida, tumida* and that with oblong seeds *Soja hispida, platycarpa*, amounting, with the differences in color, to four varieties: 1. Soja hispida, tumida β pallida; 2. Soja hispida, tumida β atrospuma [atrosperma]; 3. Soja hispida, tumida β castanea; 4. Soja hispida, platycarpa β melanosperma.

"No. 2 and 4 are black and serve especially for the fabrication of Soy or Ketchup, whilst No. 1 (pale-yellow) and No. 3 (brown) are used for other culinary purposes.

"Since the Vienna [Austria] exhibition of 1873, when several samples of Chinese, Japanese and Indian soybeans were exhibited, their great nutritive proprieties and richness of azote [nitrogen] and fat have been shown by chemical analysis, and the culture of this plant has been largely introduced into Europe, especially in Hungary." Note 1. This is the earliest English-language document seen (July 2003) that contains the word "soybeans"–spelled as one word.

König in his work *Die menschlichen Nahrungs und Genussmittel,* 2nd Ed., Vol. II, p. 372, gives an analysis of the composition of 4 types of soybeans. "Dr. Vorderman says that he has not been able to detect amylum [starch] in the Soybeans of Java, China and Annam in applying the reaction of jodium [iodine] upon the section of the bean. The texture of the cotyledons consists principally of oblong, radiating parenchyme-cells, about five times longer than broad.

Note 2. This is the earliest English-language document seen (Oct. 2004) that uses the word "cotyledons" in connection with soybeans.

"II. *Tao-kan* or Preserved Bean Curd. The Chinese make of the Soy-beans two preparations, one called in Java *Tao-hu* and the other *Tao-toa.* They both consist of leguminous cheese, obtained from the light-brown beans, principally those obtained from Annam. But at present many Chinese in Batavia prefer the so much cheaper *kadele putih* grown in the *Preanger* and the *Ommelanden* (circumjacent territory of Batavia).

"These lightcolored beans are macerated during five hours in rainwater, when they swell up to about twice or thrice their original size. After having been cleansed from accidental dirt or admixtures, they are ground in a stone handmill, very much resembling that in which Europeans ground colors. One Chinese turns the mill, whilst the other throws the macerated beans, still in their husk, with a little water into the mill, so that the stuff runs as a white, thin mass, by a small gutter, into a tub prepared for its reception. This mass is then heated upon the fire in a large iron open cauldron, until it reaches the boiling-point. The froth is skimmed, and the fluid strained, after boiling, through a cotton cloth, in which a white, doughy residu [sic, residue = okara] remains, having a peculiar oily smell, and which serves as food for ducks and fowl.

"The filtrated fluid, which has a milkwhite color, is mixed, whilst it is being cooled, with a certain proportion of common Madura-salt or with a little calcined gypsum. Note 2. This is the earliest English-language document seen (Oct. 2003) that refers to soymilk, which it calls the "milk from beans" and "The filtrated fluid, which has a milkwhite color..."

"This gypsum is imported from China in the form of large lumps of radiated gypsum. As it is specially used for preparing the leguminous cheese of the soybeans, it is called by traders in Batavia by the Malay-Chinese hybrid word *Batu-tao* i.e. 'bean-stone.'\ "The salt (or, as in China, the chloride of magnesium) and gypsum change the juice, by precipitation of the legumine [legumin], into a white, gelatineous [gelatinous] mass, which, when sufficiently cooled, obtains a certain consistency, allowing it to be cut into flat square pieces. This can, however, not be done for after two hours after the precipitation. These squares are then laid upon plantain-leaves protected by a white cotton cloth against dust, and hawked about in the streets.

"They have an unpleasant raw bean-flavor, but when mixed with other victuals, this taste is lost. It is used as well in the preparation of Chinese victuals, as in that of the so-called Indian rice-dish.

"In order to preserve the *tao-fu* for continuous use, it is made to *tao-koa* (or dried beans) by the following method.

"The *tao-fu,* cut into flat squares, is plunged into a decoctum of *Curcuma longa,* which colours it intense yellow. These yellow cakes are then wrapped up in white square pieces of cotton, laid between boards and exposed to a certain pressure. Generally they are at the same time stamped with Chinese characters.

"By this pressure a good deal of water is lost, but the cakes can be preserved much longer.

"Dr. Vorderman says that both *tao-fu* and *tao-koa* can be successfully used in the nourishment of feeble children, who refuse to take eggs. *Tao-koa* is also imported from China, but these cakes are much larger than those prepared in Java, and are always stamped with Chinese characters."

Note 2. This is the earliest document seen (Aug. 2002) that mentions Liu An of Huai Nan in connection with tofu.

Note 4. This is the earliest English-language document seen (Feb. 2004) that uses the word "Tao-fu" (or "Tao fu"), or the word "Tao-hu" (or "Tao hu"), or the word "Tao-kan" (or Tao kan") to refer to Chinese-style tofu.

Note 5. This is the earliest English-language document seen (Sept. 2004) that uses the term "pale-yellow" or the term "straw-yellow" to describe the color of soybean seeds.

Note 6. An article in this same issue, titled "The Chinese in Boston" [Massachusetts], notes that presently "1,000 Chinese live in Boston, of which 700 work in the 180 laundries, and about 300 are merchants and traffickers, all dwelling on Harrison Ave. Here one also finds 63 gambling dens (or houses of ill repute) and several others where opium is smoked–visited in part by the most vile class of Americans." We wonder if there wasn't at least one tofu shop in Boston at this time. Address: 1. Professeur de Chinois à l'Universite de Leide [Leiden]; 2. Professeur à l'Ecole spéciale des Langues orientales vivantes et à l'Ecole libre des Sciences politiques à Paris.

199. Martin, Ernest. 1895. Le Tao-fu (soya), son origine, ses propriétés, son acclimatation [Tofu (soya): Its origin,

properties, and acclimatization]. *Revue Scientifique (Revue Rose)* 3(5):144-46. Feb. 2. Series 4. [Fre]

• ***Summary:*** A French-language review of the literature on tofu, including a brief discussion of soy sauce and soybeans. The Soya hispida (Family: Papilionacées; Glycine Phaseolus) is an oilseed *(graine oléagineuse)* that originated in China. According to the research of Prof. Schlegel at the University of Leiden, it was first mentioned in the work of Liu-An, king of Huai-nan, of the Han dynasty, in the 2nd century before the Christian era. From this period, the seed was boiled and a milk-like liquid [soymilk] was extracted which had the reputation of possessing beneficial properties.

When the soybean *(le soya)* was imported to Europe, it was in the form of a sauce made in Japan and sold by the Dutch who were the first [sic] European navigators to arrive in Japan. Note: Portuguese navigators arrived in and traded with Japan before the Dutch.

Its name was *sho-yu,* which is nothing but the corruption of the Chinese characters *tsiang-yu,* which signifies savory oil [sic]. From sho-yu, the Dutch made the word "soya" or "soy" the name by which the bean is known in Europe.

Discusses: The shape and color of soybeans. The Exposition of Vienna [Austria] in 1873. König's discovery that soybeans contain 31-33% protein. The research of Vorderman and Pellet. Tao-Kan, Tao-Hu (tofu in Java), and Tao-Koa. Tofu exported from Annam. How Chinese in Batavia make soymilk and tofu (curded with gypsum); use of the residue [okara] for feeding to penned poultry, such as chickens and ducks. Further processing of tofu to extend its shelf life. Preparation of soy sauce. Many uses of tofu in Chinese therapy. Shi-tsih as the founder of the vegetarian diet. Writings of Montigny, the French consul general. Soy bread in diabetic diets. Mr. Desvilles. Soybean trials and acclimatization in France. Composition of soybeans grown in France.

"From the viewpoint of practical utility, we conclude that the acclimatization of species of the vegetable and animal kingdoms, which was formerly the goal of multiple costly tests, has now lost much of its importance. The ease of communications and the rapidity with which exotic shipments can be made often provide the same results.

"However we must continue to be attentive to failures of acclimatization, for they have much to teach us. One of the most interesting problems of science is that of mutations. The work of the mutationists *(tératologistes),* and especially of Dareste, on the production of artificial anomalies, has led to new proof that the variability of animal organization is much greater than one would be tempted to believe–and this variability extends also to plants... Such research can help elucidate the problem of the origin of races, which has heretofore remained in the deepest obscurity despite the work of savants such as Is. Geoffroy Saint-Hillaire, Darwin, and Quatrefages.

"Thus there is nothing surprising in the transformations manifested in living things which, transplanted from afar, find themselves placed in telluric [terrestrial] and climatological conditions completely different from those of their original habitat. Examples of this transformation multiple with each new day;" they include the opium poppy, rhubarb, some legumes, numerous varieties of bamboo. "What is the reason for these laws of transformation and degeneration that extend over each of the large kingdoms of nature? The problem is posed but has not been seriously addressed.

"As for the soybean *(graine de soya),* we have shown that it undergoes this transformation in a very sensitive manner: in it, the protein molecule progressively gives way to the starch *(amylacée)* molecule. At the heart of the plant organism, a special synthesis is accomplished: its chemical composition is modified in proportions such that it becomes inappropriate for the goal targeted by its cultivation in Europe."

200. Went, F.A.F.C.; Prinsen Geerligs, H.C. 1895. Beobachtungen ueber die Hefearten und zuckerbildenden Pilze der Arrakfabrikation [Observations on the yeast varieties and saccharifying fungi used in making arak, rice brandy]. *Zentralblatt fuer Bakteriologie. Series 2.* 1(13/14):501-04. July 10. Extracted from Verhandelingen der Koninklijke Akademie van Wetenschappen. II. 4(2):. [1 ref. Ger]

• ***Summary:*** Discusses raggi (ragi), tapej (tape, tapeh), and brem. Japanese miso and koji (as described by Kellner) are mentioned in passing. The four new species of microorganisms described are: *Monilia javanica, Saccharomyces Vordermanni, Chlamydomucor Oryzae,* and *Rhizopus Oryzae.*

201. Prinsen Geerligs, H.C. 1895. Eenige Chineesche voedingsmiddelen uit Sojaboonen bereid [Some Chinese foods made from soybeans]. *Pharmaceutisch Weekblad voor Nederland* 32(33):1-2. Dec. 14. Summarized in Teysmannia (1897) 7:413-15. [5 ref. Dut; eng]

• ***Summary:*** Contents: Introduction. Tofu or bean cheese *(Tao-hoe of boonenkaas).* Chinese soja or Fao-ijoe (boonenolie; soybean oil). Japanese soya (soy sauce; In Japanese: Shoijoe; in Chinese: Sex-sze-ijve). Taucho or bean paste *(Fao toio of boonenbrei).*

In the section on tofu, soymilk is mentioned twice. Note 1. This is the earliest Dutch-language document seen (Oct. 2003) that uses the term *melkachtige, vettige vloeistof* ("milky, fatty liquid") or *gefiltreerde melkachtige vleistof* ("filtered milky liquid") to refer to soymilk.

Note 2. This is the earliest document seen (March 2009) that mentions Indonesian-style miso, which it calls

"Fao toio." This would later be spelled tao-tjo, taotjo, tauco, or taucho.

At the end of the section on tofu, the author continues: Another widely used bean preparation is soy sauce (de Soja), of which two kinds exist: the Japanese and the Chinese Soja. The first-mentioned has already been repeatedly described, for example by König (1889, p. 241), further by J.J. Hoffman in his "Contributions to the Knowledge of the Language, Geography, and Ethnology of the Netherlands Indies" *(Bijdragen tot de Taal-, Land- en Volkenkunde van Nederl. Indië;* Vol. V, p. 192), and recently by G. Schlegel in T'oeng pao [T'oung Pao 1894] (Part 5, No. 2) and O. Kellner in *Chemiker Zeitung* (1895, p. 120). While I could not find anything in the literature about the preparation of Chinese soy sauce *(Soja),* I have copied the following from the manufacturers themselves.

Chinese Soja or Fao-ijoe (bean oil). For this, only black varieties of the *Soja hipida [sic, hispida] humida β atrosperma* or *Soja hipida platycarpa β melanosperma* have been used. Their seeds are cooked and the water poured off, after which the beans are left in the sun for half a day to dry. Now they are cooled on big trays of woven bamboo out of the sun, then covered with leaves of a *Hibiscus* variety. On the beans there will always appear a type of mold, the *Aspergillus Oryzae* to be precise, which, at least on Java, appears every time again on moist soybeans exposed to the open air, but strangely enough does not appear on other foods. The beans are allowed to stand until the mold sporulates, which can be seen by the green color of the mold threads (hyphae), then they are dried again for some days and then put in a strong salt solution that has been cooled. This mixture is put in the sun for 8 days and afterwards it is boiled. The salt solution is then poured off from the beans and saved. The beans are boiled again and the water is added to the first salt solution. This process is repeated as many times as it takes to extract the residue completely.

"The decoction is strained through a fine sieve, boiled again, and the sugar from the areng palm, star anise (not the leaves), and some other herbs (which are available from Chinese druggists as "soya herbs") are added. Finally, this dark brown, pleasantly aromatic liquid is boiled down until salt crystals start to appear on the surface, indicating that the liquid is completely saturated with salt. After cooling, the soy sauce *(soja)* is ready to use. It yields a spice which is used together with all different kinds of foods as a pleasant condiment, and in the Chinese, Javanese, and even the European kitchen on Java it is an irreplaceable ingredient.

Note 3. This is the earliest document seen (May 2010) that describes the preparation of a sweet Indonesian-style soy sauce quite similar to *ketjap manis* (which seems to have been first created about 1960), yet the writer does not mention its name.

"Soy sauce is sold in several quality grades, of which the best is a thick sauce with a special aroma. The lesser kinds are thinner and are made by diluting the thick soy sauce with salt water, while in the very low-grade kinds, instead of the pleasantly sweet-tasting palm sugar, the bitter, sour-smelling unassimilated molasses from sugar factories is used.

"The Chinese soy sauce appears as a black colored, thick, clear liquid in which sometimes a viscous sediment can be found. When diluted with water it turns turbid or cloudy, but after adding salt this cloudiness disappears. Here is an analysis of one of the most common varieties: Specific gravity 1.254, saccharose and glucose 15.60%, nitrogen containing substances *(stikstofhoudende stof)* soluble in alcohol 4.87%, nitrogen containing substances not soluble in alcohol 2.62%, nitrogen-free substances soluble in alcohol 0.25%, nitrogen-free substances *(stikstofrije stof)* not soluble in alcohol 0.75%, salt 17.11%, other ash components 1.65%, water 57.12%. Total 100%.

"The substances insoluble in nitrogen consist (except for peptone) mainly of legumin, which is soluble in strong salt solutions (compare Beilstein, *Handbuch Organische Chemie,* III, p. 1275) and will precipitate when diluted. This protein product *(eiwitstof)* has, by repeated precipitation with alcohol and renewed dilution in water and salt, been cleaned and could be recognized as a legumin. The elementary analyses gave these figures: Carbon 51.6, hydrogen 7.1, nitrogen 15.9.

"Furthermore, the dilution in water was precipitated by ammonium sulfate, magnesium sulfate and sodium sulfate and not by a large quantity of sodium chloride.

"The nitrogen containing substances soluble in alcohol were leucine, tyrosine and aspartic acid, all breakdown products of legumin, plus a little ammonia. Nitrogen-free extraction substances are almost not present and consist of a little pectin and the black coloring agent from the skin of the soybeans, which gives the black color to the soya.

"Just like Kellner *(Chemiker Zeitung* 1895, p. 121) remarks, the composition of the soya is very similar to the one of meat extract, by which the big importance of this condiment in countries, where mainly vegetable type food is consumed, can be readily explained. Very peculiar moreover is the way in which during the preparation of the soya the heavily digestible protein substances, which are locked into the thick skinned cells of the soya, have been converted into an easily digestible, very delicious food.

"One lets the boiled beans mold by means of the *Aspergillus oryzae,* which above all has the quality of changing amylodextrine and starchy substances into sugars followed by carbonic acid and water breakdown. We can say that a microscopic investigation of a molded soybean shows that the mold threads (hyphae) penetrate the cell walls of the complete soybean and partly dissolve them so the contents will be more readily available. When the mold has used up all that food, as shown by its fructification, the beans are put into a strong solution of salt water so that the

legumin will dissolve, producing a thick fluid liquid. At the same time, the broken down substances of the legumin will dissolve pepton [peptone], leucine, tyrosine and ammonia, next to the aromatic substance that will start to form in this stage. The continued manipulations, addition of sugar, herbs, etc., are of course of minor importance, but principally the clever way in which the mold is being used to dissolve the cell walls is highly interesting. This, like so many Chinese preparations, is completely empiric and no Chinese would have the slightest notion of what all this molding is about."

This article describes the first attempt to identify the tempeh mold. In the section on Indonesian miso (taucho), the author notes: "In a similar way, in Java, other molds are used to make leguminous seeds into more digestible foods. Thus the presscake, which remains after making peanut oil and would be indigestible without further preparation, is subjected to the action of molds. In central and eastern Java *Chlamydomucor Oryzae* [now known as *Amylomyces rouxii]* is used, whereas in western Java an orange mold of the family Oospore (Neurospora) is used. In the former case, the food is called 'bongkrek,' and in the latter 'ontjom.' If soybeans are molded with *Chlamydomucor* the spice is called 'tempets' [sic, tempeh]. In the preparation, the seeds are boiled, spread, mixed with a little molded cake from a former batch, and left alone for a while until the mass is bound into a solid white cake.

"All the aforementioned molds have the ability to break starch and pectin substances down into sugars, by which means the cell walls are opened and the seeds made more easy to digest.

"In the case of the starch-containing peanut presscakes, the breakdown of starch into sugars, followed by the use of the resulting sugars, proceeds so rapidly that the cakes become warm and within 1 day about 5% of their weight will disappear.

Kagok Tegal 28.9.95.

Note 4. This is the earliest document seen (Feb. 2004) written only in Dutch that mentions tofu, which it calls "Tao-hoe" or "boonenkaas." Earlier documents written in Latin and Dutch also mentioned tofu.

Note 5. This is the earliest document seen written only in Dutch that mentions Indonesian miso, which it calls *Fao toio* or *boonenbrei*, and *tao tsioe*.

Note 6. This is the earliest document seen stating that Hibiscus leaves are used in Indonesia to make soyfoods–in this case soy sauce.

Note 7. This is the earliest document seen (Sept. 2003) that mentions "bongkrek"–but the explanation is incorrect. Address: Java, Indonesia.

202. Prinsen Geerligs, H.C. 1896. Einige chinesische Sojabohnenpraeparate [Some Chinese soybean preparations]. *Chemiker-Zeitung* 20(9):67-69. Jan. 29. (Exp. Station Record 8:72). [3 ref. Ger]

• ***Summary:*** This is a German translation of the author's 1895 Dutch article, but with two mistakes concerning tempeh corrected. He changed the name of the mold from *Chlamydomucor Oryzae* to *Rhizopus Oryzae* and he changed the name of the product from "tempets" to "tempeh." He added in conclusion that "it was finely sliced and enjoyed, mold and all." But he continued, apparently mistakenly, to refer to tempeh as a Chinese soyfood.

He also improved his description of Chinese-style soybean paste, which he now calls *Tao-tjiung (Bohnenbrei) [doujiang],* and says has much similarity with the miso of the Japanese (p. 68 R.7).

Note 1. These two articles by Prinsen Geerligs ushered in the era of scientific research on tempeh by European microbiologists and food scientists.

Note 2. This is the earliest document seen (Dec. 1998) that contains the word "tempeh"–spelled with an "h" on the end. It is also the earliest German-language document seen that mentions tempeh, which it calls "tempeh."

Note 3. This is the earliest German-language document seen (Oct. 2003) that uses the term *milchweisse Flüssigkeit* ("milk-white liquid") to refer to soymilk. Address: Java, Indonesia.

203. Wehmer, Carl. 1896. Aspergillus Wentii, eine neue technische Pilzart Javas [Aspergillus Wentii, a new type of technical mold from Java]. *Zentralblatt fuer Bakteriologie. Series 2.* 2(5):140-51. March 27. [8 ref. Ger]

• ***Summary:*** Contents: General and background. The mold. 3. Physiology of the mold. 4. Comparison with similar mold varieties. 5. Diagnosis: *Aspergillus Wentii* [Wehmer] nov. spec.–a new species of mold.

This new species of mold was observed by Went in the preparation of Chinese-style soy sauce *(Tao Yu,* see vol. 1, p. 248) and Chinese-style soybean paste *(Tao-tjiung* or *Bohnenbrei)* according to the method practised in Java, and was described by Wehmer (XIX.) in 1896. It appears spontaneously on the boiled Soja beans that have been covered with *Hibiscus* leaves, and affects a loosening and disintegration of the firm tissue of the bean. Ten illustrations on p. 151 show different stages and parts of the mold.

Note: This is the earliest document seen (Feb. 2009) that contains the term Tao-tjiung, a term, and perhaps a product, that appears to be between *doujiang* (Chinese-style miso) and *tao-tjo* (Indonesian-style miso). Address: PhD, Privatdozenten an der Technischen Hochschule, Hannover.

204. *Bulletin van het Koloniaal Museum te Haarlem.*1896. Naamlijst van Indische nuttige gewassen, die in gedroogden staat in het Koloniaal Museum te Haarlem zijn tentoongesteld [A list of the names of useful Indonesian

crops, which are exhibited in the dried state at the Colonial Museum in Haarlem]. No. 12. p. 48-60. March. [Dut]

• ***Summary:*** The plants are listed alphabetically by scientific name. On page 59 we read: "Soya hispida Mönch, fam. Leguminosae-Papilionaceae. *Soja-plant. Katjang kadelé."*

Also discusses: (1) *Arachis hypogaea. Aardnoot. Curaçaosche amandel. Katjang tanah.* Groundnuts. (2) *Sesamum Indicum. Sésamé. Widjen.* Sesame seeds. (3) *Voandzeia subterranea. Madagascar-aardnoot. Katjang bogor.* Bambarra groundnuts.

205. Scott, Charles Payson Gurley. 1897. Malayan words in English. *J. of the American Oriental Society* 18(1):49-124. Jan/June. See p. 65-67.

• ***Summary:*** For details see the 1897 book of the same title by the same author.

The following words do *not* appear in this book: *kedelai, kedele, tahu, taosi,* or *toyo.*

206. Davenport, E. 1897. The cow pea and the soja bean. *Illinois Agricultural Experiment Station, Circular* No. 5. 4 p. Dec. 1.

• ***Summary:*** "The cow pea, which is essentially a bean, and the soja bean, which is a pea, are so similar in nature and use as to be closely associated in the public mind and to make it expedient to treat of them in close connection. Both are natives of Southeastern Asia, where the seed is used principally as human food and the vines as stock food. In this country they are used almost exclusively for stock."

"The cow pea is more spreading, makes more hay and of better quality, because the soja bean, though very upright, has a woody stem, and drops its leaves badly... The cow pea succeeds best in the South... The soja bean has been but recently introduced from Japan, succeeds best in the North and fails utterly in the far South. Both may be sown either broadcast or in drills, but both yield more seed from drills. Both enjoy good land, but will grow upon land 'too poor to raise anything else.'... The cow pea has more than 60 varieties ranging from two to five months for maturity, and from upright to trailing in habit; the soja bean has few varieties and they are all upright."

Table 1 shows the composition and digestibility of the cow pea and the soja bean (green, hay, and seeds) in comparison with that of Indian corn. The hay from soja beans is inferior for reasons given above.

"The two common varieties of soja beans are the Black Medium and the Early White, or Improved White. Of these the first seems to give the ranker growth of vines and the latter the heavier yield of seed." Address: Director of the Station, Urbana, Illinois.

207. Angell, Stephen H. 1897. Soya as food and fodder. *Consular Reports [USA]* 55(207):551-52. Dec. [2 ref. Eng]

• ***Summary:*** A remarkable article about all aspects of soybeans and soyfoods. It begins: "The following is a translation from an article by M. Henri Fortune, the well-known French agriculturist. 'There exists a plant extensively cultivated throughout China, Japan, Cochin China, and Tonquin, of which the culture on clay and flinty clay lands would be an excellent experiment for agriculturists and persons interested in the progress of agriculture. This plant acclimatizes perfectly in Belgium.

"'It is employed in the above countries as a food and for divers other purposes. Transformed by cooking into a pulp, which is mixed with salt and rice, we obtain the 'miso,' which constitutes the regulation breakfast of the Japanese. I have eaten this preparation in Yedo [Edo, Tokyo] in 1892, and I found it excellent in taste and very nourishing.

"'Mixed with barley, fermented with water and pressed, this product yields a sirup known as the "soya," which is, so to speak, the unique sauce for all and every Japanese dish, and is employed in such large quantities that the works in the town of Nagasaki have a yearly production of 2,000 tons. The soya also yields a very superior quality of oil, which advantageously replaces olive oil.'"

"'The bread made from the flour of the soya is as good as cake without sugar, and is very appetizing, and is not to be compared with gluten bread, which constipates.'" Fortune believes that 'soya bread is twice as nourishing as wheaten bread, five times as poor in starch, and ten times as rich in fatty materials, and, once its qualities are fully known, the soya may be pronounced the bread of the future.' He recommends the use of soya in bread and biscuits for diabetic diets.

"'In China, the soya replaces milk, which the Chinese do not drink at all. To make this milk, the grain must be crushed, put in a sieve, water slowly poured over it, and a product obtained having all the qualities of milk.

"'The cheese made from soya is delicious. The grain is softened in water and pounded in a mortar. The pulp compressed in a cloth gives two parts; that which is hard is used to feed poultry, etc., and the other, which passes through the cloth, is albumen, and is put on the fire, the curds separated with the aid of rennet, and, when coagulated, a little salt is added.'"

Of green vegetable soybeans he writes: "'We have a project in hand to call together the principal Paris restaurant keepers this winter, to allow them to partake of this new vegetable, which will advertise it throughout the world under the patronage of such substantial connoisseurs.

"'In a few years hence, one will buy soya at the grocers, as to-day one buys beans. It is an excellent substitute for hay, and keeps horses in good condition, and cows, when fed on it, will yield at least 20 per cent more milk daily than when fed on ordinary hay.

"'The soya produces per hectare (2.471 acres) from 2,500 to 3,000 kilograms (5,512 to 6,614 pounds) of seed, especially if phosphate fertilizers are sufficiently employed.'"

Note: This is the earliest document seen (Feb. 2001) concerning soybeans in Belgium, or the cultivation of soybeans in Belgium. This document contains the earliest date seen for soybeans in Belgium, or the cultivation of soybeans in Belgium (Dec. 1897). The source of these soybeans is unknown. Address: Commercial Agent, Roubaix, France July 13, 1897.

208. Porter, Noah. ed. 1897. Webster's international dictionary of the English language. Springfield, Massachusetts: G&C Merriam Co. 2011 p. 30 cm.

• ***Summary:*** "Soy (soi) n[oun]. (Chinese shôyû) 1. A Chinese or Japanese liquid sauce for fish, etc., made by subjecting boiled beans (esp. soja beans), or beans and meal, to long fermentation and then to long digestion in salt and water. 2. (Bot[anical]). The soja, a kind of bean. See Soja."

"Soja (sôja or sôya). n[oun]. (Bot.) An Asiatic leguminous herb (Glycine Soja) the seeds of which are used in preparing the sauce called *soy."*

"Catchup, or catsup (Probably of East Indian origin because it was originally a kind of East Indian pickles). A table sauce made from mushrooms, tomatoes, walnuts, etc. (Written also *Ketchup)."*

Note: At the entries for Ketchup and for Catsup, it says, "See Catchup." Address: Springfield, Massachusetts.

209. Scott, Charles Payson Gurley. 1897. The Malayan words in English. New Haven, Connecticut: The American Oriental Society. 93-144, 49-124 p. See p. 64-67. Index. 25 cm. [73* ref]

• ***Summary:*** The word "ketchup" is discussed in detail (p. 64-67). It is a well-known name for various kinds of sauces. The word *catchup,* which first appears in English in 1690, is defined as a "high East Indian Sauce." This word is found in Malay as *kechap* or *kichap,* and in Dutch transliteration as *ketjap.* It is also found in Lampong as *kichap* and in Sundanese as *kechap.* In Malay dictionaries from 1884 to 1895 it is defined as soy [sauce], Japanese soy [sauce], or indigenous/native soy [sauce]. The earliest Sundanese entry found (Rigg 1862) states: *"Kéchap,* Catchup, a dark coloured sauce prepared by the Chinese."

But what is soy? The word comes from the Japanese *shô-yu* (Hepburn 1867). The Chinese form, in Mandarin, is *sh'-yiu* (Williams 1874) or *shi-yu* (Doolittle 1872), Canton *shi-yau* (Chalmers 1870; Williams 1856), Ningpo *tsiang-yiu* (Morrison 1876). The Chinese forms are probably original.

Other words that have come into English from Malay or other languages of the Malay archipelago (Javanese, Lampong, Sundanese, etc.) include: agar-agar (a sea-weed), amuck (frenzied, homicidal rage), bantam (a dwarf fowl), batik (spotted cloth), catchup (see ketchup), cockatoo (a parrot), compound (from campong, a village), gecko (a lizard), gingham (cotton cloth), gong (instrument of sound), gutta-percha (a gum or resin produced by a tree), junk (a boat), kachang (a legume), ketchup (a condiment), lorikeet (a parrot), lory (a parrot), orang-utan (primate animal), padi (rice), picul (a weight), rattan (part of palm stem used for walking sticks and wickerwork), sago (pith of a palm), sambal (a curry).

Note: Reprinted from the *Journal of the American Oriental Society* vol. 17 (1896) and vol. 18 (1897).

210. *Tropical Agriculturist (Ceylon).* 1898. The soy beans. 17(7):460. Jan. 1. [1 ref]

• ***Summary:*** "The Madras Government sends us a paper showing how Surgeon-Lieutenant -Colonel W.G. King, Sanitary Commissioner for Madras, addressing the District Medical and Sanitary Officer, Vizagapatam, the Deputy Collector of Bellary and the Tahsildar of [nearby] Saidapet [Tamil Nadu], on 8th September 1897, says:

"I have the honour to forward herewith __ oz of soy beans, with the request that you will kindly cause them to be sown in any suitable place where they can be carefully watched as to progress of growth, and that you will oblige me by stating the nature and amount of crop obtained and whether you think the beans can be grown successfully in your district from the experience so obtained. I need not remind you that the 'Soy bean' is probably the most nutritious form of readily assimilable pulse at present known, and that, should it prove possible to introduce it widely in this Presidency, it would prove of great advantage in jail administration and also to the poorer classes generally... In asking you to kindly undertake the experiment, I may state that it was only after long and persistent search in India and Burma that I have ultimately obtained specimen."

"Very few vegetable products are so rich as this bean at once in albuminoids and in fat or oil, the former constituent amounting on the average to 35%, and the latter to 19... In China and Japan three preparations are extensively made from the soy bean. Soy sauce is the best known of these, but more important are the soy or bean cheeses, and a kind of paste. The beans are sometimes pressed for the sake of the oil they yield; the residual cake forms an extremely rich cattle food, containing as it does 40 per cent. of flesh-formers and 7 per cent. of oil. The Soy bean may also be grown as a fodder plant. If cut just when the pods are fully formed, it makes an excellent hay, superior to that of the lentil."

211. Essais agricoles et industriels faits en Cochinchine depuis la fondation de cette Colonie jusqu'en 1897 [Agricultural and industrial trials conducted in Cochin

China since the foundation of this colony in 1897]. 1898. Saigon, Vietnam: Imprimerie Commerciale Rey. See Vol. 2, p. 190-92. [Fre]*

• ***Summary:*** See the chapter titled *Fromage de pâte de haricots* [Fermented tofu], by Tran, Nguyen Hanh.

212. Koningsberger, J.C. 1898. Eerste overzicht der schadelijke en nuttige insecten van Java [First survey of the destructive and useful insects in Java]. *Mededeelingen uit 's Lands Plantentuin (Buitenzorg)* No 22. 53 p. See p. 16, 20-21, 36, 51-53. [22 ref. Dut]

• ***Summary:*** The following insects are mentioned in connection with soybeans *(Kedeleh; Soya hispida,* Moench): 74. *Siriocauta [Maruca] testualis,* Led.; 98. *Creatonotus lactineus,* Cr.; 99. *Creatonotus interruptus,* Gmel.; 196. *Psylloides* spec.

Pages 49-51 contain an index of the plants on which various insects live. Note 1. This is one of the three earliest publications on insects which attack soybeans.

Note 2. *'s Lands Plantentuin* is the botanical garden at Buitenzorg, Java.

213. Mayer, Leendert Theodorus. 1898. De javaan als landbouwer en veefokker [The Javanese people as farmers and cattle breeders]. Batavia [Jakarta]: Albrecht & Co. vii + 187 + ii p. 22 cm. [Dut]*

• ***Summary:*** Mayer was born in 1851. This book is bound with: Maijer, L. Th. 1894. De Jaavan, als mensch en als lid van het Javaansche huisgezin. Batavia-Solo, Albrecht & Rusche.

214. Tran, Nguyen Hanh. 1898. Fromage de pâte de haricots [Fermented tofu]. In: Essais Agricoles et Industriels Faits en Cochinchine Depuis la Fondation de Cette Colonie Jusqu'en 1897. 2 vols. Saigon, Vietnam: Imprimerie Commerciale Rey. See Vol. 2, p. 190-92. [Fre]

• ***Summary:*** At top of title page of this volume 2: "Publications de la Société des Études Indo-Chinois de Saigon–No. 1." In middle of title page of volume 2: "Extraits des Bulletins du Comité Agricole et Industriel (1865-1883) et de la Société des Études Indo-Chinois (1883-1896)."

With the haricot bean [soybean] *(dau-nanh* in Annamite) the indigenous people prepare a series of foods which are consumed abundantly in this country [Vietnam] and in China. It could be that with carefully-made preparations, Europeans could make use of it [the bean].

The soybean contains an abundance of a milk-like substance with which the followings cheese can be prepared.

1. Tofu *(Dau hu)*–A type of cheese that is eaten the day it is made. It has a consistency somewhat similar to that of Swiss cheese. It is widely used as an ingredient in other dishes, seasoned with either sugar or salt, or in cooked foods, because heat does not damage it.

2. Pressed tofu *(Dau-hu-cu.ng; [cu.ng* means "hard"])–Used in the same way as No. 1, it is always cut into pieces and cooked with other ingredients. Having a firmer consistency than No. 1, it can be kept for a day or so.

3. Yuba *(Dau-hu-ky;* [literally "bean curd skin"])–This cheese comes in dry sheets. It is cooked in other culinary preparations. It serves as a mild seasoning and as a wrapper like some Italian pastas.

4. Fermented tofu *(Dau-hu-nhan; [nhan* means "bitter"])–This fermented and salted cheese will keep for a month or even a year. It is eaten with bread, with cooked rice, or even with meats.

5. Chao–Another fermented and salted tofu, but sold in an alcoholic brine, and diluted to make a soft paste. Used in much the same way as butter. It sometimes accompanies starchy foods (grains, bread, etc.) and sometimes it is added to meats or fish.

6. *Dau-hu-oa*–A creamy cheese which is eaten with sugar or water sweetened with sugar. Note: These are soymilk curds *(doufu-hua* in pinyin). Also called *Tao pho* (in Hanoi). *Dao-hu hoa* (in Hue). Tau-hu (Saigon).

The next section describes how to make each of the six different types of tofu and yuba.

1. Tofu–As with other cheese, each of these must be prepared with care. Start by crushing soybeans into pieces–3 or 4 pieces per bean at most, then soak in water for 18-20 hours. Stir from time to time so that the hulls rise to the surface, then decant then off. Grind the rest finely to obtain a fluid puree. Bring to a boil. After 15 minutes, add sea salt to coagulate the liquid. The sea salt can be replaced by gypsum, but the result will not be the same.

2. Pressed tofu–Prepare like No. 1 but cook longer and press in a form with a very heavy weight for several hours until it is about 1 cm thick and of firm consistency so that it will last for several days.

3. Yuba–Lift off the thin films that form on the surface of hot soymilk with a fork. Let them dry in the sun. The films, which are either white or yellow, will last for a year, if care is taken to dry each film slowly and for a long time; otherwise they will turn red.

4. Salted, fermented tofu (Da-hu nhan)–Cut tofu in pieces a little larger than one's thumb and spread them on a plate covered by a banana leaf. According to the season, leave them here for 2-3 days or more, until each piece is entirely covered with mold. Wipe off the mold and layer them in a deep crock. Between each later add powdered salt. Hermetically seal the mouth of the crock / vase and expose it either to the rays of the sun or to a source of heat; continue this for 10-15 days, until the cheese is ready. It is an excellent condiment.

5.–Chao. The complex fermentation is described in detail.

6. Soymilk curds before they are pressed. Very light and delicate, with subtle sweetness.

215. *USDA Farmers' Bulletin.*1899. Experiment station work, X: The soy bean as a feeding stuff. No. 97. 32 p. See p. 13-15.

• ***Summary:*** "The soy bean, an annual leguminous plant, has been grown from the earliest times in Japan, China, and other countries of southeastern Asia. It is said to have been introduced into this country from Japan in 1854, but for a long time it was cultivated to only a limited extent, principally in the South. In comparatively recent years, however, improved varieties, adapted to varying climatic conditions, have been introduced, and the cultivation of the plant has spread quite rapidly, its range of successful culture being almost as wide as that of corn. Many of the stations have experimented with the bean and thus called attention to its merits, and the Division of Agrostology of this Department has issued a Farmers' Bulletin (58) which discusses in detail the characteristics, varieties, and culture of the plant and its value as a food and feeding stuff.

"The Japanese and other Orientals grow the plant mainly for the seed which are used in the preparation of a variety of foods. The bean is rich in nutritive material and makes a valuable food. It has a high protein content, and hence serves well to balance the diet of people, such as the Japanese, who do not eat much meat. There is no special demand for such a food in this country, however, and so the soy bean is likely to be, at least for many years to come, of most value as a feeding stuff. It serves admirably to balance the rations fed to stock. The plant may be fed as green fodder, hay, or silage; or the beans may be fed in the form of meal..."

A table shows the food constituents of soy beans as compared with other feeding stuffs. The percentage of water, ash, protein, fiber, nitrogen-free extract, and fat is given for: "Green soy bean (whole plant), green corn fodder, soy-bean hay (with pods and seeds), dry corn fodder (with ears), soy-bean straw (after thrashing), corn stover (plant without ears), soy-bean seed, corn kernels, soy-bean meal, pea meal, corn meal, cotton-seed meal, linseed meal (new process), soy-bean silage, clover silage, corn silage, soy bean and corn silage, soy bean and millet silage."

"The Kansas Station has probably experimented with the soy bean more extensively than any other station..." Address: Washington, DC.

216. T. 1899. "Soy." *Notes and Queries (London)* 4:526. Dec. 23. 9th Series. [2 ref]

• ***Summary:*** Responding to notes on "Soy" in this periodical (9 Dec. 1899, p. 475) the author states: "In Java called *Soya.* Query, from Soya, in Java?"

217. Haury, Alfred. 1899. Die Schimmelpilze und ihre industrielle Anwendung [Molds and their industrial application]. *Oesterreichische Chemiker-Zeitung* 2(23):605-11. Dec. Series 2. [24 ref. Ger]

• ***Summary:*** Discusses three genera of molds: *Penicillium, Aspergillus,* and *Mucor.* Gives details and a review of the literature on the use of *Aspergillus* species of mold for the production of saké, koji, soy sauce, miso, and various other East-Asian foods. In 1896 a book titled *Les moisissures (The molds),* by Calmette was published in Brussels, Belgium; he discussed sake, the chemical composition of koji, and the action of its diastase enzyme. "It was a Japanese named Jokichi Takamine who first had the idea of using koji in place of malt in American and European distilleries. In 1889 in the USA he was issued a patent on the process for using koji (or a mixture of koji and moto) in a fermentation to make of product containing 15-18% alcohol. The process was first tested in practice at Peoria, Illinois, is a distillery of the Distilling and Feeding Co., but not with the results that all the world had expected. Both Delbrueck (1894) and Saare (1895) had the opportunity to the process on the spot in 1894; in the opinion of Delbrueck koji is suited for use in place of malt in the saccharification of starches. For the production of koji, Takamine uses an inexpensive wheat bran instead of the typical rice. The process is then described in detail.

*Aspergillus oryzae* plays a key role in the production of two East-Asian foods: soy sauce *(Shoyu-Sauce)* and miso. The former is made with wheat, soybeans, salt, and water; miso is made from soybeans, koji, salt, and water. For details see Kellner's publication "On Saké, Shoyu and Miso." In Java, another species of Aspergillus, namely *A. Wentii* is used to make their soy sauce *(Sojasauce),* according to Prinsen-Geerligs.

Also discusses the use of Mucor species, such as *Amylomyces rouxii,* in the production of spirits or brandy from dehulled rice. In 1892 Calmette was head of the Pasteur Institute in Saigon; today he is director of the Pasteur Institute in Lille, France. He has taken considerable interest in Mucor species, and published the results of his research in his 1896 book. Colette has a factory at Seclin near Lille. Colette and Boidin have formed the Amylo Society *(Société d'Amylo)* in Lille. Address: Chemist, Austria.

218. Stoddard, W.H. 1899. Soy, or Soja beans. What they are,.... how to grow them, and what they are good for. Carlinville, Macoupin County, Illinois. Published by the author. Printed by Enquirer Printing Establishment. 6 p.

• ***Summary:*** "This is an extract from a paper read before the Macoupin (pronounced muh-KOO-pun) County Farmers' Institute, Dec. 21, 1898. It was mentioned in letter by Mary H. Stoddard, 25 Nov. 1944. On page 2 is inscribed: Compliments of Mary Hoyt Stoddard Best (Mrs. Earl),

daughter of William H. and Mary V. (English) Stoddard. 202 Sue St., Carlinville, Macoupin Co., IL 62626. July 28, 1975.

The publication begins: "To our brother farmers and stock men. In answer to the many inquiries received, asking for information about the soja beans, we have prepared the following circular to answer some of the many questions, giving a few of the facts we have learned about them from the reports of several state experiment stations, and from our own personal experience in growing them for a feed, seed, and fertilizing crop. All intelligent farmers know there is an urgent need for a grain and forage crop other than corn. A crop rich in nitrogen and fat. A crop that can be grown easily, quickly and with little or no extra cost over that of corn. If possible, one that will *not* exhaust the soil like wheat, oats and corn, but rather add to its fertility."

The author discusses clover, alfalfa, and cow peas. He says he has obtained a yield of 10 bushels "with less than half a stand." He accurately reviews the nutritional value of soy beans compared to available supplements. "The last and best of this trio of legumes is the soy bean, or as it is generally but incorrectly called, the 'soja' bean. This plant is a native of South-Eastern Asia, growing wild in Japan, Java and parts of China. In Japan, where the greatest use has been made of it as food for man and beast, there are many varieties, like our corn with us, but only a few have been introduced into this country. Here it is divided into three classes, the Early Dwarf, the Medium Early and the Late Mammoth. Of these three there are white, yellow, green and black seeded varieties, which differ but little in value. They are of an upright, branching growth. None of the varieties ever run or vine like the cow peas.

"The Early Dwarf grows from 16 to 24 inches high, matures seed fit to feed green in 69 to 75 days, and ripens fit to cut for a seed crop in 80 to 90 days.

"The Medium Early varieties grow 3 to 4 feet high and are a few weeks later than the Early Dwarf.

"The Late Mammoth grows 5 to 7 feet high, but seldom forms seed north of the Ohio river, and only ripens in our southern states. It is worthless here except for hay or green forage for pasture, or to plow under for fertilizing. The Early Dwarf has been grown successfully as far north as Wisconsin and Minnesota, where corn is a doubtful crop.

"No soil is too poor for it to thrive and grow. It even yields a fair crop on ground too poor to grow clover. Unlike cow peas, which are a failure as a seed crop on rich land, it stands prosperity, and instead of running to vines, it simply increases alike its yield of forage and seed. So far no insect is known to injure the vines while growing. Chinch bugs never touch it. Drouths that burn up clover and cow peas and fire corn, have little effect on it. Rains that make "little yellow corn" and rot off cow pea vines, do not injure the sojas. If cut for hay or seed and lying on the ground, rains that would utterly ruin clover, corn fodder or cow peas, rarely injures the sojas.

"This fall part of my own crop was cut and lay on the ground all through the two weeks' rain in October, and I never lost a handful of vines or a pint of seeds from that cause. The little, fine, velvety hairs on stalk, leaf and seed-pods, seem to hold the water at a distance till it can dry out. These same little hairs on the green, growing plant attract and hold the dew till the large pulpy leaves can absorb the nitrogen it contains, transferring it through leaf, stalk and the mass of thread-like surface roots to the soil which supports it, thus paying its rent, till the ground is richer after growing the crop than it was before planting."

"Now for the food value of the seeds: Of protein or food nitrogen, which is as necessary to the growth and health of animals as it is to plants, forming blood, bone and muscle, Soja bean seed contain 34 per cent; ground linseed oil-cake contains 32 per cent; cow peas 20 per cent; wheat and oats each 11 per cent; corn 10 per cent; wheat bran and ship stuff 15 per cent; artichokes 2½ per cent; sugar beets 2 per cent. Of fat, which goes to make heat, life and energy in the animal, these same foods contain: Soja beans 17 per cent; linseed oil-cake meal 3 to 7 per cent; corn 5 per cent; oats 5 per cent; wheat 2 per cent; bran and ship stuff each 4 per cent; cow peas 1 4-10 per cent only; artichokes two-tenths of 1 per cent; sugar beets 2 per cent."

"One of our most successful cattle feeders, Mr. J.F. Clark, of this county, reports having pastured the past season his field of sojas when summer feed was short, and says he never had cattle thrive and fatten faster on any kind of feed.

"Mr. E.G. Duckles, of Chesterfield, cut and fed his green sojas to his dairy cows the past summer with a quick and decided gain both in quantity and quality of the milk and butter.

"In my own experience I can say I never tried a better feed for calves or shoats [shotes], or brood sows and pigs, than the sojas either green or dry. They fairly go wild over the mature green beans if offered to them when grass is dry and before corn is ready to feed."

"Prices of seed for 1899: Early Dwarf Sojas, $2.50 per bushel; $1.50 per half bushel; $1.00 per peck. Medium Early Sojas, $2.00 per bushel; $1.35 per half bushel; $0.75 per peck." Note 1. No price is given for Late Mammoth Sojas.

At the end of the leaflet is a full-page ad: "Macoupin County Stock and Seed Farms. W.H. & C.L. Stoddard, proprietors, Carlinville, Macoupin County, Illinois. Our specialties: Ohio Improved Chesterwhite Swine, Soja Beans, and 'Big Macoupin' White Seed Corn."

Note 2. This is the earliest document seen (June 2007) concerning soybeans in Minnesota, or the cultivation of soybeans in Minnesota. This document contains the earliest

date seen for soybeans in Minnesota, or the cultivation of soybeans in Minnesota (Dec. 1899).

Note 3. This is the earliest English-language booklet seen (Aug. 2001) about soybeans, i.e. with the word "Soy" (or any of its cognates) in the title.

Note 4. This is the earliest English-language document seen (Oct. 2006) that uses the term "the sojas" to refer to soybeans.

Note 5. This is the earliest document seen stating that William H. and C.L. Stoddard of Macoupin County Stock and Seed Farms are selling Soja Beans.

Note 6. This is the earliest document seen (Sept. 2004) that mentions the soybean varieties Early Dwarf or Late Mammoth.

Note 7. *Merriam-Webster's Collegiate Dictionary* (1998) defines shoat (derived from Middle English *shote),* a term first used in the 15th century, as "a young hog usually less than one year old." Address: Farmer, Carlinville, Macoupin County, Illinois.

219. Douglas, Carstairs. 1899. Chinese-English dictionary of the vernacular or spoken language of Amoy, with the principal variations of the Chang-chew and Chin-chew dialects. New edition. London: Presbyterian Church of England. xix + 612 p. 27 cm. [2 ref]

• ***Summary:*** The Preface begins: "The vernacular or spoken language of Amoy, which this dictionary attempts to make more accessible than formerly, has been also termed by some 'The Amoy Dialect' or 'The Amoy Colloquial;' and it particularly coincides with the so-called 'Hok-kien Dialect,' illustrated by the Rev. Medhurst in his quarto Dictionary under that title."

On page 58, under the character for *chiang–chiu* a sort of sauce or condiment. *tau chiu* sauce made from beans and flour. *chiu-chheng* the thinner part of *tau chiu. koan-kiu-chiu* this sauce seasoned with cayenne pepper. *chiu-liau* various sorts of vegetables preserved in *tau chiu. chiu-koe* pumpkins so preserved. *chiu-kiu* ginger so preserved. *chiu-mia-chia* wheaten dough balls in this sauce.

On page 156, under the character for *hu–tau-hu* bean curd shaped into squares (from the pulpy "tau-hoe"), but not yet pressed. See *tau.*

On page 176, under the character for *iu* meaning oil or fat. On the last line of the right column–*tau-iu* soy [sauce]. *e-tau-iu* dark-colored soy. *seng-iu* the common oil from ground-nuts. *moa-iu* oil from hemp-seed.

On page 423, under the character for *shi–si* salted vegetables and fruits. *tau-si* pickled and salted beans [soybeans]. *tau-si-pe* black beans [soybeans] boiled, dried, and kept till mouldy, to be made into soy [sauce]. *tau-si-phoh* beans from which soy has been made, broken down small. *mi-si* (Cantonese) = *tau-chiu* (Amoy), sort of salted sauce.

On page 480, under the character for *tou–tau* peas or beans; pulse. *tau-khe* bean cake from North China, used as manure. *tau-iu* soy (see iu). *tau-chiu* a thick salt sauce made from pulse. *tau-si* salted beans. *tau-hoe* soft bean curd not yet pressed or shaped. *tau-chiu* same. *tau-hu* bean curd shaped but not yet pressed. *tau-hu-phe* same, but made into thin sheets for wrapping around eatables. *teh tau-hu* to shape the *tau-hoe* into pieces of *tau-hu. tau-koa* bean-curd that has been pressed in a cloth. *tau-ju* same cut into smaller squares and salted. *tau-kiam* (Cantonese) same. *tau-che* refuse from manufacture of bean-curd [okara]. *tau-thau* same. *the-tau* = lok-kha-seng, the Arachis, ground-nut, or pea-nut, from which oil is made. *tho-tau* same.

Note: This is the earliest English-language document seen (Nov. 2008) that uses the term "pickled and salted beans" to refer to soy nuggets.

Note 2. The first edition of this book was published in 1873. In 1970 the Ku-T'ing Book Store in Taipei published a photoreprint of the 1899 London edition; it was bound with a Supplement photoreprinted from the 1923 Shanghai ed. (612 p., 27 cm). Carstairs Douglas lived 1830-1877. Address: Rev., M.A., LL.D. Glasgow, Missionary of the Presbyterian Church in England.

220. Heuzé, Gustave. 1899. Les plantes alimentaires des pays chauds et des colonies. 2 ed. [Edible plants of the tropics and colonies. 2nd ed.]. Paris: Librairie Agricole de la Maison Rustique. xii + 381 p. See p. 174-78. 19 cm. Series: Cours d'Agriculture Pratique. [Fre]

• ***Summary:*** The soybean is referred to in French as "Dolic du Japon ou soja." An illustration (non-original, p. 175; by Thiebault, from Carrière 1880) shows the soybean plant (titled *Dolic du Japon ou soja)* and a cluster of pods. Its scientific names are Soja japonica, Sav. or Soja hispida, Moench. Synonyms are Dolic soja, and Dolic à café. A botanical description is given. "Varieties which are most widely cultivated are the yellow soybean (le soja jaune; Soja ochroleuca) and the black soybean (le soja noir; Soja hispida). A sub-race named *soja d'Étampes* is the most widely appreciated in France. It is very productive but it needs 4-5 months to ripen its seeds. The soybean is an annual; it was introduced to France from China by de Montigny under the name *pois olèagineux.* It is successfully cultivated in China, Japan, the Indies, the Moluccas, etc. It is rather easily sold in the green state at various markets. Its principal merit is its ability to resist drought. It needs as much heat as haricots...

"The Japanese transform the seeds of this legume into a puree (tofu; *ten-hu)* or a paste *(miso)* with which they make a sauce (soja), which they use to prepare various seasonings named *shoyu* or *sooju* and *tofu* or *daïzu.*

"Soybean seeds germinate very irregularly and very late in Europe, especially in their second year of existence. An

analysis of the soybean seed on a moisture-free basis, conducted by Mr. Joulie, is given.

"The soybean is richer than wheat in fatty and proteinaceous materials. When one prepares dry soybeans, it is useful to soak them in water for 8-10 hours before cooking, for they are naturally very hard. They are also eaten in the shelled green state.

"The varieties with branches [les variétés à rames] are not yet cultivated in Europe." Gustave Heuzé lived 1816-1907. Address: Membre de la Société Nationale d'Agriculture. Inspecteur Générale Honoraire de l'Agriculture.

221. Paillieux, Auguste; Bois, D. 1899. Le potager d'un curieux: Histoire, culture et usages de 250 plantes comestibles, peu connues ou inconnues. Troisième édition entièrement refaite [The inquisitive person's kitchen garden: History, culture, and uses of 250 edible, little-known or unknown plants. 3rd ed. completely redone]. Paris: Librairie Agricole de la Maison Rustique. xvi + 678 p. See p. 575-625. Illust. Index. 25 cm. [2 ref. Fre]

• ***Summary:*** The information about soy in this 1899 third edition is very similar to that in the 1892 second edition, but the page numbers are different. Contents of section on soy: Introduction: Work of the Society for Acclimatization with soy, structure of this book, excerpts on soy from past issues of the *Bulletin the Society for Acclimatization.* Botany of the soybean. 1. Soy in Japan: Kaempfer's writings, including miso and shoyu, Japan at the World's Fair of 1878, miso, shoyu, tofu. 2. Soy in Cochin China: Black soybeans, various foods. 3. Soy in Cbina: Soy oil, tofu and fermented tofu, soy sauce, other uses. 4. Soy in Austria-Hungary. 5. Soy in France: Historical, varieties, cultivation, utilization.

The author's full name is Nicolas-Auguste Paillieux (lived 1812-1898; he died on 8 Feb. 1898 at age 85). An illustration (non-original line drawing; p. 576) shows a mature soybean plant bearing many pods, plus a close-up of three pods to the lower right of the plant (from an original in J.R.F. 1882). Note: Desire Bois lived 1856-1946.

Other related or interesting subjects (listed alphabetically): Adzuki (p. 224). Amande de terre: See Chufa. Amarantus / Amarante (p. 14-16). Arachide / Arachis hypogæa (p. 32-35). Chufa / *Cyperus esculentus / souchet comestible* (p. 571-75). Daikon (p. 173). Gado-gado [Salad with peanut dressing] (p. 224). Gobo (p. 45). Jinenjo (p. 246). Katakuri (p. 336). Koniaku [konnyaku] (p. 289). ko / kudzu (p. 300-315). Mioga (p. 396). Moyashi (p. 226). *Phaseolus radiatus* / azuki (p. 222-24). Pistache de terre: See arachide. Quinoa (p. 523-25). Udo (p. 448). *Voandzou / Voandzeia subterranea* (p. 650-53). Wasabi (p. 420). Yama gobo (p. 496). *Zingiber mioga* (p. 396). Address: 1. Honorary member of the Council of the Societe Nationale d'Acclimatation 2. Asst. de la Chaire de Culture, Museum d'Histoire naturelle de Paris.

222. Stoddard, W.H. 1900. Soy or soja beans and cow peas for feeding and fertilizing. *Independent Press (Griggsville, Illinois)* 21(9):1, 4. Jan. 3. Paper read at the Farmers' Institute.

• ***Summary:*** Contains a biography of W.H. Stoddard, soybean pioneer in Illinois. He argues that the three best crops to restore depleted soil on farms are the legumes clover, cow peas, and "soy or soja beans." Moreover, these can combine with a grain crop as fodder for livestock. "I think the best of this trio of leguminous plants is the soy bean or as it is generally but incorrectly called, the soja bean. This plant is a native of Southeastern Asia, growing wild in Japan, Java and parts of China. In Japan, where the greatest use has been made of it as food for man and beast, there are many varieties, like our corn with us, but only a few have been introduced into this country. Here it is divided into three classes, the Early Dwarf, the Medium Early and the Late Mammoth. Of these three there are white, yellow, green and black seeded varieties, which differ but little in value of composition for feeding... I prefer the yellow as they have proven more productive of seed and the seeds are larger than the other varieties...

"The Late Mammoth grows 3 to 7 feet high, but seldom forms seed north of the Ohio river and only ripens in our southern states. It is worthless here except for hay or green forage for pasture or to plow under for fertilizing. The Early Dwarf has been grown successfully as far north as Wisconsin and Minnesota where corn is a doubtful crop.

"No soil is too poor for it to thrive and grow. It even yields a fair crop on ground too poor to grow clover. Unlike cow peas, which are a failure as a seed crop on rich land, it stands prosperity, and instead of running to vines, it simply increases alike its yield of forage and seed. So far no insect is known to injure the vines while growing. Chinch bugs never touch it. Drouths that burn up clover and cow peas and fire corn, have little effect on it. Rains that make 'little yellow corn' and rot off cow pea vines, do not injure the sojas. If cut for hay or seed and lying on the ground, rains that would utterly ruin clover, corn fodder or cow peas, rarely injures the sojas...

"My sojas with less than half a stand, averaged 10 bushels per acre, while crops, of 25 to 60 bushels are common, average crops, according to soils and seasons, and over 100 bushels per acre have been grown at the south. Grown for forage or hay it yields 5 to 15 tons green and 2 to 5 tons dry. As hay the sojas are ¼ richer feed than clover, 3 times richer than field corn cut green purposely for fodder...

"As a dairy feed they are of the greatest value, giving an additional amount of milk and butter and also adding to the quality of the latter...

"In my own experience I can say I never tried a better feed for calves or brood sows and pigs than the sojas, either green or dry. They fairly go wild over the mature green

beans if offered to them when grass is dry and before corn is ready to feed.

How to plant, cultivate, harvest, and thresh the sojas: "Plant about a peck per acre in drills with a corn planter in rows 20 to 30 inches apart... To harvest the Early Dwarf is quite a task, as the seed pods set so low on the stalks and they are so tough and hard when ripe it is impossible to cut them with a machine. It has to be done by hand with corn knives or hatchets. Cut as soon as the pods turn yellow. Catch the tops with one hand, cut and throw into small piles to cure. Dry thoroughly and then thresh or store in a barn; or better, in open shed till ready to thresh or feed. If many are grown, they are best threshed with a common grain separator, removing the concave and putting in a board in its place. Don't use a wind-stacker machine if you can get any other, as they have to run too fast to do good work. If ripe, don't cut with a scythe; it shatters the beans and does not cut low enough. Don't use a hoe, the handle strikes the vines, shatters seeds and the blade digs up clods of dirt to get mixed with the seeds."

The author concludes: "Don't feed like it was corn fodder or hay; remember they are very rich, condensed feed. Try them. Write to the secretary of agriculture, Washington DC, for Farmers' Bulletins Nos. 16, 22 and 58. They are sent free of charge to any address. No. 58 is specially valuable as it is devoted entirely to the topic of soy beans as food for man and beast, the different varieties and how to grow them."

Note 1. This is the earliest document seen (Jan. 1998) that uses the word "separator" or the term "common grain separator" in connection with soybean production. Address: Carlinville, Illinois.

223. Sack, J. 1900. Samenstelling van Indische voedingsmiddelen: Eerste serie (I-L) [Composition of Indonesian foods: First series (1-50)]. *Bulletin van het Koloniaal Museum te Haarlem* No. 22. p. 76. March. Fold-out table bound at the end of No. 22. [1 ref. Dut]

• ***Summary:*** This is the first such table published in this Bulletin. The second table by J. Sack was published in Bulletin No. 23 (Nov. 1900). Dr. M. Greshoff supervised the work. The composition of fifty Indonesian foods is given, with two lines of notes in one wide column after each. Each food is numbered: 1-50. Soy-related foods are: 15. Soybeans *(Katjang kadelé; K.M.; Sojaboon;* white soybeans). 16. Soybeans *(Katjang kadelé; H.).* Note No. 2 states: "The products marked with 'K.M.' come from the Koloniaal Museum; those marked with 'H.' *[=Handel]* are taken, with supervision, from trade.

The composition of the first soybean seeds (no. 15) are: Nitrogen 5.60%, protein (Nitrogen x 6.25) 35%, fat 19.20%, carbohydrates 10.20%, fiber *(Vezelstof)* 9.40%, ash 4.36%, and water 15.89%.

Also discusses: 20. Groundnuts *(Arachis).* Address: Assistent bij het Laboratorium, van het Koloniaal Museum te Haarlem [Netherlands].

224. Sack, J. 1900. Samenstelling van Indische voedingsmiddelen: Tweede serie (LI-C) [Composition of Indonesian foods: Second series (51-100)]. *Bulletin van het Koloniaal Museum te Haarlem* No. 23. p. 85. Nov. Fold-out table bound at the end of No. 23. [3 ref. Dut]

• ***Summary:*** This is the second such table published in this Bulletin. The first table by J. Sack was published in Bulletin No. 22 (March 1900). Dr. M. Greshoff supervised the work. The composition of fifty Indonesian foods is given, with two lines of notes in one wide column after each. Each food is numbered: 51-100. Soy-related foods are: 56. Black soybeans *(Katjang kadelé itam; zwarte soja).* 76. Tempeh *(Tempé).* 81. Japanese shoyu *(Japansche soja).*

Also discusses: 57. *Katjang poetih* (Poetih [putih] means "white." A note says this is a type of soybean but we think it is a species of *Vigna).* 58. Katjang ketjipir *(Psophocarpus tetragonolobus).* 67. Sesame seeds. 82. Agar-agar. Address: Assistent bij het Laboratorium, van het Koloniaal Museum te Haarlem [Netherlands].

225. Sack, J. 1900. Samenstelling van één honderd Indische voedingsmiddelen [Composition of one hundred Indonesian foods]. *Bulletin van het Koloniaal Museum te Haarlem* No. 23. p. 68-73. Nov. [Dut]

• ***Summary:*** This is a detailed summary of information published in two fold-out tables by J. Sack, published in Bulletin No. 22 (March 1900) and No. 23 (Nov. 1900). Here, however, the 100 foods are listed in a different sequence–alphabetically by Indonesian name.

Soy-related foods are: 33 and 34. Soybeans *(Katjang kadelé; Glycine).* 35. Black soybeans *(Katjang kadelé itam).* 84. Japanese shoyu *(Soja; Japansche).* 90. Tempeh *(Tempé).*

Also discusses: 1. Agar-agar *(Eucheuma).* 36. Winged beans *(Katjang ketjipir; Psophocarpus tetragonolobus).* 43. Peanuts *(Katjang tanah; Arachis).* 81. Sesame seeds *(Sesam-zaad; Sesamum).* Address: Assistent bij het Laboratorium, in het Laboratorium van het Koloniaal Museum te Haarlem [Netherlands].

226. Boorsma, P.A. 1900. Scheikundig onderzoek van in Ned.-Indie inheemsche voedingsmiddelen. De sojaboon [Chemical analysis of some indigenous foodstuffs in the Netherlands Indies. The soybean]. *Geneeskundig Tijdschrift voor Nederlandsch-Indie* 40:247-59. [18 ref. Dut]

• ***Summary:*** Contents: Literature review. Introduction (Boorsma is living in Java). Chemical composition of indigenous soybeans: Table giving figures (based on Boorsma's original research) for large black, large yellow, small yellow, unripe or immature black soybeans, soy protein *(eiwit in de soja)* or legumine, the oil *(De vette olie),*

analysis of the ash, starch, the black soybean *(zwarte kedeleh),* use of soybeans in Java and Japan. Japanese soya preparations *(soja preparaten):* Shoyu (soja) made with koji, tofu, yuba, miso and natto. Indigenous (Chinese) preparations: Tempeh *(tempe kedeleh),* Indonesian soy sauce *(Ketjap–Bataviasche soja),* tofu and pressed tofu *(Tao-hoe en Tao-koan),* Indonesian miso and soy nuggets *(Tao-tjo en Tao-dji).*

Note 2. This is the earliest Dutch-language document seen (May 2010) that mentions soy nuggets, which it calls *Tao-dji.*

Note 3. This is the 2nd earliest document seen (March 2009) that mentions Indonesian-style miso, which it calls "Tao-tjo." This is the earliest Dutch-language document seen (Feb. 2009) that uses the word "Tao-tjo" to refer to Indonesian-style miso.

This excellent article contains a 4½-page description (the best seen to date) of the traditional process for making soybean tempeh *(Tempe kedeleh).* The soybeans are parboiled, soaked in water for 2-3 days, drained, steamed in a steamer *(koekesan),* spread in a layer several centimeters thick on woven bamboo trays in shelves, and covered completely with banana leaves. They are then inoculated with the *bijang,* which is the "mold containing residues of a previous preparation." This is mixed in here and there, then the trays are covered lightly with banana leaves so as to let in some air. "Rampant growth of the mold soon begins. In the evening the mass is molded a little and after two 24-hour periods one will obtain a coherent cake, which is cut into pieces and taken as is to the market."

The cotyledons are stuck together by a dense mycelium, which has grown into a somewhat white covering. According to Prinsen Geerligs (cited above), the name of the mold is *Chlamydomucor Oryzae.*

During the two days of rampant mold growth, a radical conversion takes place in the components of the seeds; a lot of water, carbonic acid, and heat start to develop... A thermometer inserted into the fermenting mass shows a temperature 10-12ºC above that of the environment.

As the preparation is finished, the banana leaves are taken away; the temperature drops slowly to normal, the rampant mold growth stops, and the mass dries out slightly. In this condition, the tempeh can be kept for several days with spoiling.

When the rampant mold growth is allowed to continue for a third day, simply by leaving the banana leaves in place, the conversion will soon become much stronger as noted by the formation of ammonia. Also poisonous products start to form; a monkey, given a little bit [of overripe tempeh] among his other foods that day was vomiting violently one hour later. Thus we should admit that the stories about poisonings caused by various sorts of tempeh [such bongkrek, made from coconut presscake] probably have some foundation. But there is little fear of this from soybean tempeh.

After microscopic examination, Boorsma concluded that Prinsen Geerligs and others were wrong in stating that (1) the mold hyphae penetrate and dissolve the hard soybean cell walls, and (2) cellulose is decreased during tempeh *(tempe)* fermentation. He studied the chemical and compositional changes at four stages during a 3-day tempeh fermentation; a table shows his findings. He observed that fats and soluble carbohydrates decreased substantially, while nitrogen decreased only slightly. He also discussed the hydrolysis of soybean lipids, and why tempeh is easier to digest than whole soybeans.

Note 4. This is the earliest Dutch-language document seen that uses the term *tempe kedele* or the word *tempe* to refer to tempeh.

On page 258 Boorsma briefly discusses Ketjap (which he called *Bataviasche soja,* or Jakarta soy sauce) and Tao-hoe and Tao-koan (tofu and firm tofu), based on information from Prinsen-Geerlings (for both) and Vorderman (for firm tofu). For each he gives a nutritional composition. On page 259 Boorsma briefly discusses *Tao tjo* and *Tao-dji* (Indonesian-style miso and soy nuggets). Note 5. This is the earliest Dutch-language document seen (Dec. 1999) that uses the term *Tao tjo* to refer to Indonesian-style miso or tauco / taucho.

Note 6. This is the earliest document seen (April 2001) that contains the term *Tao-koan.*

Note 7. This is the earliest Dutch-language document seen (Feb. 2004) that contains the term *natto.*

Note 8. This is the earliest Dutch-language document seen (Oct. 2008) that mentions yuba, which it calls *Yuba* and describes as *een nog vetrijker product dat verkregen wordt bij uitdampen van de roomloog, die zich bij de zooeven genoende boonenmelk aan de oppervlatke verzamelt."*

Note 9. Boorsma was a Dutch naturalist who lived in Indonesia in the early 1900s. Address: Netherlands.

227. Zavitz, C.A. 1900. Report of the experimentalist. *Ontario Agricultural College and Experimental Farm (Guelph), Annual Report* 25:101-29. For the year 1899. See p. 121-22.

• ***Summary:*** The section titled "Soy, Japanese beans" (p. 121-22) begins: "The Soy beans, which are also called Soja beans, have been grown for a great length of time in Japan and in South-eastern Asia... About eighteen years ago Prof. Georgeson, then connected with the Agricultural College in the State of Kansas, imported from Japan fifteen varieties of the Soy beans, with which he conducted practical experiments on the Experiment Station grounds and found that five of the varieties gave good results. These five varieties were imported from Kansas some seven years ago [i.e. in about 1892] for growing in our experimental plots.

The Yellow Soy bean has given decidedly the best results among the five varieties which we obtained from Kansas. A few years ago, the Agricultural College of Massachusetts also imported a number of varieties of the Soy beans from Japan, and three of these have now heen tested in our experimental grounds here at the College.

"The *Yellow Soy* hean which was imported from Kansas has given an average of eight tons of green crop per acre, heing two and one-quarter tons per acre more than that produced from the common beans, and three and one-quarter tons per acre more than that produced from the horse beans. In each of the past three years the *Medium Green* Soy bean has given the largest yield of green crop per acre among the three varieties imported from Massachusetts, but each of these years the Yellow Soy variety has given hetter satisfaction than the Medium Green in yield of crop per acre, although the results in 1898 were practically equal. We hope to grow these two varieties in larger lots, in order that we can compare them thoroughly in regard to their qualities for green fodder and for hay.

"In the production of grain the Yellow Soy variety has produced the greatest yield of each of the tests made at the College. Of the different varieties tested during the past three years, the Extra Early Dwarf is the earliest, the Yellow Soy the second earliest, the American Coffee Berry the third earliest, and the Medium Green is the latest to reach maturity. In many of the localities in Ontario the Medium Green variety of Soy beans would be too slow in maturing to produce seed.

"In the spring of 1899 three varieties were sent out over Ontario in connection with the co-operative work, to find out how these varieties would succeed over the Province. The varieties distrihuted were the Medium Green Soy beans, American Coffee Berry and the Extra Early Dwarf Soy beans. The Medium Green and the American Coffee Berry gave upwards of twenty bushels of seed per acre, and the Extra Early Dwarf an average of about thirteen bushels per acre. The Yellow Soy bean was not included in the experiment, as the seed of that variety was not availahle at the time. Arrangements have heen made, however, to secure seed of this variety from the Kansas Experiment Station, for 1900. We feel justified in making somewhat extensive experiments with the Soy beans on account of the strong claims made for these beans in a few places where they have been grown. The following is taken from the bulletin issued by the United States Department of Agriculture on the Soy hean as a forage crop:"

"The Experiment Station at Kansas is growing the Soy heans very extensively; they had no less than sixty acres in Soy beans this year."

"We understand that at least five complex food products are prepared from the Soy beans in Japan, although the beans are seldom used alone as a vegetable. They are also frequently dried and roasted, and used as a substitute for coffee."

Note 1. This is the earliest document seen (June 2005) concerning co-operative research on soy beans (one of two documents). This research was initiated and organized in 1899 hy C.A. Zavitz of Ontario Agricultural College in Canada; he also recorded and compiled the results.

Note 2. This is the earliest English-language document seen (June 2005) that uses the word "co-operative" (or "co-operatives" or "co-op" or "co-ops" spelled with a hyphen) in connection with soy beans. Address: B.S.A., Experimentalist, Ontario Agricultural College [Guelph, Ontario, Canada].

228. Carpenter, Frank G. 1901. How John Bull huilt upon harren rocks: The richest colony in the world. *Atlanta Constitution (Georgia).* Jan. 27. p. B3, B10.
• ***Summary:*** About Hong Kong (and the city of Victoria), which is rapidly becoming a manufacturing center, based on cheap Chinese labor. It is regarded as an example of what the Americans might do in the Philippines with Chinese immigrant lahor.

In Hong Kong, the "Chinese make soap and dye stuffs. They have rice mills, hean curd factories, tooth powder factories and cigar works." Four photos show different views of and buildings in Hong Kong.

229. Grijns, G. 1901. Over polyneuritis gallinarum. I. [On polyneuritis. I.]. *Geneeskundig Tijdschrift voor Nederlandsch-Indie* 41:3-110. Jan. [32 ref. Dut]
• ***Summary:*** In the Dutch Indies and Federated Malay States germinated heans or "tow-gay" [taugé, soy sprouts] are eaten raw as a common article of the diet. Note: Polyneuritis may be caused by a deficiency in poultry of the vitamin thiamine (vitamin B-1). Address: M.D., Netherlands Indies.

230. Burkill, I.H. 1901. The flora of Vavau, one of the Tonga Islands; with a short account of its vegetation hy Charles Steele Croshy. *J. of the Linnean Society of London, Botany* 35(242):20-65. See p. 34. April 1. [1 ref]
• ***Summary:*** "Glycine tahacina, Benth. Fl. Austral. ii. p. 244. Fiji; westward to the New Hebrides and New Caledonia; and to Tropical Asia."

Note 1. This is the earliest document seen (March 2010) concerning soybeans (but only wild perennial relatives of soybeans) in New Hebrides (later Vanuatu); cultivated soyheans have not yet heen reported.

Note 2. This is the earliest document seen (March 2010) concerning soybeans (hut only wild perennial relatives of soybeans) in the Kingdom of Tonga; cultivated soybeans have not yet been reported.

231. D.A.R. 1901. De Katjang Kedelih [The soybean]. *Orgaan van de Vereeniging van Oudleerlingen der Rijks*

*Landbouwschool (see Landbouwkundig Tijdschrift)* 13(153):77-79. April. [Dut]

232. D.A.R. 1901. Katjang-Kedelihpraeparaten [Soyfoods]. *Orgaan van de Vereeniging van oud Leerlingen der Rijks Landbouwshool (see Landbouwkundig Tijdschrift)* 13(161):242-45. Dec. [Dut]

• ***Summary:*** The author wrote an article in the April issue of this magazine about soybean cultivation. Now he will discuss how soybeans are used to make foods. As mentioned in the previous article, soya beans as such are not good to eat, even boiled or roasted; they need to be processed so as to digest the indigestible protein; then this protein can be absorbed by the digestive enzymes of the stomach and intestines.

As Japan is *the* soya country, we will start with the product that is most popular there, soy sauce, which has also earned its place in Europe. It is made from equal parts of roasted soybeans and wheat, 1-3 parts water, and much salt. The koji is fermented for a long time. Prof. Dr. M. Fesco [sic, Fesca], who provided much of this information, said it takes about 20 weeks to 5 years. The longest and slowest fermentation gives the best quality product. In Japan, every housewife makes her own soya sauce and there is competition for the best homemade soy sauce. Late-ripening protein-rich soybeans, called shoyu-mame, are used. In Java, the residue from soy sauce is used a lot, along with peanut presscake, for fertilizing sugar-cane fields.

In the Netherlands Indies, ketjap [Indonesian-style soy sauce] is made solely by the Chinese. Also called Tao-yoe, it is prepared by covering cooked soybeans with hibiscus *(waroe)* leaves. The age and variety of the leaves is very important. The mold that grows produces substances [enzymes] that digest legumin [soy protein]. More of the process is described.

Note 1. This is the earliest document seen (Feb. 2009) that contains the term Tao-yoe. H.T. Huang (e-mail of 25 Feb. 2009) states: "Tao-Yoe sounds like Cantonese for *Douyou* (pinyin) or *tou yu* (W.-G.) which in Mandarin mean soy sauce, and which first appeared in about 1750 in the *Xingyuan Lu (Hsing Yüan Lu).* See Huang 2000, p. 371-73.

Star anise (Hades manies) is also added to Indonesian soy sauce. Some Chinese have gained a reputation for their knowledge of the different additives *(boemboengs).* 61. kg of soybeans (1 gantang or 10 katties) can yield 3 bottles of number 1 ketjap (which retails for 50 Dutch cents per bottle), plus 3 bottles of 2nd extraction ketjap (each 40 cents), plus 3 bottles of ketjap no. 3 (which is little better than salt water with a light brown tint; each 20 cents).

The Japanese also use soybeans to make tofu *(tofoe).* Precipitated with magnesium chloride, it is a greyish-white tough, or sometimes yellow product. Although containing 90% water, it is a concentrated food. A table (based on analyses by E. Kirch [sic, Kinch] of Tokyo) shows the composition of tofu and kori-tofu; the latter is made by freezing tofu then thawing it. Tofu is a good product for vegetarians, but beware than it can act as a laxative because of the magnesium chloride.

Note 2. This is the earliest Dutch-language document seen that uses the term "Katjang-Kedelihpraeparaten" in the title to mean "Soyfoods."

Note 3. This is the earliest Dutch-language document seen (Feb. 2004) that mentions dried-frozen tofu, which it calls "kori-tofu."

233. Van Eck, J.J. 1901. Samenstelling van Indische voedingsmiddelen: Derde serie (CI-CL) [Composition of Indonesian foods: Third series (101-150)]. *Bulletin van het Koloniaal Museum te Haarlem* No. 25. p. 91. Dec. Fold-out table bound at the end of No. 25. [1 ref. Dut]

• ***Summary:*** This is the third such table published in this Bulletin. The first and second tables by J. Sack were published in Bulletin No. 22 (March 1900) and No. 23 (Nov. 1900). Dr. M. Greshoff supervised the work. The composition of fifty Indonesian foods is given, with two lines of notes in one wide column after each. Each food is numbered: 101-150. Soy-related foods are: 125. Soybean meal *(Soja-meel)* from Amsterdam.

Also discusses: 123. Katjang bogor *(Voandzeia).* Address: Doctorandus in de pharmacie, Laboratorium van het Koloniaal Museum te Haarlem.

234. Wilkinson, Richard James. 1901-1902. A Malay-English dictionary. Singapore: Kelly & Walsh Ltd. 700 p. 31 cm.

• ***Summary:*** This book was published in two parts in 1901 and 1902 but continuously paginated. Under *tempe* we read (p. 190): "Jav. A kind of dish; beans prepared in a certain way." Under *tauge:* "[Chinese tau-ge]. A vegetable; bean sprouts." The soybean is mentioned under *kachang* (p. 492) and is written *"K. jepun*–the soy bean, soya hispida. Other entries at kachang are: *K. botor–psophocarpus tetragonolobus. K. china*–the pea-nut, *arachis hypogæa. K. goreng*–the pea nut, *arachis hypogæa. K. kedelai*–a bean *(dolichos lablab ?). K. kelisah*–(Kedah) *psophocarpus tetragonolobus.* Also *k. kotor. K. menila–voandzeia subterranea.*

Also discusses: *bijan* (sesamum-seed, sesamum indicum, p. 139). *tapai* (rice fermented with ragi [tapeh], p. 151). *ragi* (yeast or leaven, p. 316). *kedelai–Kachang kedelai.* : a plant, *phaseolus mungo;* Height about 180. Also *kedele* and *kedeli* (p. 508).

Note 1. This book is hard to use since the order of words follows the Malay alphabet. The digital edition on Google Books is easier to use.

Note 2. The author lived 1867-1941. Address: Straits Settlements Civil Service.

235. Lafar, Franz. 1901-1907. Technische Mykologie. Ein Handbuch der Gaerungsphysiologie... Zweiter Band: Eumyceten-Gaerungen [Technical mycology. A handbook of fermentation physiology... Vol. 2: Eumycetic fermentations]. Jena: Verlag von Gustav Fischer. x + 507 p. (p. 365-871). See p. 638, 640, 674-76. Illust. No index. 25 cm. Foreword by Prof. Dr. Emil Chr. Hansen (Carlsberg-Laboratorium, Kopenhagen). [5 ref. Ger]

• ***Summary:*** This book is continually paginated with Vol. 1, so the first numbered page is 365. Part 15 (chapters 56-58) is titled "Morphology, physiology, and classification of the technically important higher Ascomycetes and related forms" (p. 627-704). Chapter 56, by Prof. Dr. Carl Wehmer *(Dozent an der Technischen Hochschule zu Hannover* [Germany]), "Morphology and classification of the families of the Aspergilli *(Aspergillaceen)"* discusses (p. 627+): Eighteen illustrations of Aspergillus conidiospores (p. 632-33). *Aspergillus Oryzae* (Ahlburg) Cohn (=*Eurotium Oryzae* Ahlburg), which is widely used in Japan to make saké, soy sauce *(Soja-Sauce),* and miso (p. 638-39, with illust.). *Aspergillus Wentii* (Wehmer), which is used in Java to make Tao-Yu (Chinese-style soy sauce) using cooked soybeans covered with *Hibiscus* leaves (p. 640).

Chapter 57, also by Prof. C. Wehmer, titled "Chemical effects of the Aspergilli *(Aspergillaceen),"* discusses (p. 674+): Saccharification of starches, diastase and diastatic enzymes, Takamine's research using Aspergillus to make diastase (Takadiastase) and its efficiency compared with similar enzymes of different origins, koji extract which contains amylase and other enzymes, use of *A. oryzae* to make saké, shoyu, and miso (p. 675-76).

This book also discusses: Zygospore production (p. 379). Sporulation and Aspergillus (p. 387-89, with illust.). Morphology and classification of the Mucorales, zygomycetes, zygospores (p. 420-21). The genus Mucor, sporangia, Rhizopus (p. 424-27, illust.). Mucorales used in the spirits industry, Mucor rouxii, Chinese yeasts (p. 436-37). Ragi/raggi and tapé *(tapej)* (p. 441). Decomposition of proteins and their derivatives, protease (p. 690-91). Film-forming surface yeasts and their accompanying phenomena, *Mycoderma* (p. 732-33). Invertase (p. 828). Other enzymes discussed in this chapter include maltase, melibiase, lactase, trehalase, raffinase, and amylase. Address: Prof. of Fermentation Technology and Bacteriology at the Imperial-Royal Technical College at Vienna [o. ö. {obiger Oesterreichischer} Professor der Gaerungsphysiologie und Bakteriologie an der k.k. {kaiserlich-königliche} Technischen Hochschule zu in Wien].

236. Bie, H.C.H. de. 1901. De landbouw der inlandsche bevolking op Java [The agriculture of the indigenous people in Java]. *Mededeelingen uit 's Lands Plantentuin (Buitenzorg)* No. 45. 143 p. See p. 97, 99, 138-43. [Dut]

• ***Summary:*** The soybean is discussed in the chapter titled "Cultivation of crops other than paddy rice: Cultivation of secondary crops *(Palawidja)."* Soya bean is one of the secondary foods served with rice, but it is mostly used to make soy sauce and tempeh *(tempe).* One variety of soybean, which originally came from Japan, is widely grown as a second crop on the wet rice fields *(sawahs),* and it is easy to cultivate at altitudes of 1,200 to 1,500 feet above sea level. It is called *katjang kedele* in Central and East Java, but *katjang djepoen* in Sunda or West Java *(de Soedalanden).* A description of the plant and the method of cultivation in Java is then given. It is planted much more on wet rice fields than on dry (non-irrigated) fields *(tegalans)* near the rice fields used for vegetables and secondary crops. Usually the soybean seeds are planted right after the paddy stumps have been cut away, but sometimes they are planted just before or during the paddy harvest, and pressed into the earth under the feet of the paddy cutters. They are rarely weeded, excepted when the crop is suffocated by tall weeds. At harvest, the plants are pulled completely out of the ground and bound into bunches. At night they are stored under a specially-constructed roofed shelter in the field, and during the day they are sun-dried on bamboo structures or on the ground. This takes at most 3-4 days, if the plants are really ripe and the weather is good, after which the bunches are put on bamboo mats in heaps and threshed. To protect the seeds from damage, one preferably uses piece of banana tree branches which still have woody veins. The woody plant stems and branches are removed together with the soybean pods and burned on the sawah fields. Poor people first sort out the pieces good enough for fuel and take these home. Immature green leaves are fed to animals. Sometimes soybeans are planted on the dikes of the paddy fields at the same time as or a few days later than the paddy rice. The fresh seeds from this harvest are then planted in the sawah fields after the paddy is harvested. Soybeans planted in this way are called *katjang apitan.*

There are two varieties of soya: one has an ivory yellow seed coat and the other is black. The latter is used almost exclusively to make soy sauce; the former to make pastry and condiments for rice or as a vegetable *(sayur).* Soya is cooked with salt in the green pod and eaten as a snack.

The indigenous people don't concern themselves with the production of ketjap (soy sauce). The work is too involved and takes too long before the product is ready to be sold. Most people are too inexperienced and there is not enough of a market for the product.

The only food that most people make out of soybeans is tempeh *(tempe),* which plays the same role in Central and East Java as does ontjom in Sunda or West Java, and is prepared similarly. The tempeh-making process is described. It takes place indoors, out of the light. It is sometimes cut into smaller pieces. It is usually eaten pan-

fried after being soaked in a solution of tamarind and salt. It is also cooked with vegetables.

Most soybean seeds are sold to the Chinese, who export them or process them to make soy sauce and other products. To make soy sauce, the seeds are roasted to aid in removing the hulls. Some people pound the seeds instead. They are cleaned, boiled in water, drained, spread on flat bamboo trays *(tampah* or *njiroe)* and dried daily for a week in the wind. They are washed again then soaked for 30-40 days in salt water which has been boiled then cooled. This mash is mixed thoroughly and strained through a cloth. To the black liquid is added a boiled and cooled mixture of cane sugar and water, then the mixture is boiled until its volume is reduced by 20%. If the solid residue removed by filtering still tastes salty, it is put into water, kneaded and strained again. A sugar solution is added and all is boiled down as before to make second-grade ketjap.

To make *taoetjo (tauco, taucho* or Indonesian-style miso), the soybeans are soaked in fresh water, the hulls are removed, the seeds boiled and spread on bamboo trays to cool. Rice or glutinous rice flour is roasted until golden brown, then mixed with the seeds and set aside for 2-3 days to ferment between hibiscus *(waroe)* leaves on flat trays. When the mass has molded, it is sun dried for a few days until very hard. Note: This is the soybean koji used making taucho.

Remove the leaves and put this mass of soybean koji into salt water. On the third or fourth day, add some yeast *(gist)* and some cane sugar syrup. Continue the soaking and fermentation in salt water for 2-3 seeks. Place it [in crocks] daily outside in the dew, taking care that no rain gets on it.

To stimulate the fermentation, take steamed rice or glutinous rice that is only half cooked. Add *ragi* starter and allow it to ferment for 2-3 days until a sweet, alcoholic flavor develops. This kind of fermented rice is called *peujeum* in West Java, or *tapé* in Central or East Java. Now add this fermented rice to the soybeans in salt water to enhance both the fermentation and the product.

After 3-4 weeks the soybeans should be very soft like porridge; then the taucho is ready to be used. It is eaten raw with cooked or raw vegetables, or mixed with meat or rice dishes; other condiments are also made from it.

Another product that the Chinese make out of soybeans is tofu *(tahoe* or *tauwhoe).* Soaked soybeans are ground and the puree is mixed with fresh water. Then a milky liquid *(melkachtige vloeistof)* is filtered off and coagulated. The Chinese use a coagulant called *tjiogo* (gypsum or calcium sulfate), which is specially imported from China and is not always available, even to the Chinese apothecary. It is first burned, then cooled before being added to the milky liquid. The white mass which is precipitated is called tofu. A similar product can be made from mung beans. Address: Batavia (Jakarta), Java.

237. Bie, H.C.H. de. 1901. De cultuur van cassave in de Preanger-Regentschappen en het gebruik, dat van dit gewas door de bevolking wordt gemaakt en hare verwerking tot tapioca-meel [The culture of cassava in the Praenger Regency, its use by the population, and its processing into tapioca flour]. *Teysmannia (Batavia [Jakarta])* 11:273-98. See p. 273, 288-89. [Dut]

• ***Summary:*** The soybean (kadele, sojaboon) is mentioned only in passing (p. 273). Ontjom is described as a tempeh substitute in Java (p. 288-89). Address: Controleur voor de landrenteonderzoeking te Bandong.

238. Hosie, Alexander. 1901. Manchuria: Its people, resources, and recent history. London: Methuen & Co. xii + 293 p. See p. 180-84, 218-24, 240-45, 252-53. Illust. Index. 23 cm.

• ***Summary:*** The Preface states that Hosie was in charge of the British consulate at Newchwang in Manchuria from Nov. 1894 to July 1897 and from April 1899 to April 1900. In 1900 he made the first careful estimate of soybean production in Manchuria, calculating the amount at 600,000 tons. He noted that during that period most of Manchuria's soybean exports went to southern China, through the ports of Swatow, Amoy, and Canton, where mills were erected for extracting the oil; the cake was used for fertilizing sugar plantations there and in Java. Nearly all of the soybean oil exported from Manchuria was consumed in China.

Chapter 2, titled "Recent events in Manchuria" (p. 39-72) begins with the Sino-Japanese war of 1894-95 (it began on 3 Aug. 1894 and concerned a dispute over the kingdom of Corea [Korea]), the Japanese invasion of Corea and Manchuria, Japanese victory and the treaty of Shimonoseki (17 April 1895), the complexities of railway construction and financing in Manchuria (from the start of construction of the Manchurian Railway on 28 Aug. 1897), and the expected effects of the new railroads on Manchurian trade. Manchurian trade currently labors under serious disadvantages due largely to climatic conditions, absence of good roads, and the slow and clumsy methods of transport. "I have said that it is practically impossible to sow, reap, and export [soy] beans, the most valuable trade product of the country, in the same year, and that they have to be carried by cart and stored at depots on the waterways to await shipment when the ice breaks up in the following spring. In this way capital is locked up for months and heavy storage charges are incurred" (p. 67). The Russian Central Manchurian Railway should greatly alleviate these problems. Bubonic plague struck Manchuria in 1899 (p. 69).

Note 1 This is the earliest document seen (Jan. 2008) concerning the transportation of soybeans by railway.

Chapter 7, titled "Agriculture and agricultural products" (p. 172-98) contains extensive information on "Beans" (which are actually soybeans). Beans are often

used on large farms in the second year of a 4-year crop rotation consisting of millet, beans, rice (or barley or wheat), and millet. Other important cereal crops are Job's tears *(Coix lachryma,* used medicinally and in making sweetmeats) and tall millet *(Kao-liang).*

"A large variety of beans is grown in Manchuria, and, together with their resultants, bean-cake and bean-oil, they constitute by far the most valuable item in the export trade of the three provinces." In April they are sown by hand in drills, and the crop ripens in September. "The Chinese distinguish the beans of commerce by their colours, and they are known as Yellow (Huang Tou), Green (Ch'ing Tou), Black (Hei, or Wu Tou), White (Pai Tou), Red (Hung Tou) and Small Green (Lü Tou). The yellow, green and black are varieties of the soy bean *(Glycine hispida, Moench.,* or *Dolichos soja,* L.)..." The white and red beans are "the ray-fruited dwarf bean *(Phaseolus radiatus,* L.)" [azuki bean]. The Lü Tou (small green bean, *Phaseolus mungo,* L.) [mung bean], "the smallest but one of the most important of the beans of commerce cultivated in Manchuria," is used to make vermicelli and bean sprouts.

Concerning soy beans: The "yield per acre, whicb requires from 16 to 18 lb. of seed, is estimated at from 27 to 39 bushels, with a weight of about 40 lb. per bushel." [Note: A U.S. bushel of soy beans weighs 60 lb.]. "Each variety of soy bean has a number of sub-species. The yellow has three, known respectively as (a) Pai-mei (white eyebrow), from the white scar on the saddle or point of attachment to the pod; (b) Chin-huang, or Chin-yüan (golden yellow or golden round), from the golden colour and more rounded shape of the bean; and (c) Hei-chi (black belly), from the dark brown scar on the saddle. All the three sub-species are highly prized for the quantity of oil or fat which they contain, but sub-species (a) and (b) are noted for the quality of the bean-curd (Tou-fu) or legumine obtained from them, as well as for the sprouts which are procured by soaking the beans in water, and which are greatly relished as a vegetable.

"There are two sub-species of the green bean (Ching-Tou)." One has a green epidermis (skin) but is yellow inside, while the other is green on the both the surface and inside.

The black bean (Wu Tou) has three sub-species:–(a) To-wu-tou (large black bean), where the epidermis is black and the inside green. It yields oil or fat, and it is likewise boiled with millet or rice and used for food.

"(b) Hsiao-wu-tou (small black bean), where the bean is somewhat smaller than the sub-species (a), with a black epidermis and yellow inside. It is largely used for horse feed and also yields oil, the refuse being employed for feeding pigs. It is likewise pickled for food.

"(c) Pien-wu-tou (flat black bean), where the epidermis is black and the inside yellow. It is flattened and elliptical in shape, and is mostly used for pickling and for horse feed." (p. 181-82).

A detailed description is then given of Tou-fu, or bean curd, and how it is made (p. 183-84).

"Besides these beans of commerce there are several varieties of garden beans cultivated for food, such as...; the Mao Tou, or hairy bean [probably green vegetable soybeans], with short hairy pods, each containing one to three beans (epidermis white and inside green);... With the exception of the Mao Tou these are usually cooked and eaten with the pods" (p. 186).

"The plants grown in Manchuria whose seeds yield oil are six in number. They are (1) *Dolichos soja,* L., or soy bean," (2) Castor oil plant. (3) *Sesamum orientale,* or sesame. (4) *Perilla ocymoides,* L., or perilla. (5) The cotton plant. (6) *Cannabis sativa,* L., or the true hemp plant. "The names and uses of these [six] oils are the following: (1) *Tou yu* [soy bean oil]–cooking, mixing paints and lighting" [illumination]. All these six "oil-yielding seeds" (with the exception of *sesamum seeds,* which are roasted) are crushed, steamed and subjected to great pressure. A table (p. 188) shows the percentage and value of the oil and cake extracted from these six seeds.

A black-and-white photo shows a Chinese bean mill at Newchwang with a huge granite stone wheel (facing p. 220).

Also discusses: Job's tears or pearl barley (p. 180-81). *Phaseolus radiatus* (the ray-fruited dwarf bean [azuki] which is red or white, p. 182-83). Hemp, a valuable textile plant (p. 186-88, 251). Sesamum seed (p. 188). Ground-nuts [peanuts] (p. 188, 251). The ground nut *(Arachis hypogæa,* L.) is cultivated in Manchuria for food, however not to any great extent. The oil is not extracted from the nuts, as it is in the south of China. Seaweed (p. 258).

A second edition of this work was published in 1904 (London: Methuen & Co., 293 p.; New York: C. Scribner's Sons; see p. 181-87). In the 1910 ed. (published in Boston by J.B. Millet Co.; 320 p.), see p. 75-79. Address: M.A., F.R.G.S., Once Acting British Consul, Tamsui; Now at Aberdeen (Scotland or Hong Kong).

239. Hosie, Alexander. 1901. Manchuria: Its people, resources, and recent history. Chapter X–The trade of Manchuria (Document part). London: Methuen & Co. xii + 293 p. See p. 236-59.

• ***Summary:*** "There can be no doubt that millet *(Horcus sorghum,* L.) is the principal and most valuable crop of Manchuria; but being the staple food of the people, the common feed of beasts of burden, and the grain used by the distilleries in the manufacture of *samshu,* it is nearly all consumed in the country itself." The rest is exported to other parts of China. Other important related grain crops are Kao-liang *(Holcus sorghum,* L.) and Hsiao-mi *(Setaria italica,* Kth.).

The port of Newchwang is the only Manchurian port still open to foreign trade and the only place at which reliable trade statistics were available. These statistics, collected and published by the Imperial Maritime or Foreign Customs, cover the trade in vessels for foreign type only, and do not include the native junk trade, which is conducted under the supervision of the Native Custom-House. The latter type of trade is considerable, but the statistics are not reliable.

After the Sino-Japanese war of 1894-95, Japan invaded and occupied the southern province of Manchuria. Some expressed gloomy views concerning the commercial future of Manchuria, but Japan has now become the main market for Manchurian agricultural products, and in turn is now trying to sell her manufactured goods to Manchuria. Since the war, the trade of Manchuria has actually trebled. "The chief export from Manchuria is beans and their products, bean-cake and bean-oil..." A table (p. 242) shows "Exports of beans, bean-cake and bean-oil for 1898 and 1899 in foreign-type vessels. For each product is given the quantity (tons) and value (in both Haikwan taels and British pounds). In 1899 the quantities were as follows: [Soy] Beans (yellow 153,745 tons {58.6% of total weight} worth 4,694,750 Haikwan taels; green 95,649 tons {35.3% of weight} worth 3,306,172 taels; black 21,076 tons {7.8%} worth 602,492 taels) totaling 270,470 tons worth 8,603,414 taels. Bean-cake 260,798 tons worth 6,711,364 taels (=£1,010,200). Bean-oil 9,512 tons worth 1,000,193 taels (=£150,550).

An estimated additional 30,000 tons of [soy] beans were exported that year from Newchwang in junks headed for China Proper.

"A few years ago the consumption of pulse and bean-cake was practically confined to the southern provinces of China (through the ports of Swatow, Amoy and Canton), where mills were erected for extracting the oil from beans and the bean-cake was used for fertilising the sugar plantations." Since the Chino-Japanese [Sino-Japanese] was of 1894-95, Japan has occupied the Liao-tung Peninsula and realized the value of Manchurian agricultural products. In 1899 Japan's purchases of these products had surpassed that exported to Southern China. In Japan, "bean-cake is replacing fish manure," which in recent years has become scarce and expensive due to the shortage of herrings along the Japanese coast. From Canton, some bean-meal goes to the sugar fields of Java. Nearly all of the bean-oil exported through Newchwang is consumed in China. Due to the rough roads, bean-oil from the interior of Manchuria is brought in large, strong watertight wooden boxes lined with paper to the port of shipment, where the boxes are broken up and the contents, like the oil extracted in Newchwang itself, poured for export into large brittle jar- or carafe-shaped wicker baskets lined inside and outside with layers of waterproof paper."

Beans and their products "are, in a word, the wealth of Manchuria. They were worth 2.5 million British pounds in 1899 exports alone.

A table titled "Summary of the export trade of Manchuria through Newchwang, 1898-1899" (p. 252) shows that beans, bean-cake, and bean-oil are by far the most valuable export, worth much more than all other exports combined. A second table titled "Distribution of Manchurian exports through the Port of Newchwang, 1898-99" (p. 253) shows that in 1899, the destinations receiving exports of greatest value were (in million British pounds sterling): Japan 1.2, Shanghai 0.95, Swatow 0.505, Canton 0.404, and Amoy 0.272.

A final table (p. 259) shows that in 1899 the tonnage exported from Manchuria by steam ship was more than 38 times as great as the tonnage exported by sailing ship to destinations.

Note: This is the earliest English-language document seen (Dec. 2005) that uses the term "bean-meal" to refer to ground, defatted soybeans. Address: M.A., F.R.G.S., Once Acting British Consul, Tamsui; Now at Aberdeen (Scotland or Hong Kong).

240. Irish, H.C. 1901. Garden beans cultivated as esculents. *Missouri Botanical Garden, Annual Report* 12:81-165. See p. 147-48. [3 soy ref]

• ***Summary:*** The article begins: "In entering upon a study of garden beans in 1898, all procurable varieties catalogued by leading seed firms of America and Europe were grown at the Missouri Botanical Garden during that and the two succeeding years. Habit of growth and other varietal characters were carefully noted in the field each year. These, together with the seed characters, have been brought together and classified. The varieties studied are here grouped under five genera which are distinguished from each other mostly by technical characters as follows:" Phaseolus, Dolichos, Vigna, Glycine, and Vicia. There follow detailed descriptions, keys, synonymy and figures of all the seeds various esculent [edible] varieties, with notes on diseases, culture, and cooking.

Under *Glycine hispida* Maxim. (p. 147-48) is a list of five previous scientific names for the soybean and the sources in which those names were first cited. A photo (plate 44) shows the front and side views of six soybean varieties. A full-page original illustration (line drawing, plate 46) shows the leaves, pods, and flowers of a soybean plant.

Describes five varieties whose seeds can be obtained from seedsmen Haage & Schmidt: Yellow Soy, Black Soy, Green Soy, Brown Soy, and Etampes Soy. The accession numbers for each of these, and their original foreign names and places or countries of origin are given.

A long footnote states that a number of the domestic U.S. seeds came from the Field Columbian Museum or the

Philadelphia Commercial Museum [Pennsylvania]. Most of the imported seeds came from Japan, including at least seven soybean ("Daidzu") varieties: (1) Yellow–10757, "Daidzu," Mujage Agric. School, Japan. (2) Yellow–10758, "Daidzu," Iwate Agric. Institute, Japan. (3) Yellow–10760, "Daidzu," Japan. (4) Black–10752, "Kuro mame," Japan. (5) Black–10753, "Daidzu," Osaka Agric. School, Japan. (6) Green–7743, "Awo-daidzu," Yamacata [sic, Yamagata], Japan. (7) Green–10756, "Daidzu," Iwate Agric. Institute, Japan.

But at least one each came from Russia (10470 Kazan), Siam (10574 "Waa Tai"; 10768 "Lau Lao Peas"), Korea (10771 "Pea Bean"), Floyd County, Georgia (USA; 10932), and Polk County, Georgia (USA; 10937 "Weevil Proof Peas" (Beans)).

241. Zehntner, L. 1901. De Kedelehboorder. (Agromyza spec.?) [The soybean borer or Agromyza phaseoli fly (Agromyza species?)]. *Indische Natuur (De)* 1(7-8):113-24. [Dut]

• ***Summary:*** Discusses the behavior, damage, and control of this insect pest [also called French bean fly]. A nice 4-part illustration (p. 122) shows the (a) fly (greatly enlarged), (b) the full-grown larva, (c) the pupa (enlarged), and (d) the pupa inside the stem of a soybean plant. Views (a-c) are enlarged 15 times, view (b) is enlarged 7 times.

Dr. Zehntner was in Indonesia in 1897-1900. P. van der Goot (1930) says of Dr. Zehntner: "Little information is available in the literature on the *Agromyza* of soybean in the tropics... Zehntner (1900) was the first researcher to pay attention to these pests, and wrote in 'De Indische Natuur' a concise description [with an illustration {line drawing}, p. 122] of this insect and gave a scientific name *Agromyza soya* Zehntner... As with every pioneering work, either in entomology or other fields, the work of Zehntner had some inaccuracies, and it seemed advisable to investigate the subject once again."

"Zehntner thought this insect to be the same as soybean stemborer because he found the larvae in the pith of older plants."

Note: This is the earliest document seen (April 2007) that mentions an insect of the genus *Agromyza* in connection with soybeans. Address: Dr.

242. Vorderman, Adolf G. 1902. Analecta op bromatologisch gebied. IV. [Writings on mold-fermented foods. IV.]. *Geneeskundig Tijdschrift voor Nederlandsch-Indie* 42:395-431. See p. 411-31. [10 ref. Dut]

• ***Summary:*** Describes the "ontjom" and "tèmpé" [onchom and tempeh] processes, including *ontjom beureum* [a Sundanese food made from *boengkil katjang* (bean waste or okara) and *Monilia sitophila* mold], onggok, and tempe-kedele. He describes two ways of making tempeh that he saw. The first is the well-known one in which soybeans are fermented between banana leaves. In the second way the soybeans are wrapped in a banana leaf to form a package about 20 cm (8 inches) long and 7 cm (2.8 inches) wide, then wrapped in a djati (jati) leaf. These packages are stacked in a bamboo basket covered with sacks for 24 hours, then taken out and spread on the floor to cool for another 24 hours.

He also describes: Tempe bongkrek katjang; same as ontjom beureum [okara onchom] except that a *Rhizopus* mold is used. Ontjom bodas; same as tempe bongkrek katjang except that another *Rhizopus* mold, not similar to Oryzae, is used. Tempe bongkrek kelapa (from South Banjoemas); Quite similar to ontjom beureum, it is made from pressed coconut and inoculated in the old leaves from tempeh kedele. It is eaten mostly by poorer people because of its lower price. Tempe morrie made with Soempiaoeh type soybeans (from Banjoemas) and coconut residue pressed 3 times. The soybeans are treated like soy tempeh up to the laroe process. Then they are mixed with coconut presscake, which has been washed, steamed, and inoculated with ground bibit leaves on which there is *Rhizopus oryzae.* Finally it is packed in the skin of the banana stem to make long slender rods, and fermented. Tempe enthoe, from South Bagelen, is made from coconut (no soy) wrapped in a banana stem. Tempe tjenggereng is made with coconut presscake (called gatok in Banjoemas) and ragi, no soy; "This tempeh has, like the tempeh bongkrek kelapa, lead to several cases of fatal food poisoning. Dage is made with bacteria rather than molds on a substrate of oilseed cakes, primarily pressed coconut, sesame seeds, or peanuts." The last page contains detailed illustrations (drawings) of *Rhizopus* species from *Ontjom bodas* and *Rhizopus oryzae* from *tempe kedele,* each magnified 60 times.

Note: This is the earliest Dutch-language document seen (Oct. 2001) that mentions okara, which it calls *boengkil katjang.*

243. Adams, George E. 1903. The soy bean. *Rhode Island Agricultural Experiment Station, Bulletin* No. 92. p. 117-27. March.

• ***Summary:*** "The soy bean *(Glycine hispida),* also known as soja bean and coffee berry, is a native of southeastern Asia... This plant was taken to England about one hundred years ago, where it was grown for years without attracting any attention as an economic plant either as food for man or beast. In the southern states it was grown for many years, but not until about twenty years ago did it commence to attract attention as a forage plant. Within the past few years considerable attention has been given this plant by the different agricultural experiment stations, and its value as a food-plant has been clearly proven by feeding experiments in which the plant has been fed both in the green state and as hay... During the past ten years several varieties of soy beans have been grown at this Station... [Note: The names

of these varieties are not listed.] All things considered, the Medium Early Green is the variety which has given the best results during the ten years in which these plants have been grown here. It makes a heavy growth of forage, retains its leaves well, and has not failed to ripen a crop of seed during that time."

"In experiments at this station, it has been shown that a liberal application of nitrate of soda interfered with the development of the root tubercles on the soy bean, as may be seen from the following table... In addition to the nitrate of soda mentioned above, each plot received the following manures" (in pounds per acre): Air-slaked lime 2,000, acid potash 1,200, and muriate potash 180. The "yield of dry beans was slightly increased by the use of a large amount of nitrate of soda, while the yield of vines was materially lessened, although in no case was the increase sufficient to cover the additional cost of the nitrate."

Photos (p. 121, 123, 126) show: (1) Root tubercles from soy beans grown with and without nitrogen. (2) Medium green soy beans grown with different nitrogen rations. (3) Varieties of soy bean plant. A table (p. 122) titled "Yield of green forage per acre, and fertilizing ingredients in crops and roots in certain legumes" shows the yields of different crops using nitrogen in., potash, and phosphoric acid. Address: B.S., Asst., Field Experiments, Kingston, Rhode Island.

244. Balland, A. 1903. Sur les principales légumineuses alimentaires des colonies françaises [The principal edible legumes of the French colonies]. *Comptes Rendus des Seances de l'Academie des Sciences (Paris)* 136:934-36. Meeting of April 14. [Fre]

• ***Summary:*** This article appears to be a summary of, and contains less details than, one of the same tile by the same author published this year in *Annales d'Hygiene et de Medecine Coloniales.* Eight legumes are described briefly and the maxima and minima of their nutritional compositions given. Included are peanuts *(Arachide or Pistache de terre, Arachis hypogaea),* soybeans *(Soja, Dolichos soja),* and Bambarra groundnuts *(Voandzou, Voandzia [Voandzeia] subterranea).*

"Soja–The cultivation of the soybean *(Soja, Dolichos soja)* dates back to ancient antiquity in China and Japan. The seeds, which are rich in both nitrogen and oil, enter into culinary preparations which are very popular in these countries. The samples analyzed come from Cambodia, Cochin China [in today's Vietnam], and Tonkin." The protein content of these samples ranges from 34.85% to 38.41%, and the fat content from 12.95% to 14.80%. The mean weight of 100 seeds ranges from 5.00 gm to 11.23 gm.

Note: This is the earliest document seen (May 2010) concerning soybeans in Cambodia (renamed Kampuchea in 1979) (one of two documents). Address: Ancien Pharmacien Principal au Laboratoire des Expertises du Comite de l'Intendance, France.

245. Sack, J. 1903. Samenstelling van Indische voedingsmiddelen: Vierde serie (CLI-CC) [Composition of Indonesian foods: Fourth series (101-200)]. *Bulletin van het Koloniaal Museum te Haarlem* No. 28. p. 160. May. Fold-out table bound at the end of No. 28. [1 ref. Dut]

• ***Summary:*** This is the fourth such table published in this Bulletin. Dr. M. Greshoff supervised the work. The composition of fifty Indonesian foods is given, with two lines of notes after each. Each food is numbered: 151-200. Soy-related foods are: 163. Soybeans *(Soja-boonen, gele; Glycine).* Address: Assistent bij het Laboratorium, van het Koloniaal Museum te Haarlem [Netherlands].

246. Dmitriev, Konstantin. 1903. Ekskursiia dlia izucheniia porta In-kou [A trip for the study of the port of Yingkou]. *Izvestiia Vostochnogo Instituta (J. of the Oriental Institute, Vladivostok)* 7:21-146; 8:115-270. [Rus]

• ***Summary:*** As the major export port for Manchurian soybeans and soy products prior to the completion of the Chinese Eastern Railway and the consequent rise of Dairen and Vladivostok to preeminence, Yingkou is the appropriate focus for a study of the increasing export trade to Southern China and Japan (especially) in the 1880s. Pages 85-88 list foreign companies and establishments operating in Yingkou in 1902-03.

Of particular interest might be Bandinel and Co. known in Chinese as Jichang (?) which represented such worldwide and regional ocean freighters as Hamburg- American, Lloyds and Mitsui Bussan as well as the oil mill carrying its own name *(Jichangyan).*

Tables (p. 256) give 1901 export statistics for soybeans, cake and oil both by quarters and destinations (Hong Kong, Japan, Chinese ports, Samarang [Semarang, Central Java], and Korea). Address: Manchuria.

247. Balland, A. 1903. Les principales légumineuses alimentaires des colonies françaises [The principal edible legumes of the French colonies]. *Annales d'Hygiene et de Medecine Coloniales* 50(3):193-206. Third Series. [1 ref. Fre]

• ***Summary:*** Contents: Peanuts *(Arachide* or *pistache de terre, Arachis hypogaea)* in Congo (samples were analyzed from Bahr-el-Ghazal [a former province of southwest Sudan–just east of the Central African Republic] and from Haut-Oubangui [later in the Central African Republic]), Senegal, Guinea, Indochina [in today's Vietnam], Madagascar, New Caledonia.

Cajan *(Cajanus indicus)* in Guinea, French Guiana, New Caledonia, Réunion, Madagascar. Doliques *(Dolichos lablab, D. sinensis, D. uniflorus)* in French Guiana, Indochina, Cambodia, the Indies, Madagascar, New

Caledonia, Réunion, Sudan. The Haricot bean *(Phaseolus vulgaris)* in the Congo, Dahomey, Guinea, French Guiana, Sudan, Madagascar, New Caledonia, and Réunion. Lima bean *(Haricot courbé, Phaseolus lunatus)* in French Guiana, the Indies, Madagascar, Réunion. Mung bean *(Haricot mungo, Haricot trilobé, Phaseolus mungo)* in the Indies, Indochina, Madagascar, Réunion.

Soya *(Soja, Dolichos soja)* (p. 204-05): The cultivation of soya dates back to the ancient past in China and Japan. "According to A. Candolle (1885): 'Known facts and historical and philological probabilities tend to show that the species was wild from Cochin-China to the south of Japan and to Java [Indonesia] when the ancient inhabitants of this region began to cultivate it at a very remote period, to use it for food in various ways, and to obtain from it varieties of which the number is remarkable, especially in Japan.' The seeds, which are rich in both nitrogen and oil, enter into culinary preparations which are very popular in these countries. The samples analyzed come from Cambodia, Cochin China, and Tonkin." The protein content of these samples ranges from 34.85% to 38.41%, and the fat content from 12.95% to 14.80%. The mean weight of 100 seeds *(Poids moyen de 100 grains)* varies by country as follows: Cambodia 11.23 gm, Cochin China 9.10 gm, and Tonkin 5.00 gm.

Note: This is the earliest document seen (May 2010) concerning soybeans in Cambodia (renamed Kampuchea in 1979) (one of two documents).

Bambarra groundnuts *(Voandzou, Voandzia [Voandzeia] subterranea)* in Congo and Madagascar. This annual legume comes from sub-tropical Africa, where it is widely cultivated. According to Candolle, it is also called "Mandubi d'Angola." Address: Pharmacien principal de l'armée (Main pharmacist for the French Army).

248. Koenig, Franz Joseph. ed. 1903. Chemie der menschlichen Nahrungs- und Genussmittel. Vol 1. Chemische Zusammensetzung... Ed. 4 [The chemistry of human foods and food adjuncts (stimulants / enjoyables). Vol. 1. Chemical composition... 4th ed.]. Berlin: Verlag von Julius Springer. 1535 p. See vol. 1, p. 97-98, 595-600, 638, 651-53, 1463, 1483-84, 1509. [31 ref. Ger]

• ***Summary:*** Summaries of early studies on the chemical composition of soybeans and various soyfoods, plus some original studies. Commercial sauces and Japanese shoyu (p. 97-98). Cites: Wein, Kinch, Anderson, Senff, Schwackhöfer & Stua, Zulkowski, Mach, Ulbricht, Wildt, Schröder, Blaskovics, Caplan, Pellet, Carriere, Kellner, Jenkins, Becke & Cosack, Kornauth. Soybeans in Russia: Nikitin, Giljaranski, Lipski [Lipskii] (p. 1483-84). Address: Geh. Reg.-Rath, o. Professor an der Kgl. Universitaet und Vorsteher der Agric.-Chem. Versuchsstation Muenster in Westphalia, Germany.

249. Koningsberger, J.C. 1903. Ziekten van rijst, tabak, thee en andere cultuurgewassen, die door insecten veroorzaakt worden [Diseases of rice, tobacco, tea, and other crops, which are caused by insects]. *Mededeelingen uit 's Lands Plantentuin (Buitenzorg)* No. 64. 109 p. + 5 plates. See p. 87-91. [Dut]

• ***Summary:*** Section VII is titled "Soybeans, regular beans, and other legumes" *(Kedeleh, katjangsoorten en andere leguminosen)*. Address: Dr., Java.

250. Whitehead, Jessup. 1903. The steward's handbook and guide to party catering. 6th ed. Chicago, Illinois: Jessup Whitehead & Co., Pubs. v + 464 + 29 p. Illust. No index.

• ***Summary:*** Page 60: "Those everlasting relishes" mentions catsups, soys, Worcestershire sauce, mushroom and walnut catsups, Harvey's sauce, India soy.

Page 87: Relishes: Tomato catsup, Worcestershire sauce. Page 214: Worcester sauce.

Alphabetical: Carp (p. 267): Baked carp; gravy made with Worcestershire sauce. Chinese cookery (p. 278-80): Chinese chop soly [chop suey], a savory ragout, is the national dish of China. Incidental ingredients include "salted black beans." Chop sticks.

Cucumber (p. 299) and eggs, with vinegar and Worcestershire sauce. Devil sauce (p. 303), with Worcestershire. Drinks (p. 305): Prairie oyster, with dash of Worcestershire sauce. Garum (p. 324): "One of the two principal sauces used by the ancient Romans...; a kind of soy,..." Horseradish (p. 343): Napolitaine sauce, with Worcestershire sauce.

Japanese cookery (p. 350-51): Mentions "Japanese misoshiru [miso soup]... This is made from miso, a fermented mixture of soy, beans [sic, soy beans], wheat and salt. It has a gamey flavor all its own." "Hachimono,... a piece of sole stewed in soy." "... the brown soy-colored beans and strips of Kukirage, or ear-shaped mushrooms." "Fu, a kind of biscuit made from the glutinous part of wheat flour." A gravy "thickened with a transparent, starchy substance, obtained from the root of a climbing plant *(Pueraria Thunbergiana),* called by the Japanese Kuzu."

Sauces (p. 430-34): "Harvey's sauce–'A fair imitation of Harvey's sauce may be produced by working the following recipe. Mince a clove of garlic very finely, add 6 chopped anchovies, ¼ oz. cayenne, 3 tablespoonfuls of Indian soy, 3 tablespoonfuls of mushroom or walnut ketchup..." "Soy–An East Indian bottled sauce; it is made of purple wrinkled morels, galangal root and spices." "Bottled table sauce–The recipe for making the genuine Yorkshire relish is probably known only to manufacturers. However, the following is said to yield a good imitation of that popular sauce: 1 oz. garlic, 1 teaspoonful cayenne, 2 tablespoonfuls Indian soy, 2 tablespoonfuls mushroom ketchup, and 1 pint vinegar."

Scottish cookery (p. 438): Mince collops–incl. a "dessertspoonful Worcester sauce..."

"Soy–A bottle sauce imported from China and India; composition uncertain."

Tripe (p. 461): Tripe a la Creole, with Worcestershire sauce. Address: Chicago, Illinois.

251. Hitier, H. 1904. Société Nationale d'Agriculture de France: Communications diverses [National Society of Agriculture of France: Various communications]. *Journal d'Agriculture Pratique* 68:2. p. 55. July 14. [Fre]

• ***Summary:*** During the session of 6 July 1904 Mr. Bouvier presented a sample, to pique our curiosity, of tofu *(fromage de Soja)* that Mr. Paul Serre had sent to the Society from Java. This cheese is obtained after grinding the soybeans in water, in a double boiler or steam-jacketed kettle *(bain-marie).* The albumin is precipitated, just like casein, with the aid of a special ferment *(d'une ferment spécial)* and with it one makes a special sort of cheese, of which the indigenous people are very fond. It would be interesting to study the one or several particular "ferments" used for this cheese.

Note 1. The reporter seems confused between fermented and non-fermented tofu. Note 2. Ferments were later called "enzymes." Address: France.

252. Burg, Cornelis Leendert van der. 1904. De voeding in Nederlandsch-Indië [The foods of the Netherlands Indies]. Amsterdam, Netherlands: J.H. de Bussy. viii + 526 p. See p. 210-20, 222-23, 255-56. Index. 24 cm. [49 ref. Dut]

• ***Summary:*** Burg describes the preparation of tempe as follows: "Yellow soy-beans are boiled, soaked in cold water for 48-72 hours, squeezed out between cloths, and then steamed in a conical basket, made of flattened bamboo or of cane (Malay: kukusan) till they are done. Afterwards they are spread out on wire frames, which are entirely covered with banana leaves, and mouldy remains of a previous preparation are added, then all is covered again with banana leaves. The whole mass is stirred a few times, and after 2 days a cake has been formed, from which pieces are cut, which are fried in cocoanut oil and eaten afterwards. During the preparation, the cotyledons have been bound together by a tight mycelium, much water and carbonic acid being secreted in the meantime and the temperature of the mass rising 10 to 12ºC above that of the surroundings. The cellular walls are not dissolved by the hyphae, but the soluble carbohydrates and the fat diminish, the nitrogen content remains about the same, but in tempé only 70% is to be found of the protein, as originally present in the beans."

He also describes, on Prinsen Geerligs' authority, the preparation of *tao-tjo* (Indonesian-style miso). Peanuts are discussed on p. 220; *tempé boengkil, tempé bongkrek, ontjom beurreum, ontjom bodas* on p. 222.

253. Hosie, Alexander. 1904. Manchuria: Its people, resources, and recent history. London: Methuen & Co.; New York: C. Scribner's Sons. xii + 293 p. Plus 16 unnumbered leaves of plates. See p. 180-87, 218-24, 240-45, 252-53. Illust. Map. Index. 23 cm.

• ***Summary:*** For details, see the original 1901 edition; the two editions are very similar and contain the same number of pages.

This book contains information about Manchuria's railways including the Central Manchurian Railway, Imperial Chinese Railway, Siberian Railway, South-Baikal Railway, Trans-Baikal Railway, Trans-Manchurian Railway, and Ussuri Railway. However neither the South Manchuria Railway nor the South Manchuria Railway Company are mentioned. Address: Once Acting British Consul, Tamsui; Now at Aberdeen (Scot or HK).

254. Kiliaan, H.N. 1904. Madoereesch-Nederlandsch woordenboek [Madurese-Dutch dictionary]. Leiden, Netherlands: Boekhandel en Drukkerij voorheen E.J. Brill. vii + 384 p. [Dut]

• ***Summary:*** Dutch-language definitions are given for each of the following words: (1) ketjap (p. 193) = soy sauce. Made from soja.

(2) "kadhelli" (p. 260) = soybean. Jav. kedele. Glycine soja. De soja boon.

(3) kotok (p. 281) = "koffie, amfioen of soja voor de tweede maal koken; koto kotoghan." (4) "tahu" (p. 302) = tofu. includes the words "kadhelli" [kadele / kedele] and "soya." Address: East-Indian civil servant with permission [Oost-Indisch Ambtenaar met verlof.

255. Bui, Quang Chieu. 1905. Des cultures vivrières au Tonkin [On the food crops of Tonkin, Indochina]. *Bulletin Economique de l'Indo-Chine* 48:1152-90. New Series 2. Many illust. and photos. [4 ref. Fre]

• ***Summary:*** This article begins with a foreword by H. Brenier, Director of Agriculture, Forestry and Commerce for Indochina. He notes the importance of soybeans, soy products (including soy sauce and tofu) and adzuki beans *(Phaseolus radiatus),* among the people of Asia. In Annamite (south Vietnamese), tofu is called *dau phu* and the soybean is called *dau nanh* or *dau tuong.*

Adzuki beans are discussed (p. 1153-55, 1157) and a nutritional analysis of the azuki bean, which has been cultivated in France, is given. The section on the soybean (p. 1153, 1157-68) discusses: The local names and varieties of the soybean, botanical characteristics, cultivation, utilization (to make soy sauce, *tuong,* tofu, etc.), commerce and trade (in the province of Hungyen, the stalks of the soybean plant are used to make a sort of incense). An illustration (line drawing, p. 1159) shows a Soja plant with pods.

A detailed description is given of the manufacture of *tuong* (a sort of soft miso) in Tonkin. First *moc,* or molded glutinous rice is prepared. After glutinous rice is cooked, it is covered with banana leaves and allowed to mold for 2-3 days. Then the soybeans are prepared. They are grilled, ground to a powder, boiled with water, and put into a jar for 7 days until sweet. Six parts of rice koji are then mixed with 5 parts soy. The mixture will be ready to eat after it has fermented for 15-30 days. If it is too thick, add salt. Good tuong is soft and mildly sweet. It is sweeter and smoother than nuoc mam. Annamites say that only the prosperous households succeed in making tuong. If the tuong starts well, then becomes sour, that is a bad omen.

Tuong can also be made from corn *(maïs),* which is grilled, ground, sifted, covered with taro leaves, and allowed to mold. Put it in salt water, then after 5-6 days add roasted soy flour as above. Stir it before sunrise and let it stand open in the sun for 15 days, putting on the cover as soon as the sun disappears. If this is done, it will last a long time.

Note 1. This is the earliest document seen (Jan. 2009) that mentions *tuong*. The importance of this fermented seasoning, a close relative of Chinese *jiang,* is indicated by the local name for the soybean *(dau tuong),* or "the bean used to make tuong."

Production of tofu *(dau-phu):* Lots of dau-phu is made in Tonkin, especially in Hanoi, where it constitutes the basis of the poor people's food. It is never made in large factories, only small shops. Soak the soybeans, wash them and remove their hulls, cook to soften them, then grind them with a hand-turned mill over a wooden bucket. The soymilk is extracted with cold water then boiled for 30 minutes. There remains in the sack a white residue *(un résidu blanc)* [okara] which is fed to the pigs. The next day, add some fermented whey from a previous batch to coagulate the soymilk. Then press the curds. The finished tofu cakes are each 15 by 8 by 1 cm thick. Tofu is widely used in soups. A table (p. 1165) shows the costs of equipment to start a tofu shop, and a profitability analysis. Early analyses of the composition of the soybean, conducted by Fremy, Muentz and Pellet (in France) and Wechler (in Austria), are reproduced. Photos show key steps in the process: (1) A person is washing soybeans in a bamboo colander while standing in a stream near Hanoi. (2) The soybeans are ground in a small, traditional, hand-turned stone mill by a person sitting on the same wooden bench as the mill, in a bamboo hut, surrounded by various wooden tubs and colanders. (3) Using a sack to filter the ground puree from the stone mill. (4) Cooking the filtered liquid over a small wood fire in an earthenware pot. (5) Pressing the curds (outdoors) after precipitation of the protein. (6) More forceful pressing. (7) A merchant walking the streets selling tofu on two trays, each suspended by 3 ropes from the ends of a shoulder pole.

Note 2. This is the earliest French-language document seen that mentions okara (Oct. 2001), which it calls *un résidu blanc.*

Note 3. This is the earliest document seen stating that okara is fed to "pigs." Address: Indo China.

256. Clubb, Henry Stephen. 1905. Unpolished rice, the staple food of the Orient: A lecture to the Vegetarian Society of America; to which is added over one hundred receipts [recipes] for cooking unpolished rice, rice flour, rice polish; and testimonials of eminent food reformers. Philadelphia, Pennsylvania: The Vegetarian Society of America. 32 p. 18 x 14 cm. Pages unnumbered.

• ***Summary:*** Rev. Henry Clubb (born 1827) was an early advocate of the use of brown rice in America. He notes that this is the food on which the Japanese Army won its great victories (in the recent Russo-Japanese War), performed its rapid marches, remained comparatively free from camp diseases, and recovered rapidly from battle wounds.

On page 5 he notes: "In China, Japan and Java soy sauce, soy bean cheese [tofu], or a similar product is eaten with rice in considerable amounts, and furnishes a large part of the protein necessary for the daily diet of the laborious people."

On the inside rear cover of the booklet is a list of publications and products sold by the Vegetarian Society, which is located at 1023 Foulkrod St., Philadelphia. Address: Rev., Philadelphia.

257. Duthie, John Firminger. 1905. Flora of the upper Gangetic plain and of the adjacent Siwalik and sub-Himalayan tracts. Vol. I. Ranunculaceae to Campanulacae. Dehra Dun, India: M/s. Bishen Singh Mahendra Pal Singh; Delhi, India: M/s. Periodical Experts. 500 p. + v. See p. 231-32. [6 ref]

• ***Summary:*** In the section on "Leguminosæ" we read (p. 230-31): "20. Glycine, Linn.; Fl. Brit. Ind. ii, 183 [Hooker, Joseph D. 1879. *The Flora of British India.* Vol. 2, p. 183].

"Twining or suberect herbs... Species about 15, spread through the tropics of the old world, also in Australia.

"*G. Soja,* Benth, in *Journ. Linn. Soc.* viii, 266: F.B.I. ii, 184 (not of Sieb. & Zucc.) G. hispida, Maxim.; Watt E.D.; *Field & Gard. Crops* iii, 3, t. 85; Prain in *Journ. As. Soc. Beng.* LXVI (1897), 403. Soja hispida, Moench.; W.&A. *Prod* 247. Dolichos Soja, Linn.; *Roxb. Fl. Ind.* [Roxburgh's Flora Indica] iii, 314; DC. *L'Orig. Pl. Cult* 264. Vern. [Vernacuar] *Bhat.* (Soy bean, Japan pea).

"An annual, with stout suberect or climbing stems, densely clothed with fine rusty-coloured hairs. *Leaves* 3-foliolate, long-petioled; *leaflets* 2-4 in. long, ovate, usually acute. *Racemes* sessile, few-flowered. *Calyx* ¼ in., densely hairy; teeth long, setaceous. *Corolla* reddish-purple, not much exserted [sic]. *Pods* 2-3 in the axils of the leaves, 1½-

2 in. long, linear-oblong, recurved, densely pubescent, subtorulose, 3-4 seeded.

"Sparingly cultivated within the area, and confined to a few of the Sub-Himalayan districts. It is grown more extensively on the lower slopes of the Himalaya up to 6,000 feet, from the Punjab eastwards; also in Bengal, on the Khasia, Manipur and Naga Hills, and in Burma, but nowhere in India has it been found truly wild. De Candolle considered the plant to be a native of Cochin China, Japan and Java at the time when the ancient inhabitants of that region began to cultivate it, and to use it as food. As grown within the area of this flora, and in other parts of India, it represents a very inferior form of soy bean. It is a rainy-season crop, and is usually sown in very poor land. Under proper cultivation the chemical composition of the bean shows it to be the richest of all the pulses in albuminoids and oil. In China and Japan various preparations are made from it, including soy-sauce, which is largely exported from those countries. The plant affords very excellent fodder for all kinds of stock, if harvested before it is fully matured." Address: B.A., F.L.S., Formerly Director of the Botanical Dep. of Northern India.

258. Pouchat, J. 1905. Légumes indigènes: Susceptibles d'être consommés par les Européens [Indigenous vegetables: Capable of being consumed by Europeans]. *Bulletin Economique de l'Indo-Chine* 8(48):1097-1151. New Series. [Fre]

• ***Summary:*** The short section titled "Soja: *Dolichos soja* (Lin.). Ann [Annamese]: Dau nanh" + Chinese characters (p. 1124) states that the soybean is cultivated abundantly by the Annamites, who consume it in large quantities and cook it in many different ways.

"The seed is very rich and very nourishing, however since it is a little hard, it should be soaked in water for 24 hours before cooking. It can be cooked in the same way as haricot beans.

The next entry, for Haricot mungo: *Phaseolus radiatus* (Lin.) Ann: Dau xanh + Chinese characters states: This bean can produce for the greater part of the year, except during periods of the greatest heat. An illustration shows a mound of mung bean sprouts [or perhaps azuki bean sprouts]. A Job's tears plant *(Coix lachryma (L.); Larmes de Job)* with seeds is discussed on pages 1142-43, with illustration, Annamese name, and Chinese characters. Address: Prof. d'Agriculture, Directeur p.i. [par intérim] de l'Ecole Profesionelle de Hanoi [Indochina]. Phone: 00000.

259. Bloch, A. 1906. Quelques mots sur la fabrication et la composition du Teou-Fou (Fromage de haricots chinois fourni par le *Soja hispida)* [Some remarks on the production and composition of tofu (Cheese from Chinese beans furnished by the *Soja hispida)]. Bulletin des Sciences Pharmacologiques (Paris)* 13:138-43. March. (Exp. Station Record 18:857). [Fre]

• ***Summary:*** The author, a pharmacist to France's colonial troops, describes tofu as *fromage de Haricots* (bean cheese) or *fromage de Haricots chinois* (cheese of Chinese beans) and gives a detailed description of how it is made. "It is said to be a food at the frontier of Tonkin [in today's Vietnam]; the church fathers of Szechuan speak of tofu in their dictionary, it is used in all of Pet-chi-li [Petchili or Chili, today's Hebei province] (I have helped several times in making it in the city of Tien-Tsin {Tientsin, Tianjin})." Note: Chihli was a former province in northeast China; its capital was Peking. In 1928 it was divided largely into Hebei (formerly called Hopei or Hopeh), Jehol, and Chahar. The largest part was Hebei. There was also a Gulf of Petchili / Chihli, which is today's Bo Hai, the huge gulf east of Tianjin.

Tofu shops start work at 1:00 in the morning and finish by 9-11:00 A.M. Soaked soybeans look a little like the French Flageolet. The mill used for grinding soybeans to make tofu is turned by an animal, usually a donkey. The puree is cooked for 10-30 minutes. From 1 kg of *Soja hispida* (soybeans) one can get 3.3 to 4 kg of tofu. Tofu is also made into sheets.

The author then gives a nutritional analysis of tofu (water 83.5%, protein 11.25%, oil 4.33%, ash 0.57%) and okara *(tourteau, teou-fou-tcha, le résidu*–water 88.75%, protein 10.85%, oil 0.4%, ash 0.36%). Finally he analyzes two coagulant solutions: Nigari *(solution coagulante, yen lou;* it is rich in magnesium chloride) and magnesium sulfate.

In conclusion Dr. Bloch recommends introducing tofu among France's Indochinese troops since it is rich in protein, contains no starch, is inexpensive, and can be used in a wide variety of forms and recipes, and is easily preserved in thin dried sheets.

This entire article was reprinted in *Annales d'Hygiene et de Medicine Coloniales* 9:298-304 (1906). German summary in *Chemisches Central-Blatt* 1906(1):1502-03. Address: Pharmaceutical doctor to the colonial troops (Docteur en pharmacie, Pharmacien-major de 2e classe des troupes coloniales).

260. Peltrisot, C.N. 1906. Les cultures alimentaires en Indo-Chine [The food crops of Indochina]. *Bulletin des Sciences Pharmacologiques (France)* 13:427-435. Aug. See p. 429-30, 434. [1 ref. Fre]

• ***Summary:*** "Next we will discuss the seeds of the soybean *(Soja hispida ou Glycine hispida)*. This interesting product is used in many ways: the most interesting is, undoubtedly, the preparation of soy cheese *(fromage de soja* [tofu]), which is real vegetable casein *(veritable caséine végétale)*.

Next is the complicated and difficult preparation of the fermented sauce, known under the name of *tuong* [a sort of

soft miso]. Then, the therapeutic use of soy bread *(pain du soja),* commended for diabetes, because of its low content of sugars and starches, and its richness in albuminoids *(albuminoïdes).* Finally, the industrial and food uses of the oil obtained by expression / pressing *(expression).*

A table of synonyms (p. 433-35) gives the family name, the scientific name, and vernacular / local name in Indochina of 66 plant species, including: "Légumineuses–*Soja hispida* Sieb et Zucc–Dâu nành."

Also discusses: *Cajanus indicus. Dolichos sinensis et tonkinensis.* Cowpeas *(Vigna sinensis).* Mung beans *(Phaseolus radiatus* L.; *haricot mungo),* which has green seeds, widely used for sprouting. An illustration (facing p. 430) shows mung bean sprouts and an entire mung bean plant. Job's tears *(Coïx Lacryma* L.; *larmes de Job).* Quinoa *(Chenopodium quinoa; Ansêrine, Quinoa blanc).* Address: Head of micrographic work, Elite Public College of Pharmacy of Paris (Chef des travaux micrographiques à l'École supérieure de Pharmacie de Paris).

261. *Revue de Service de l'Intendance Militaire (France).*1906. Les cultures alimentaires en Indo-Chine [The food crops of Indochina (Abstract)]. 19:856-65. Sept. [1 ref. Fre]

• ***Summary:*** A French-language summary of the following French-language article: Peltrisot, C.N. 1906. "Les cultures alimentaires en Indo-Chine" [The food crops of Indochina]. *Bulletin des Sciences Pharmacologiques* (France). 13:427-435. Aug. See p. 429-30, 434.

262. Dampier, William. 1906. Dampier's voyages: Consisting of a new voyage round the world, a supplement to the voyage round the world,... Edited by John Masefield. 2 vols. London: E. Grant Richards. Portrait. See vol. I, p. 580.

• ***Summary:*** The following passage appears in the chapter titled "The Voyage to Tonquin from Achin in Sumatra" (p. 557-612). "Year 1688. The Nuke-mum [nuoc-mam, fish sauce] is of a pale brown colour, inclining to grey; and pretty clear. It is also very savory and used as a good Sauce for Fowls, not only by the Natives, but also by many Europeans who esteem it equal with Soy. I have been told that Soy is made partly with a fishy Composition, and it seems most likely by the Taste: tho' a Gentleman of my Acquaintance, who was very intimate with one that sailed often from Tonquin to Japan, from whence the true Soy comes, told me that it was made only with Wheat, and a sort of Beans mixt with Water and Salt."

Captain William Dampier, an Englishman, lived 1652-1715. Address: Capt., London.

263. Kaempfer, Engelbert. 1906. The history of Japan, together with a description of the Kingdom of Siam 1690-1692. (translated by J.G. Scheuchzer from the original edition of April 1727. 3 vols). Glasgow, Scotland: James MacLehose and Sons. Vol. 1, xc + 334 p. Reprinted 1971 New York, NY: AMS Press Inc.

• ***Summary:*** Please see the original 1727 edition of this work for a long quote on soybeans, miso, shoyu, and azuki beans; it appears in this 1906 edition in Vol. 1, p. 187-88. Many of Dr. Kaempfer's botanical specimens may still be seen in the Natural History Museum, South Kensington. The front matter in this book is very interesting: The frontispiece shows a full-page portrait (illustration, painting) of Sir Hans Sloane. List of illustrations. Publisher's note. Biographical note of the Scheucher family, by Sir Archibald Geikie. To the King, by J.G. Scheucher. The names of the subscribers [alphabetical]. The author's preface. The life of the author, by the translator. An introduction, by the translator.

In the author's preface Kaempfer explains (p. xxix-xxxiii) that the Swedish Embassy, where he was secretary, was dismissed by the Persian Court. Since his native country Germany was at war, he decided to travel rather than to return home. He joined the Dutch-East India Company and went to Japan, where most visitors find it very difficult to obtain any information about the country, since all Japanese are obliged by solemn oath not to discourse with foreigners. But Kaempfer developed a rare friendship with his interpreters and the Japanese officers on his island (Deshima in Nagasaki Bay). He assisted them in the fields of medicine, astronomy, and mathematics, and in turn was able to learn about their country. Kaempfer was especially fortunate in gaining "the assistance of a discreet young man, by whose means I was richly supplied with whatever notice I wanted concerning, the affairs of Japan. He was about twenty-four years of age, well vers'd in the Chinese and Japanese languages, and very desirous of improving himself. Upon my arrival, he was appointed to wait on me, as my servant, and at the same time to be by me instructed in Physick and Surgery" (p. xxxii). The chief of the island allowed him "to continue in my service during the whole time of my abode in the Country, which was two years, and to attend me in our two journeys to Court, consequently four times almost from one end of the Empire to the other... As I could not well have obtain'd my end without giving him a competent knowledge of the Dutch language, I instructed him therein with so much success, that in a year's time he could write and read it better than any of our interpreters: I also gave him all the information I could in Anatomy and Physick, and farther allow'd him a handsome yearly salary, to the best of my abilities... There was not a Book I desired to see, on these and other subjects, which he did not bring to me, and explain to me, out of it, whatever I wanted to know."

A very interesting map of Japan shows each of the provinces and off-shore islands.

Note: The long index in volume 3, which makes interesting reading, includes acupuncture, algae (marine, used for food), amasake (amazake, see sake), *Amoenitates Exoticæ*, atheists, Buddhism & pagan worship, cami [kami], Canagawa [Kanagawa], cannnib, hempstuffs, Corea [Korea], Cublai–Tartar monarch, culis (see coolies), Deshima (island of Kaempfer at Nagasaki), Dutch East India Company, Fide Jori [Hideyori], Fide Joshi [Hideyoshi], Gendsii [Genji], gokokf [go-kokufu, chief kinds of peas], herbals, Hirando, Isje [Ise], Jejas [Ieyasu], Kami, Kioto (see Miaco), Koja [Koya], Marco Polo, Mikado, moxa, Nagasaki, oil seeds, opium, paganism, paper made by Japanese, pulse, Pythagoras, Quannon [Kwannon], religion, sago, saki [sake], salt, sasen [zazen], secular monarchs [Shogun], sesamum (plant and oil), Siaka (Buddha), Shimonoseki, submarine plants, Tokaido, Tokio, transmigration of souls, umbrellas, Wilstach (Maria Sophia, wife of Dr. Kaempfer). Address: Physician to the Dutch Embassy to the Emperor's Court, Edo (Tokyo), Japan.

264. Stuerler, F.A. von. 1906. Nederlandsch Oost-Indische cultuurgewassen: Hunne kenmerken, teelt en bereiding [Crops of the Dutch East Indies: Their characteristics, cultivation and preparation]. Tiel: A. van Loon. ii + 373 p. See p. 341-43. Illust. Index. 25 cm. [5 ref. Dut]
• ***Summary:*** The subsection on the hibiscus plant *(De Waroe-boom, Hibiscus tiliaceus,* p. 334) states that the leaves are used in making foods from soybeans [tempeh].

In the chapter on crops that yield oils and fats *(Vette oliegewassen,* p. 335-44), the section titled "Soja" (p. 341-43) has the following contents: General botanical characteristics: Introduction, the plant, stem, leaves, flowers, fruit, seeds. Cultivation. Chemical composition of the seeds, preparation, and uses.

The main product made with soybeans is soy sauce *(kètjap).* The Chinese in Java cook the soybeans and inoculate them between hibiscus leaves *(Hibiscus tiliaceceus)* to make tempeh *(tèmpé).* They also make *tao-tjo,* a sort of bean paste (Indonesian-style miso). And with the black soybeans the make a sort of bean cheese, tao-djie (soy nuggets). Also discusses peanuts *(aardnooten,* p. 335-37), sesame seeds *(sesam,* p. 337-39), the castor oil plant *(ricinus,* p. 339-41), other crops that yield oils and fats (p. 343-44).

Note: This is the earliest document seen stating that molds grown on Hibiscus leaves are used in Indonesia to inoculate tempeh. Address: Leiden.

265. Ball, Carleton R. 1907. Soy bean varieties. *USDA Bureau of Plant Industry, Bulletin* No. 98. 30 p. + 5 plates. May 27.
• ***Summary:*** This publication started a new system for naming soybeans, giving them common names such as Buckshot, Ogemaw, and Ito San. Contents: Origin and introduction of the soy bean. Variability. Classification: Key to the varieties. Descriptions of the varieties (23–including the source of the name and the numbers and sources of lots grown, incl. Agrost. No. and S.P.I. No.): Black-seeded group (Buckshot, Nuttall, Kingston, Ebony, Flat King, Riceland), Brown-seeded group (Ogemaw, Eda, Baird, Brownie), Mottled-seeded group (Hankow {with patch or saddle, and usually eccentric lines or stripes outside the patch}, Meyer), Green-seeded group (Samarow, Guelph), Greenish-yellow-seeded group (Yosho, Haberlandt, Tokyo {incl. Best Green}), Yellow-seeded group (Ito San {"It has long and widely sold under the names, 'Yellow,' 'Early Yellow,' 'Early White,' etc."}, Manhattan, Butterball, Amherst, Hollybrook, Mammoth). List of synonyms.

Note 1. This is the earliest document seen (Nov. 2003) containing a list and descriptions of early U.S. soybean varieties. Details on each of the 23 individual varieties discussed by Ball are given in separate records in this database with titles of the format "Buckshot: New U.S. domestic soybean variety" (for Buckshot).

Note 2. This is the earliest document seen (Nov. 2003) which tries to standardize early soybean varietal names / nomenclature to prevent confusion.

Note 3. This is the earliest English-language document seen (Sept. 2004) that uses the word "mottled" (or "mottling") or the word "stripes" to describe the color of soybean seeds. Note that both the mottled Hankow and Meyer varieties came from China.

"Classification: The first separation of the numerous forms or agricultural varieties of this species will naturally be through the colors of the seeds. The varieties having seeds of the solid colors black and yellow are by far the most numerous and most striking. The greens and browns are much less common and are also very variable in shade. The browns are of various shades of reddish brown and are also closely related to the mottled group. The yellows vary commonly into greenish shades, and any line drawn between the yellow and greenish yellow is only arbitrary. The yellows also vary into paler shades, and some have even been called 'white' in Japan. This is most noticeable in old seeds, but is never carried farther than pale yellow. It seems likely that none of the legumes commonly cultivated in Japan can have pure white seeds, like our navy beans for example, or the term 'white' would never be applied to a pale-yellow form. All yellow soy beans gradually turn paler with age for at least three to four years, although some varieties are originally paler than others. Although the black group shows more variation in the size of the seeds, the yellow is much more variable in color shades... Figure 1 shows an attempt to represent graphically the relationships and importance of the various color groups." Six color groups are recognized and described herein.

Distribution numbers: Part I is "serial numbers under which soy beans were distributed by the former Division of

Agrostology, with the name of the variety to which each has been referred." Part II is a "list of the serial numbers under which soy beans have been distributed by the Office of Seed and Plant Introduction and Distribution, with the name of the variety to which each is referred in this bulletin. Several S.P.I. numbers representing soy beans not studied by the writer are not included in the list. 3870–Hollybrook. 4285–Mammoth. 4912–Hollybrook. 4913–Amherst. 4914–Tokyo. 5764–Hollybrook," etc. up to "17852–Meyer." Note 4. One variety was often introduced several different times under different S.P.I. numbers, and that many varieties have an "Agrostology No." [Number] separate from their S.P.I. number. Description of plates.

"Origin and introduction of the soy bean (p. 7-8): The soy bean *(Glycine hispida* (Moench.) Maxim.) is an annual leguminous plant from the Orient. Its native home is said to be from southern Japan southward through eastern China and Indo-China to Java. In China and Japan it has been in cultivation for many centuries, certainly since before the beginning of the Christian era. In those countries it is easily the most important legume grown, and in some provinces it is the most important of all crops. Owing, perhaps, to the almost complete isolation of that part of the Orient, its cultivation spread only slowly to other lands. It is now grown to some extent in India, but its introduction there seems to be of recent date. It reached Europe probably in the latter part of the eighteenth century, and its arrival in England is credited to 1790. For several decades it was grown merely as a curiosity in botanic and private gardens. Investigation of the economic value of this plant began more than thirty years ago in Europe, rather earlier than in this country, but the soy bean has not yet attained any great prominence there.

"The soy bean has been known in the United States for more than three-quarters of a century. In the New England Farmer of October 22, 1829, Thomas Nuttall wrote of its possibilities as a crop for this country. For many years it was grown only in gardens as a curious plant from the Far East. The Perry expedition to Japan in 1853 brought back two varieties, a yellow and a red sort [azuki?], which were tested here in a limited way.

"During the last twenty years the soy bean has been the subject of many experiments to determine its agricultural value and adaptations. The agricultural experiment stations of Kansas and Massachusetts were pioneers in these investigations and seed was imported directly from Japan by both stations. Through these efforts considerable interest was aroused, and two or three varieties soon became available commercially. The number of forms and varieties in this country was further increased by additional importations made by enterprising seedsmen. Since 1898 the Office of Seed and Plant Introduction of the United States Department of Agriculture has secured from seven different countries of the old world no less than 65 different lots of soy bean seeds, representing about twenty varieties."

Page 2 lists the 28 people and divisions in the Bureau of Plant Industry. Beverly T. Galloway is chief of the Bureau. Merton B. Waite and Irwin F. Smith are pathologists. Walter T. Swingle is physiologist in charge of plant life history investigations. Mark A. Carleton is cerealist in charge of grain investigations. David Fairchild is in charge of seed and plant introduction. Charles V. Piper is agrostologist in charge of forage crop investigations. Palemon H. Dorsett is pathologist in charge of the plant introduction garden, Chico, California.

List of synonyms (p. 27): Adzuki = Ito San. Black = Buckshot. Brown Eda Mame = Eda. Crossbred No. 6 = Ogemaw. Early Black = Buckshot. Early Green = Guelph. Early Japan = Butterball. Early White = Ito San. Early Yellow = Ito San. Extra Early Black = Buckshot. Green = Guelph. Green Samarow = Samarow. Hollybrook = Hollybrook [sic]. Ito San = Ito San [sic]. Japanese No. 15 = Kingston. Kaiyuski Daizu = Ito San. Kiyusuki Daidzu = Ito San. Kysuki = Ito San. Large Black = Buckshot. Late Yellow = Mammoth. Mammoth Yellow = Mammoth. Medium Black = Buckshot. Medium Early Black = Buckshot. Medium Early Green = Guelph. Medium Green = Guelph, Ogema = Ogemaw. Southern = Mammoth. Yellow = Mammoth. Yellow Eda Mame = Ito San.

A color photo (frontispiece, facing the title page) shows one or two views of 22 different soy bean varieties, lined-up and numbered. Diagrams show: The probable relationships of the different groups of soy beans (block style; p. 10). The number of days required to reach maturity and the height of the plant in inches, with averages, for each variety of soy bean (graph plot; p. 13).

Note 5. This is the earliest document seen (Sept. 2004) that mentions the following soybean varieties: Amherst, Baird, Brown Eda Mame, Brownie, Buckshot, Butterball, Ebony, Eda, Flat King, Guelph, Haberlandt, Kingston, Large Black, Manhattan, Meyer, Nuttall, Riceland, Samarow, Tokyo, Yosho.

Note 6. This is the earliest document seen (Sept. 2004) which states that Black is the same as Buckshot, or that Brown Eda Mame is the same as Eda, or that Early Green is the same as Guelph, or that Early Japan is the same as Butterball, or that Large Black and Medium Black are the same as Buckshot, or that Yellow is the same as Mammoth. Address: Agronomist, Grain Investigations, USDA Bureau of Plant Industry.

266. Bloch, A. 1907. Le soja. Sa culture, sa composition, son emploi en médecine et dans l'alimentation [The soybean. Its culture, its composition, its use in medicine and in food]. *Bulletin des Sciences Pharmacologiques (Paris)* 14:536-51. Sept.; 14:593-606. Oct. [46 ref. Fre]

• ***Summary:*** A review of the literature drawing heavily on Egasse (1888), Trimble (1896 and 1897), and Williams & Langworthy (1897, revised 1899), and including many others. Contents: Introduction (mainly a long history of the soybean worldwide, with emphasis on Europe). Chemical composition of the soybean. Chemical composition of the soybean plant.

Part II: Preparation of shoyu. Preparation of miso. Natto. Preparation of tao-yu ([Chinese-style soy sauce] a condiment made with black soybeans, hibiscus leaves, and *Aspergillus Wentii* mold) and tuong. Tofu and yuba. Other soyfoods, incl. soy coffee.

"We are presently looking everywhere for ways of giving economic value to our colonies. It seemed interesting to me to draw attention to the soybean, the Chinese bean *(le Soja, Haricot chinois)* which contributes a large part of the food of the people in China, Japan, and the Far East. Already in use in Indochina, tested in Europe with success then abandoned for no apparent reason, the soybean could acclimatize itself in other colonies of ours, particularly in Madagascar, and perhaps in certain of our African possessions, and therefore could contribute to increasing their riches and the well being of their indigenous peoples."

Soy oil "can be extracted partially by pressure or completely by ether or petroleum ether. It is yellowish red with a not particularly disagreeable odor."

Mr. Lailleux, a former intern at the hospital in Algiers, has reported that a certain number of diabetic Arabs under treatment at the hospital of Dey, in Algiers [Algeria], have been helped by a dietary regimen based on soybean pap.

Note 1. This is the earliest document seen (Aug. 2009) concerning soybeans in connection with (but not yet in) Madagascar.

Note 2. This is the earliest French-language document seen (Feb. 2004) that mentions natto, which it calls *le natto.* Address: Pharmacist major 2nd class of the colonial troops. Doctor of pharmacy.

267. Ruata, Guido; Testoni, Giuseppe. 1907. La soia nell'alimentazione italiana [Soy in the Italian diet]. *Ministero d'Agricoltura, Industria e Commercio. Bollettino Ufficiale* 6(6):698-718. Dec. 18. (Chem. Abst. 2:864). [35 ref. Ita]

• ***Summary:*** Contents: Introduction. Description of the soybean. Cultivation and its history in Europe. Harvest and yield. Nutritional value of the soybean: Tables show analyses according to König (10 tables), to Balland (1 table analyzing 3 varieties, from Cambodia {Exposition of 1900}, from Cochin China, and from Tonkin), to Gautier (1 table), to Maurel (1 table), and to Lechartier and Joulie (from Grandeau 1903, analyzing 3 varieties, from Etampes, black soybean, and yellow soybean–all grown in France; each either as is or dry). Tables of nutritional analyses by Ruata & Testoni (includes the weight of 1,000 seeds for each variety): I. Black soybean, from Vilmorin-Andrieux of Paris, France; from Dammann & Co. [seedsmen] of Naples (Italy); and from the Inst. of Hygiene of Bologna, Italy. II. Giant Yellow, from Etampes (Pinolini), from Naples (Dammann), from Bohemia *(Boemia*–Ingegnoli); III. Small yellow soybean (from Dammann in Naples). IV. Green soybean (from Dammann). V. Brown soybean (from Dammann). The authors believe the Giant Yellow soybean is best adapted to Italian conditions. The analysis of the variety from Naples is as follows: Weight of 1,000 seeds: 205 gm. Water 9.80%. Albuminoids 37.13% *(albuminoidi,* protein) Carbohydrates 24.40%. Fat 18.36%. Lecithin 1.62%. Crude fiber 4.47%. Ash: 4.30%.

Preparation of soybeans (detailed descriptions and nutritional analyses): The whole seeds, miso *(Il miso),* tofu *(To-Fu* or *to-fu),* shoyu (made with koji), soy flour and bread *(farina e pane di soia,* incl. experiments by Brugia, and Rimini), soy polenta. Conclusions.

Three non-original illustrations (line drawings; between p. 700 and 701) show three different full-size views of the Soja plant, including: (1) Plant with roots. (2) Stem, leaves and pods. (3) Stem and pods (Original from Pinolini 1905).

Several bar charts (following p. 712) give nutritional composition comparisons of 12 staple foods, mainly legumes, cereal grains, dairy products, and meat: Fig. 2–Albuminoids (protein content); soya is the highest with 37.13%. Fig. 3–Carbohydrate content. Fig. 4–Fat content; soya is highest with 18.36%. Fig. 5–Salt *(Sali).*

Other tables show: (1–p. 701): For four soybean varieties, weight of 100 liters in kg and number of seeds per kg. Soia d'Etampes yellow 72 / 7,400. Black soybean from Podolia 74.5 / 7,400. Yellow soybean 72.5 / 8,550. Black soybean 73 / 12,200. Note that the black soybean has by far the smallest seeds.

Selected translations of the text: The first part of the article discusses dietary problems in Italy, especially pellagra, a skin disease caused by deficiencies in protein and niacin. One of the causes seems to be the consumption of corn, especially spoiled corn *(maiz guasto)* (p. 699-700). The authors are interested in studying the soybean as a potential new food for Italy, based on the examples from other countries where it has been consumed for a long time and where corn is unknown or almost unknown. They want to take the initiative in getting the best possible advantage from the introduction of soybeans as an Italian food (p. 700). In Italy the varieties which grow well are the early black, the yellow, the brown, the green, and the giant yellow; the latter is similar to the variety Soya Etampes, which has been acclimatized in France (p. 701). History in Italy: According to Pinolini, the soybean made its appearance around 1840, and has been cultivated with success around Verona, along the Lombard coast of Lake Maggiore, and near Mantua and Lucca (Mantova and Lucchese). As far as we know, it either was cultivated or is

still cultivated in Liguria, Friuli, the Marches, and Emilia. Around Naples, it is especially cultivated in San Giovanni a Teduccio, under the care of Dammann & Co., a seed company (p. 702).

In the year 1906 in a field annexed to the Institute of Hygiene, we conducted experimental cultivation of soybeans, sowing the black variety from Podolia, sent to us by the Vilmorin-Andrieux, a seed company in Paris. A similar experiment was carried out on a larger expanse of land, at the same time as ours and with the same seeds, by Dr. Ignazio Buldrini at his farm near Bologna. The land at the Institute of Hygiene, being rather rich in humus, was fertilized with phosphate fertilizer at the rate of 500 kg/ha and potassium sulfate at the rate of 100 kg/ha. Dr. Buldrini's land, well supplied with potassium and phosphoric anhydride,... was fertilized with plenty of manure. The seed was planted on both fields in early May. The vegetation developed regularly and in August we obtained a harvest that yielded 1,500 kg/ha of seeds reaching perfect maturation (p. 703).

Brugia (1902) has conducted numerous experiments in baking with soy flour, and here is what he writes about it: "It is necessary to find an inexpensive food with great nutritional value for the poor farmers and rural people. It would be ideal to be able to make bread from soybean flour, thus creating a food that would be physiologically balanced and complete." He first tried mixing soy flour with wheat flour in the proportions 50/50 and 30/60, but the results were unfavorable. Then they tried using brewer's yeast in the process and had very good results, except that the price was a little high. It was then necessary to substitute a mixture of bicarbonate of soda and cream of tartar (½ gm per 3 g of flour) for the brewer's yeast. This worked very well. He then gives a table showing the nutritional analysis of the best bread (p. 716). In the conclusions of his work, Brugia says: "Soy flour cannot be used by itself in baking. But mixed with wheat it gives an optimum bread, soft textured, complete and balanced nutritionally, economical, and convenient. A second table shows an analysis of soy bread published by Rimini (1902) (p. 716).

Soy polenta, a mixture of soy and corn, was named Soyenta by Haberlandt who first prepared it. It could be of nutritional benefit to the people in those parts of Italy who get almost all of their nutrients from polenta. We have conducted numerous tests to find a type of Soyenta (to adopt Haberlandt's name) which, because of taste and ease of preparation, could enter into the diet of our rural population without difficulty. Here are the results of our experiments with various types of Soyenta: (1) With whole yellow soy flour: The resulting product does not have a soft consistency; it is coarse and crumbles rather easily, but the taste is nice. (2) With sifted soy flour: This product is not as good as the previous one, because it is too sticky. The taste reminds us of infant cereal made of wheat flour. (3) Soy flour mixed with wheat flour in varying proportions: Not advisable because it presents in various degrees the difficulties of the former. (4) (p. 717). Soy flour mixed with corn flour: Best results were obtained with a mixture of 1 part soy flour to 4 parts corn meal (coarsely ground, Veronese style). The consistency of this product is not unlike that of regular polenta, and the flavor is also very close. Hot or cold it slices very well, and overall it can be used just like regular polenta, but it has more nutritional value (p. 717).

Note 1. This is the earliest Italian-language document seen that mentions tofu, which it calls *To-fu.*

Note 2.

Note 2. This is the earliest Italian-language document seen (March 2009) that uses the word "miso" *(Il miso)* to refer to miso.

Note 3. This is the earliest Italian-language document seen (Aug. 2003) that uses the term *albuminoidi* to refer to protein in connection with soybeans. Address: 1. Direttore dell'Istituto d'Igiene della Regia Universita di Bologna (Director of the Inst. of Hygiene at the Univ. of Bologna); 2. Insegnante nella Regia Scuola Media Commerciale, Direttore del Laboratorio chimico Compartimentale delle Gabelle di Bologna, Italy.

268. Savornin Lohman, C. de. 1907. Aanwijzingen voor het planten van Kadele [Instructions for planting soybeans]. *Beknopte Gegevens over Cultuurgewassen, Hunne Behandeling en Ziekten (Departement van Landbouw in Ned. Indië (Buitenzorg))* No. 6. [Dut]*
• ***Summary:*** JN: Beknopt = Concise, brief, succinct. Gegevens = Data, fundamental idea. Cultuurgewassen = Cultivated crops.

269. Balland, A. 1907. Les aliments; Analyse, expertise, valeur alimentaire. Vol. II. Légumes, fruits, viandes, laitages, conserves, boissons & fourrages [Foods: Analysis, expertise, food value. Vol. II. Legumes, fruits, meats, dairy products, conserves, beverages & fodder plants]. Paris: Librairie J.-B. Baillière et Fils. 508 p. See p. 180-81, Soja. [1 ref. Fre]
• ***Summary:*** The author notes the antiquity of the soybean in Cochin China (citing A. Candolle 1885) and their use in making tofu (citing A. Bloch 1906). He then gives nutritional analyses of three soybeans, one each from Cambodia, Cochin China, and Tonkin, obtained at an exposition in the year 1900. Their protein content *(matières azotées)* is 35.14%, 34.85%, and 38.41%, and their fat content *(matières grasses)* is 14.80%, 12.95%, and 13.35% respectively.

Note: This is the earliest document seen (May 2010) concerning soybeans in Cambodia (renamed Kampuchea in 1979). This document contains the earliest date seen for soybeans in Cambodia (1900). The soybean was probably

being cultivated in Cambodia at that time. The source of these soybeans is unknown. Address: Ancien Pharmacien Principal au Laboratoire des Expertises du Comite de l'Intendance, France.

270. Gagnepain, Francois. ed. 1907. Flore générale de l'Indochine. Vol. 2 [A general flora of Indochina. Vol. 2]. Paris: Masson et Cie. 1213 p. See p. 398-99. Published under the direction of H. Lecompte. [ soy ref. Fre]

• ***Summary:*** In the section on the genus Glycine, there is a subsection on *Glycine soja* Sieb et Zucc. Cultivated in Tonkin, Laos, Cochinchine. Vernacular names: *Dàu nanh, Mak toua kon* or *ta tone*. Uses: The seeds can be consumed like those of the haricot, or used to make a cheese [tofu] or a condiment, and they also yield oil. The black variety is used to feed livestock. The stem and leaves can be used as forage. The author lived 1866-1922.

Note: This is the earliest document seen (May 2010) concerning soybeans in Laos, or the cultivation of soybeans in Laos. This document contains the earliest date seen for soybeans in Laos, or the cultivation of soybeans in Laos (1907). The source of these soybeans is unknown.

271. Hurrier, Paul. 1907. Matière médicale et pharmacopée Sino-Annamites [Chinese and Annamite (Vietnamese) materia medica and pharmacopoeia]. Paris: Vigot Frères. viii + 292 p. Illust. Index. 25 cm. Preface by Prof. Em. Perrot. [25 ref. Fre]

• ***Summary:*** The book begins with a chapter titled "History of medicine in China," which includes many abbreviated bibliographic references in the text. Pages 21-22 discuss acupuncture and a large fold-out illustration (facing p. 20) shows several views of the meridians on the human body. Part two of the book, titled "Special Chinese and Annamite drugs with therapeutic uses," contains four chapters: 1. Mineral kingdom. 2. Animal kingdom. 3. Vegetable kingdom. 4. Five indexes: Latin names, Chinese names, Annamite names, Japanese names, and Cambodian names.

In chapter 3, "Vegetable kingdom," in the section on Legumes (p. 144) is a subsection titled *Dolichos soja* L. (p. 147). It begins with the three Chinese characters for "Yellow soy bean" = *Teou-Ko* (Mérat); *Mau-tau* (Porter Smith); *Houang-teou* (in Chinese), *Dan-dèn* (in Annamite). The laxative seeds of this variety are used to make a special condiment, soy sauce *(le soy; Tsiang-yu)* composed of soybean flour, tea, and salt. From the cooked seeds, the Annamites make a vegetable cheese *(fromage végétal; Teou-fou)*, which resembles goat cheese, and of which they consume very large amounts. Mr. Bloch, in a recent study on tofu *("Quelques mots sur la fabrication et la composition du Teou-Fou,"* published in *Bulletin des Sciences Pharmacologiques* (Paris), March 1906, p. 138-43), described the process of making tofu, which is coagulated witb magnesium chloride. The entire plant is used to make a decoction for treating smallpox and rheumatism.

*Glycine javanica (no-mame* in Japanese is also mentioned on p. 148).

Also discusses: Various sea vegetables *(kombu, kanten, funori, amanori;* p. 71-72). *Cannabis sativa* (hemp; p. 102). *Phaseolus radiatus* = small red bean (azuki in Japanese; p. 150). *Sesamum orientale* (sesame seeds; kuro-goma [black sesame] and shiro-goma [white sesame] in Japanese; p. 178). Address: Pharmacien de 1re class, Docteur de l'Université de Paris, France.

272. Jumelle, Henri L. 1907. Les resources agricoles et forestiéres des colonies Françaises [The agricultural and forestry resources of the French colonies]. Marseille, France: Barlatier, Imprimeur-Éditeur. viii + 442 p. See p. 333. No index. 28 cm. [2 ref. Fre]

• ***Summary:*** In the chapter on Indo-China (p. 267-363) is a section on coconuts (p. 322+) followed by a section on "Other oil-bearing plants" *(Les autres plantes oléagineuses)*, which contains paragraphs (p. 326-27) on the sesame seed *(Le sésame*, cultivated in Cambodia) and the peanut *(L'arachide*, long cultivated in Cochin China and central and south Annam). Some confusion exists concerning the oil of *Aleurites cordata* (Chinese wood oil, *l'huile d'abrasin)* (p. 331-32): "Why is this oil, so well known and widely used in Indo-China, not exported, as is its analogous oil from China? It is not ignored by European and American manufacturers; and in the United States, as in Europe, it is in demand * by the factories that make linoleum or that prepare varnish from copal." (Footnote: *"It seems that the oil imported into Europe and the United States is often adulterated with oil from the seeds of *Soja hispida* [soybeans], which is likewise a very drying oil").

The next section, titled "The indigenous food" *(L'alimentation indigène)* (p. 332-35) includes a discussion of various legumes consumed in Indo-China. "Among the leguminous seeds used as food, there is a large consumption of kidney-beans *(de haricots)*, of dolichos beans *(de doliques)*, and, even more, of soybeans *(de sojas).*" "The large consumption of the soybean *(du soja)* is due to the fact that its beans, not only are eaten after a long cooking, but, again, serve as the base for various preparations, as in Japan and China (Footnote: It is with these soybeans, mixed with wheat and *koji*, and coarse salt, that the Japanese make their *shoyou [shoyu*, soy sauce] and their *miso*, and the Chinese their sauces or analogous dishes, *teou-ju* and *teou-tiung*. In Java, the indigenous people make similar preparations. The fermentations are, in all these cases, caused by various molds.) It is thus that the Annamites [of central Vietnam] make a cheese called *dau-phu*, which is the *teou-fou* of the Chinese, the *tofu* of Japan. They likewise make a sauce named *tuong*, which is almost the same as the *teou-tiung [doujiang]* of the Chinese, and two cheeses [tofu], one

solid, the other of a softer consistency, called *dau-hu* and *dau-hu-ao* in Cochin China." Address: Prof., Faculte des Sciences de Marseille [Marseilles], France.

273. Lan, J. 1907. Le maïs au Tonkin [Corn in Tonkin]. *Bulletin Economique de l'Indochine (Hanoi)* 10:212-28. New Series. See p. 223, 226. [Fre]

• ***Summary:*** Soybeans *(dau-tuong; Glycine hispida* Maxim.) were interplanted with corn in today's Vietnam. In 1906 experiments were conducted by Messrs. Borel and Broemer at the agricultural station of Quang-Ngai; they used soybean cakes *(tourteaux de soja)* as a fertilizer for corn. Address: Sous-Inspecteur d'Agriculture.

274. Bloch, A. 1908. Le soja. Sa culture, sa composition, son emploi en médecine et dans l'alimentation [The soybean. Its culture, its composition, its use in medicine and in food]. *Annales d'Hygiene et de Medecine Coloniales* 11:85-122. [29 ref. Fre]

• ***Summary:*** This article is identical to that published by Bloch in 1907 in *Bulletin des Sciences Pharmacologiques* (Paris). Address: Pharmacist major 2nd class of the colonial troops. Doctor of Pharmacy.

275. Morse, Hosea Ballou. 1908. The trade and administration of the Chinese empire. London, New York, Bombay, and Calcutta: Longmans, Green and Co. xv + 451 p. See p. 206, 296, 318. Illust. Index. 22 cm.

• ***Summary:*** An important early book on this subject. A second edition was published in 1913, and a third edition in 1921. The dedication states: "Thirty-three years ago [from 1907, i.e. in about 1874] four young men came to China direct from the halls of Harvard. To the other three, the fourth dedicates this work." The Preface begins: "This book is intended to portray the present state of the Chinese Empire, with such record of the past as will show by what process the evolution of the existing state has been reached." It continues: "The first two chapters on Chinese History have been written by the Rev. F.L. Hawks Pott, D.D., President of St. John's College at Shanghai, and author of the useful *Sketch of Chinese History.* His task of condensing the history of forty centuries into as many pages has been performed in a very judicious way."

A color map (facing p. 8) shows "The gradual extension of the Chinese empire." China originated in the northeast part of today's China, in the area around Shansi, Chihli, and northern Shantung provinces, southeast of Peking. The main river was the Yellow River, and the key cities were Lo-yang / Luoyang (the capital of several early dynasties) and Ch'ang-an / Changan or Hsi-an / Xi'an (the capital of 11 dynasties, beginning with Chou–founded 1111 B.C.). The empire gradually spread southward.

In Chapter 7, titled "The provinces and treaty ports," under Manchuria (p. 205-09) we read (p. 206): "The western part of this province is made up of the plain of the Liao and the valleys of its tributaries, and grows wheat and durra for food, and beans from which are made an esculent and illuminating oil, and bean-cake shipped to restore exhausted fertility to the fields of Japan and of Kwangtung." These beans are soy beans.

Chapter 9, titled "Foreign trade" notes that "silks of China reached the Roman Empire, following presumably the Central Asian caravan routes which were later followed by the Polo brothers and their nephew, Marco Polo" [lived 1254-1324; arrived in China 1375].

"The Portuguese were the discoverers of the East, as the Spanish were of the West, and the first recorded arrival of a European ship in China was that of Raphael Presetrello, who sailed from Malacca [a city in 21st century Malaysia on the Strait of Malacca] about 1511. Six years later, in 1517, Fernando Perez de Andrade entered Canton waters and was well received by the local officials, then as ever quite ready to encourage trade, and was allowed to proceed in person to Peking." The Spanish first arrived in China in 1575, when they were well received at Canton.

In this chapter, in the section on Exports, is a subsection on [soy] beans which states (p. 296-97): "Beans are used to make an oil for cooking and, prior to the introduction of kerosene, for illuminating purposes; the bye-product of this process, bean-cake, is used to fertilise the fields chiefly of Kwangtung and Japan. The foreign export of beans is first recorded in 1870 with shipment of 578,209 piculs, and of bean-cake in 1890 with 96,297 piculs; in 1905 the export of beans was 2,665,523 piculs, of which 80 per cent. went to Japan, and of bean-cake 2,897,948, entirely for Japan; in addition, over two million piculs of beans and two and a half million piculs of bean-cake were imported into Kwangtung ports. The chief source of production is Manchuria, next to that Shangtung, Hupeh, and the lower Yangtze."

The section titled "Oil seeds" (p. 298) discusses only cotton, rape, and sesamum seeds; these have only recently entered into foreign trade. In 1888 the export of rape-seed was 873 piculs, and of sesamum-seed 3,027 piculs. The sesamum seed goes chiefly to Germany and Japan.

In Chapter 10, titled "Internal Trade" (p. 302-22), the subsection on "Beans" states (p. 318): "Beans were shipped in 1903 (much of the trade was diverted from Manchuria during the Russo-Japanese War) to the extent of 3,423,766 piculs from Newchwang, 1,928,543 piculs from Hankow, 404,063 piculs from Chinkiang, and enough from other ports to make a total of 6,327,080 piculs; of this quantity 1,836,707 piculs were shipped to Japan, some 72,000 piculs to other foreign destinations, and the balance, except 590,000 piculs for Amoy, went to the Kwangtung ports, Canton and Swatow. In the same year *Bean-cake* was shipped, 4,553,367 piculs from Newchwang, 1,192,948 piculs from Chefoo, 583,095 piculs from Hankow, 423,447

piculs from Chinkiang, with total shipments of 7,030,325 piculs; of this quantity 3,400,444 piculs went to Japan, and the balance, except 731,161 piculs for Amoy, went to Kwangtung."

Also discusses internal trade of ground-nuts, hemp, jute, and ramie (p. 319). "Oil-seeds" (cotton-seed, rape-seed, and sesamum-seed) and "Vegetable tallow" (expressed from the seeds of *Stillingia sebifera)* are discussed on p. 320. A table (p. 321) gives details on railways in for each province of China (incl. Manchuria), including the points served and length in miles (completed, and under construction in late 1906). Address: A.B. (Harvard), Shanghai, China.

276. Watt, George. 1908. Commercial products of India. Being an abridgment of "The Dictionary of the Economic Products of India." London: John Murray. viii + 1189 p. See p. 564-65. [15 soy ref]

• ***Summary:*** Since Watt's *Dictionary of the Economic Products of India* has been out of print for some time, the Government of India asked him to write an updated 1-volume abridgement. He said that soybeans in India were first introduced from Indonesia. "The Soy Bean; in Indian vernaculars, *bhat, ram, gari-kulay, hendedisom horec, pond disom, an-ing-kiyo, tzu-dza, bhatnas, seta, musa, khajuwa,* etc.

"A sub-erect or creeping annual native of China, Cochin-China, Japan and Java, comparatively recently introduced into India, though recorded as acclimatised and even seen as an escape from cultivation. It might, in fact, be described as extensively cultivated, though more as a garden than a field crop; is especially prevalent in Eastern Bengal, Assam (Barpeta Sub-division), the Khasia hills, Manipur, the Naga hills and Burma. It is not infrequent in the plains of India proper, especially in Busti, Gorakhpur, Patna and Purnea, etc. In Bombay and Madras, however, the Soy Bean has apparently hardly passed the experimental stage.

"Cultivation.–Two chief varieties occur, one called white, the other black. On the plains it is generally grown by itself as a *kharif* (autumn) crop. The seeds are sown from June to September, and harvested from November to December... In Assam it is sown with*áhu* (autumn rice) in April and May. The*áhu* crop is removed in July and August, and its stubble acts as a support for the bean plants, which are ready for harvest in December and January."

"It is eaten in India in the localities where it is cultivated, chiefly in the form of *dál* or *satú.* In Japan it is largely used as a sauce, cheese *(natto)* or paste, and in China an edible oil is obtained from the seed. If cut when the pods are fully formed it makes a most nutritious fodder, and the seed-cake, as already stated, is an extremely rich cattle food."

Also discusses: Alfalfa (p. 778). Almonds *(Prunus amygdalus,* p. 905). Broad bean or Windsor bean *(Vicia faba,* p. 1106-07. "There are two distinct forms, the long-podded and the broad-podded, the latter originating the name 'Broad' or 'Windsor bean'"). Chufa *(Cyperus esculentus,* p. 465; also called Rush-nut, earth-almond, or tiger-nut). Coffee (p. 363-68, with an excellent history). Cowpeas (p. 1107-08). Lucerne or alfalfa *(Medicago sativa,* p. 778-79). Mung bean, *udid,* and *urud / urd (Phaseolus mungo* or *P. radiatus,* p. 880-82). Sea-weeds (Kelp, p. 50). Address: Kew Gardens, England; Formerly, Prof. of Botany, Calcutta Univ., Superintendent Indian Museum (Industrial Section) and reporter on economic products to the Government of India.

277. *USDA Bureau of Plant Industry, Inventory.*1909. Seeds and plants imported during the period from January 1 to March 31, 1908. Nos. 21732 to 22510. No. 14. 64 p. Jan. 9. Also titled USDA Bureau of Plant Industry, Bulletin No. 137.

• ***Summary:*** Soy bean introductions: Glycine hispida (Moench) Maxim. [Note the first use of this terminology in this publication.]

21754-21757. "From Paris, France. Purchased from Vilmorin-Andrieux & Co. Received January 3, 1908.

"21754. Yellow seeded.

"21755. *Ogemaw.* Extra early, brown seeded.

"21756. Black seeded.

"21757. Extra early, black seeded."

21818. "From Paris, France. Purchased from Vilmorin-Andrieux & Co. Received January 17, 1908. *Ito San.* Called by the French, *Yellow Etampes.*

21825. "From Hokkaido, Japan. Presented by Mr. K. Hashimoto, Kuchchau Agricultural Society, Abutagun. Received January 14, 1908. *Amherst* (?). 'Used in the manufacture of "soy," "miso," "tifu" [tofu], etc.' *(Hashimoto.)"*

21830/21831. "From Hokkaido, Japan. Presented by the Yokohama Nursery Company, Yokohama, Japan. Received January 24, 1908.

"21830. *Butterball.* Japanese name *Akita.*

"21831. Japanese name *Rumoi."*

21946. "From Buitenzorg, Java. Presented by Dr. M. Treub, director of the Department of Agriculture. Received February 11, 1908. *'Zwarte kadelee'"* [black soybeans].

21999. "Received through Mr. F.N. Meyer, agricultural explorer for this Department at the Plant Introduction Garden, Chico, Cal., February 12, 1908. From Boshan, Shantung, China. '(No. 799a, Sept. 18, 1907.) A rare variety of soy bean, sparsely grown near Boshan. Chinese name *Ta ha tau.* Used by the higher classes as a vegetable in soups.' *(Meyer.)"*

22311/22312. "From Shanghai, Kiangsu, China. Presented by Rev. J.M.W. Farnham, Chinese Tract Society.

Received March 11, 1908.

"22311. Black. 'Similar to *Nuttall* but larger.' *(Neilsen.)*

"22312. Yellow."

22317-22322. "From Erfurt, Germany. Purchased from Haage & Schmidt [seedsmen]. Received March 16, 1908.

"22317. Probably *Butterball.*

"22318. *'Giant Yellow.'* Probably *Amherst.*

"22319. Brown.

"22320. *Samarow.* Like No. 17260.

"22321. Probably *Cloud.*

"22322. *'Early Black* from Podolia [Ukraine].' Probably *Buckshot."*

22333-22337. "Grown at Arlington Experimental Farm, Virginia, season of 1907. Received March 19, 1908.

"22333. *Baird.* 'This variety was mixed with *Brownie* when received from Pingyang [Pyongyang / P'yongyang], Korea. This mixture was given S.P.I. No. 6414. The two varieties were grown together under these numbers, 9417, 17256, and Agrost. No. 1542, respectively. The two varieties were separated in the 1907 seed from Arlington Farm, and *Baird* given the above new number, *Brownie* remaining as No. 17256.' *(Nielsen).*

"22334. Flat black. 'Received from Mr. H.B. Derr, Agricultural Experiment Station, Champaign, Illinois. The original source of the seed is not known. It is quite similar in growth to *Nuttall,* but the seed is not the same shape, being flatter and larger.' *(Nielsen.)*

"22335. Yellow. 'Received from Mr. H.B. Derr, Agricultural Experiment Station, Champaign, Illinois, where it was grown as *Illinois Medium Yellow.* It is very similar to *Hollybrook,* and perhaps is the same, but appears different on account of having been grown farther north.' *(Nielsen.)*

"22336. *Guelph.* 'Received from Mr. H.B. Derr, Agricultural Experiment Station, Champaign, Illinois. Original seed was procured from the Agricultural Experiment Station, Wooster, Ohio.' *(Nielsen.)*

"22337. *Guelph.* 'Received from Mr. H.B. Derr, Agricultural Experiment Station, Champaign, Illinois. Original seed was procured from the Agricultural Experiment Station, Fayetteville, Arkansas' *(Nielsen.).*"

22379-22381. "From Canton, Kwangtung [province], China. Presented by Dr. J.M. Swan, Cooks Hospital. Received March 20, 1908.

"22379. Yellow.

"22380. Black.

"22381. Green mixed with yellow and a few brown."

22406/22407. "From Hongkong, China. Presented by Mr. S.T. Dunn, Botanical and Forestry Department. Received March 26, 1908. [Note: It is not clear whether or not they were ever cultivated in Hongkong. These two soybeans (#22406 and #22407, both black seeded) were later given the names "Hongkong" and "Nigra" respectively, and introduced to the USA in about 1910].

"22406. Yellow.

"22407. Black."

22411-22415. "From Naples, Italy. Purchased from Dammann & Co. Received March 25, 1908.

"22411. *Samarow.*

"22412. Black. 'Similar to *Cloud.' (Nielsen.)*

"22413. Brown.

"22414. Yellow. 'Similar to *Acme.' (Nielsen.)*

"22415. Giant yellow."

"Glycine soja Sieb. & Zucc." [Note the first mention of this species.] 22428. "Grown at Arlington Farm, Virginia, season of 1907, under C.V.P. No. 0474. Received March, 1908. 'Original seed presented by the Botanic Gardens, Tokyo, Japan. A near relative to the soy bean, but a spreading or decumbent plant, abundantly provided with large root nodules. Has considerable promise as a cover or green manure crop.' *(Piper.)*"

22498-22501. "From Hangchow, Chehkiang, China. Presented by Dr. D. Duncan Main, through Mr. J.M.W. Farnham, Shanghai, China. Received March 26, 1908.

"22498. Yellow. Similar to No. 18619.

"22499. Yellow.

"22500. Green. Similar to No. 17857.

"22501. Black."

22503-22507. "From Yokohama, Japan. Purchased from L. Boehmer & Co. Received March 31, 1908. The following seeds with Japanese names quoted; varietal descriptions by Mr. H.T. Nielsen:

"22503. *'Teppo Mame.'* Yellow, similar in appearance to *Amherst,* No. 17275.

"22504. *'Kaze Mame.'* Green.

"22505. *'Gogwatsu Mame.'* Yellow, similar to *Haberlandt,* No. 17271.

"22506. *'Maru Mame.'* Yellow.

"22507. *'Vieuri Lei.'* Green, similar to *Yosho,* No. 17262." Address: Washington, DC.

278. Grijns, G. 1909. Over polyneuritis gallinarum. II. [On polyneuritis. II.]. *Geneeskundig Tijdschrift voor Nederlandsch Indie* 49:216-38. Jan. [10 ref. Dut]
• ***Summary:*** Experiments with cocks indicate that the vitamin content of soybeans is lower than that of katjang idjoe (Cacang ijo [Kacang ijo]; Phaseolus radiatus var. Javan.; mung bean, now named Vigna radiata).

Note: Polyneuritis may be caused by a deficiency of the vitamin thiamine. Address: Treasurer, Geneeskundige Wetenschappen in Nederlandsch-Indië.

279. *USDA Bureau of Plant Industry, Inventory.*1909. Seeds and plants imported during the period from April 1 to June 30, 1908. Nos. 22511 to 23322. No. 15. 81 p. Feb. 25. Also titled USDA Bureau of Plant Industry, Bulletin No. 142.
• ***Summary:*** Soy bean introductions: Glycine hispida (Moench) Maxim.

22534/22535. "From Weihsien, China. Presented by Mrs. C.W. Mateer. Received April 4, 1908.

"22534. Yellow. 'This bean is used for making lamp and cooking oil and for flour to make cakes; also for bean curd (a mush curdled by caustic soda and eaten fried). All these are nourishing, but more esteemed by Chinese than foreigners. The refuse after expressing the oil forms a cake (round) 2 feet in diameter and 3 inches thick. This is exported for feeding animals (pounded fine) and enriching land.' *(Mateer.)*

"22535. Black. Similar in appearance to *Cloud.*"

22536-22538. "From Chefoo [Yantai], Shantung, China. Presented by Mr. Hunter Corbett, through Rev. J.M.W. Farnham, of Shanghai, China. Received April 4, 1908. The following seeds, varietal descriptions by Mr. H.T. Nielsen:

"22536. Green. Similar to No. 17857.

"22537. Green. Similar to No. 17262, *Yosho.* 'Chinese names (S.P.I. No. 22536) *Ching teo* and *Luh teo;* (S.P.I. No. 22537) *Whong teo.* These beans are used extensively for the manufacture of oil; the bean cake which remains after the oil has been pressed out is shipped south and extensively used as a fertilizer in vegetable gardens. Will grow well on level or high and hilly land. Is used by the people largely for food, being ground and made into a curd, also put in water and soaked until well sprouted and used as a vegetable. It is also boiled and eaten in the same manner as rice.' *(Corbett.)*

"22538. Black. Similar in appearance to *Cloud.* 'Chinese name *Shao hih teo.* Used chiefly for feeding animals.' *(Corbett.)"*

22633/22634. "From Sheklung, Kwongtung [Kwangtung / Guangdong], China. Presented by Mr. A.J. Fisher, American Presbyterian Mission. Received April 3, 1908.

"22633. Yellow. Similar in appearance to *Acme,* No. 14954, but seed is a trifle larger.

"22634. Black. Seed flatter than any other of the same size received from China."

22644-22646. "From Hangchow, Chehkiang, China. Presented by Mr. John L. Stuart. Received April 18, 1908. The following seeds, varietal descriptions by Mr. H.T. Nielsen:

"22644. Smoky yellow. Looks like it might possibly be a mixture.

"22645. Greenish yellow. Similar in appearance to *Haberlandt,* No. 17263.

"22646. Yellow. Practically identical with No. 18619."

22714. "From Saigon, Cochin China. Presented by Mr. Jacob E. Conner, American consul. Received April 21, 1908. Yellow."

22874-22885. "From Tokyo, Japan. Purchased from the Tokyo Plant, Seed, and Implement Company. Received May 14, 1908. The following seeds, varietal identifications and descriptions made by Mr. H.T. Nielsen:

"22874. Green.

"22875. *Flat King.* Same as Nos. 19982 and 17252.

"22876. Yellow. Similar in appearance to *Hollybrook,* No. 17269.

"22877. *Okute.* Apparently identical with No. 19986.

"22878. *Butterball.* Apparently identical with Nos. 19981 and 17273.

"22879. Yellow. Evidently two varieties; most of the seed very similar in appearance to *Acme,* No. 14954.

"22880. Yellow. Quite closely resembling *Hollybrook.*

"22881. Green.

"22882. Yellow. Apparently identical with No. 20892.

"22883. *Buckshot.* Apparently identical with No. 19987.

"22884. Yellow, with a slight purple marking on many of the seeds.

"22885. *Amherst.* Apparently identical with Nos. 19983 and 17275."

22886. "From Swatow [Shantou], Kwangtung [province], China. Presented by Mr. William Ashmore, Jr., through Rev. J.M.W. Farnham, Chinese Tract Society, Shanghai, China. Received May 14, 1908. Black."

22897-22901. "From Paotingfu, Chihli [later Baoding, Hebei], China. Presented by Rev. J.W. Lowrie, D.D., through Rev. J.M.W. Farnham, Chinese Tract Society, Shanghai, China. Received April 22, 1908. The following seeds. Chinese names in italic as given by Mr. Lowrie. Descriptions of varieties by Mr. H.T. Nielsen.

"22897. *Da ching don.* Green. Similar to No. 17857.

"22898. *Hwang don.* Yellow.

"22899. *'Hei don.* Boiled as a fodder for mules and horses. Oil expressed from it, and refuse used as manure.' *(Lowrie.)*

"22900. *'Da wu don.* Tends to vary after successive plantings.' *(Lowrie.)* Black. Similar in appearance to *Nuttall,* Nos. 17253 and 19183, but has green cotyledons.

"22901. *Hsiao bai hei don.* Smoky yellow."

22919-22922. "From Ingchung, via Fuchau, China. Presented by Mr. J. Willis Hawley. Received May 22, 1908. The following seeds. Varietal descriptions by Mr. H.T. Nielsen:

"22919. Black. Very similar to No. 22886.

"22920. Yellowish green.

"22921. Yellow. Very similar to No. 22714.

"22922. Yellow. Seed resembles *Mammoth* very closely, but slightly smaller."

22927. "From Shanghai, Kiangsu, China. Presented by Rev. J.M.W. Farnham, Chinese Tract Society. Received May 27, 1908. Black. 'Identical with *Shanghai,* No. 14592; cotyledons are green.' *(Nielsen.)"*

23205. "From Shanghai, Kiangsu, China. Presented by Dr. S.P. Barchet, interpreter, American consulate. Received June 30, 1908. 'Similar in appearance to *Ebony,* No. 17254.'

*(Nielsen.)* An important bean for dry rice land. Chinese name *Pu chi.' (Barchet.)*"

23207-23209/23211-23213/23229/23232. "From China. Received through Mr. Frank N. Meyer, agricultural explorer, and brought by him to the Plant Introduction Garden, Chico, Cal., June, 1908. Forwarded to Washington, D.C., and received July 6, 1908. The following seeds:

"23207. From Soochow, Kiangsu, China. '(No. 960a, April 27, 1907.) A large, greenish soy bean, grown around Soochow on the rather low-lying lands. Used when slightly sprouted as a vegetable. Chinese name *Tsin tou.' (Meyer.)*

"23208. From Tangsi, Chehkiang, China. '(No. 961a, April 20, 1908.) A large, yellow soy bean, often purplish colored on one side. Considered locally a very good variety. Chinese name *Sian chu tou.* Grows on the ridges around inundated rice fields.' (Meyer.)

"23209. From Tangsi, Chehkiang, China. '(No. 962a, April 20, 1908.) The ordinary variety of yellow soy bean as grown around Tangsi on the ridges and strips of land around and between inundated rice fields. Chinese name *Huang tou.' (Meyer.)*

"23211. From Tangsi, Chehkiang, China. '(No. 964a, April 20, 1908.) A very dark brown colored soy bean, grown near Tangsi; said to be very productive. Chinese name *Tsze pi tou.' (Meyer.)*

"23212. From Hangchow, Chehkiang, China. '(No. 965a, April 24, 1908.) An early-ripening, yellow soy bean, called the sixth month's bean, meaning ripening in the Chinese sixth month (our July). Chinese name *Lu ya pai mou tou.' (Meyer.)*

"23213. From Hangchow, Chehkiang, China. '(No. 966a, April 24, 1908.) A yellow soy bean called the seventh month's bean, meaning ripening in the Chinese seventh month (our August). Called in Chinese *Chi ya pai mou tou.' (Meyer.)*

"23229. From Tientsin, Chihli, China. '(No. 982a, April 4, 1908.) A dark brown colored soy bean; rare. Said to grow near Tientsin. Used for human food; boiled in soups or as a vegetable when slightly sprouted. Chinese name *Tse doh.' (Meyer.)*

"23232. From Shanghai, Kiangsu, China. '(No. 985a, May 11, 1908.) The *Barchet* soy bean, growing on wet rice lands. Chinese name *Ma liao tou.* Obtained through Dr. S.P. Barchet, of Shanghai, who procured these soy beans from Chinhuafu, in the Chehkiang Province, central China.' (Meyer.)"

23291/23292/23296/23297/23299/ 23303/23305/ 23306/23311/23312. "From China. Received through Mr. Frank N. Meyer, agricultural explorer, and brought by him to the Plant Introduction Garden, Chico, Cal., June, 1908; forwarded to Washington, D.C., and received July 6, 1908. The following seeds:

"23291. From Wutaishan, Shansi, China. '(No. 922a, Feb. 26, 1908.) Black soy bean, growing at 5,000 to 6,000 feet elevation. Are considered by the Chinese the best food for their hard-working mules and horses; they must always be boiled before being fed to the animals; otherwise they may cause colic; the Chinese also mix a liberal quantity of sorghum seed and chopped straw with these beans. Chinese name *Ghae doh.' (Meyer.)*

"23292. From Wutaishan, Shansi, China. '(No. 923a, Feb. 26, 1908.) Yellow soy bean. Growing at 5,000 to 6,000 feet elevation. They are used all through northern China for making bean curd and bean vermicelli. Chinese name *Huang doh.' (Meyer.)*

"23296. From Taichou, Shansi, China. '(No. 929a, March 2, 1908.) Yellow soy beans, found growing on strongly alkaline lands. Chinese name *Huang doh.'* For further remarks see No. 923a (S.P.I. No. 23292).' (Meyer.)

"23297. From Taichou, Shansi, China. '(No. 930a, March 2, 1908.) Black soy bean. Grows on strongly alkaline lands. Chinese name *Ghae doh.'* For further remarks concerning their uses see No. 922a (S.P.I. No. 23291).' (Meyer.)

23299. "From Tsintse, Shansi, south of Taiyuanfu, China. '(No. 933a, March 12, 1908.) Black and yellow. A rare local variety of a strange soy bean used as a vegetable when slightly sprouted, and after having been scalded for a few minutes in boiling water is eaten with a salt sauce; the skin must be removed before scalding. Chinese name *Yang yen doh,* meaning sheep's eye bean.' (Meyer.)

"23303. From Shiling, Chihli, China. '(No. 949a, Jan. 25, 1908.) Yellow soy bean. Chinese name *Ta huang doh.* For further remarks see No. 923a (S.P.I. No. 23292).' (Meyer.)

"23305. From Peking, Chihli, China. '(No. 951a, Feb.8, 1908.) Large, light yellow soy bean. Used mostly as a vegetable when slightly germinated, and eaten with a salt sauce. Chinese name *Ta huang doh.' (Meyer.)*

"23306. From Peking, Chihli, China. '(No. 952a, Feb. 8, 1908.) Large, black soy bean, green inside. Comes from Manchuria and is used mostly like the preceding number (S.P.I. No. 23305.) Chinese name *Ta ghae doh.' (Meyer.)*

"23311. From Shiling, Chihli, China. '(No. 957a, Jan. 25, 1908.) Large, green soy bean. Used as a vegetable when slightly sprouted, after having been scalded in boiling water. Chinese name *Ta ching doh.' (Meyer.)*

"23312. From Pautingfu, Chihli, China. '(No. 958a, Jan. 28, 1908.) A rare, local variety of soy bean, being small and of greenish yellow color. Chinese name *Shau ching doh.' (Meyer.)*"

Note: This is the earliest English-language document seen (Oct. 2004) that uses the term "dark brown" to describe the color of soybean seeds. Address: Washington, DC.

280. Saccardo, Pier Andrea. 1909. Cronologia della flora Italiana [Chronology of Italian flora]. Padova [Padua], Italy:

Published by the author. Printed by Tipografia del Seminario. xxxvii + 390 p. See p. 173. March. Index. 28 cm. [Ita]

• ***Summary:*** Contents: Preface. Explanation of abbreviations. Bibliographic catalog of authors cited in this book: Listed alphabetically by author, with each author's works cited chronologically. Plants (organized by family, and within family by genus).

In the section on Family 70, Leguminosae, is an entry for the genus Soja *Moench.*–which appears to be the second of two subcategories of the genus Vigna *Savi*–the first being Dolichos. The only entry under the genus Soja is: *"Soja hispida* Moench. Native of Japan and Java. Cultivated [in Italy] since the mid-1700s and sometimes extensively, as in the Treviso *(Trivigiano,* a province and city in northeast Italy, located about 15 miles northwest of Venice).

The soybean has been cited as follows (in chronological order): 1701–Martini. 1760–Allioni. 1780–Farsetti. 1793–Zuccagni. 1801–Bonnato. 1807–L. Arduino. 1880–Saccardo. Address: Padova, R. Istituto botanico, Italy.

281. *Indian Trade Journal (The) (Calcutta).*1909. Soy bean. Memorandum by reporter on economic products. 14(174):136-38. July 29. [14 ref]

• ***Summary:*** This is an excellent summary by Mr. Burhill (see this journal, 22 July 1909, p. 113), from original observations and many early Indian sources, of soybeans in India and the results of early soybean cultivation experiments in India. The introduction of the cultivated soy bean "into India is comparatively recent; and, except among those tribes or peoples who are mostly Mongolian, it has obtained little hold. I will state in what parts of India it may be found.

"The Burmese grow it under the names of Pe-ngapi and Pe-kyat-pyin, sowing it, never in great quantity, along with other beans on the mud banks as the falling rivers leave them bare in October, or more sparingly still away from the rivers. The Kachins and other hill-tribes grow a little of it on their hill-clearings, the Kachins calling it Lasi. The Khasis, the Nagas and other tribes between the Brahmaputra and Upper Assam cultivate it similarly. The Khasi name seems to be U-rymbai-ktung and the Naga name An-ing-kiyo or Tzu-dza; but these three names should be subjected to scrutiny as they may be wrong. In the Brahmaputra valley it is grown, so far as known, only towards Barpeta. Whether grown or not in the hills north of the Brahmaputra I cannot prove, but the probability is strong that it is. It is grown by the Lepchas in Sikkim, and is called by them Salyang or Selliangdun, or by the Bhutias Botumash Bhatwas of Bhatmars. It is apparently grown in the Kingdom of Nepal, for it is found just under the mountains in the north of Oudh and again in the valleys of the north-western Himalayas right to the extreme end, and sparingly up to an altitude of 6,000 feet. In western Bengal and through the submontane districts of the United Provinces it is rare, passing chiefly under the name of Ram Kurthi, or in Bengal also as Gari Kalai. Right upon the Nepal boundary it is known by the hill names, *e.g.,* Bhatnas or Bhatwas, as well as Kajuwa. The Santals grow it and call it Disom Horec. I saw it in 1902 sparingly grown towards Belgaum.

"There are several races in India differing in small points; the seeds may be black or whitish, the leaves may be larger or smaller, etc. The black-seeded races occur in the hills, the other colours of seed both in the hills and the plains. The Khasi hills contain both larger-leaved and smaller-leaved plants...

"We seem to have no green [soy] beans in India and nothing approaching the yellow Manchurian beans [described by Hosie in 1904] in shape nor the larger black."

Many analyses of the percentage, on a dry weight basis, of the oils in soy beans from various countries have been made. "The average of eight analyses of soybeans from China is 19.89. The average of six analyses from Japan is 20.01. The average of six analyses from Java is 21.62. The average of forty-two analyses from Europe is 18.98, being from Germany fourteen analyses with an average of 19.74, from Austria eleven, average 19.44, from Hungary six, average 19.16, from Russia nine, average 17.93, from France two, average 15.40...

Concerning the composition of Indian soy beans, Church, in his *Food Grains of India* (p. 141) stated that they contained: Water 11%, albuminoids [protein] 35.3%, fat 18.9%, starch and sugar 26.0%, fibre 4.2%, and ash 4.6%. "I Presume he had Indian seed but it is not possible to say what race he examined.

"Dr. Leather in 1903 analysed the seeds of seven samples of soy from Japanese seeds cultivated at Manjri, near Poona. The amount of oil in them varied from 14.92 to 23.05 per cent, being on the dry weight 15.97 to 24.41 per cent with an average of 19.99.

"My office is now studying the composition of the seeds of established races in order to see how they compare in oil content with such material as Manchuria exports, or such as Manchurian seed might give in India. At the present time India has not the supply of these beans for an export trade; but possibilities of a certain extent are evident."

"One of the first considerations must be the yield that soy will give per acre in various parts of the country. In British India, in Burma, since the soybean is rarely cultivated alone, no statistics on yields are available. "When the bean in 1885 was grown experimentally at Nagpur from Japanese seed, it yielded at the rate of 180 lbs. per acre [202 kg/ha] (see Report Experimental Farms for that year, p. 5), but later *(vide* Nagpur Experimental Farm Report for 1889-90, p. 5) it yielded but an average of 88 lbs. per acre [98.8 kg/ha] over five years. In Lahore in 1894-95 *(vide* Report on the Government Agri-Horticultural Garden, p. 2) it yielded at an estimated rate of 349 lbs. of seed per acre

[391.9 kg/ha] and 349 lbs. of fodder, but on a very small area. Its yield was very poor in the next year. The estimated yield in 1898 in an experiment done in Madras was 468 lbs. per acre [525.6 kg/ha]. It has been grown sparingly at Nadiad in Gujarat, and elsewhere in the Bombay Presidency. In the Experimental Far Report, Bombay, for 1901 a big yield was chronicled, but in the next year the crops at Poona and Surat failed. In 1903 the seeds analysed by Dr. Leather, as already reported, were grown near Poona: the yield is not recorded. In 1904 a yield of about 300 lbs. per acre [337 kg/ha] was obtained (Experimental Farms Report, Bombay, p. 70) on light land. One year later nineteen plots were under trial but with unpromising results, for only five yielded seed enough to repay for the cost of cultivation. The yield varied from 50 to 293 lbs. per acre [56.2 to 329 kg/ha], the five promising to be remunerative yielding over 200 lbs. per acre [224.6 kg/ha]. The Manjri (Poona) farm grew 19 plots in 1905-06 with better results, probably as a consequence of better land. Plot No. 3 yielded at the rate of 700 lbs. per acre [786 kg/ha], No. 13 at the rate of 690 lbs. per acre [774 kg/ha], No. 4. at the rate of 650 lbs. per acre [730 kg/ha] and so on. Nearly all the plots gave returns likely to be remunerative. [Note that the size of the plots is unfortunately not indicated.] One year later it was reported by Mr. Fletcher, Deputy Director of Agriculture, Bombay (Annual Report of the Agricultural and Botanic Stations for 1906-07, pages 15-16) that plot No. 5 had yielded on the edge of black soil at the rate of 1,166 lbs. per acre [1,309 kg/ha], while plots numbered 6, 7, 12 and 13 gave, respectively, 513, 650, 575 and 395 lbs. per acre.

"Earlier than this in the United Provinces, many experiments had been done at the Sahranpur Botanic Gardens (*vide* Gollan in Bulletin of the Department of Land Records and Agriculture, No. 21, 1906, pages 27-28). He obtained yields at the rate of 1,124 lbs. per acre and 561 lbs. per acre.

"These experiments have not yet affected the ryots [peasants, tenant farmers]; the crop must be demonstrated very clearly as a paying one before it will do that."

Note 1. This is the earliest document seen concerning soybeans in Lahore. It is not clear whether the Lahore referred to was in today's Pakistan or India. In 1846 Lahore was conquered by British troops and in 1849 placed under British sovereignty. Before 1947 Lahore was a division of the Punjab in British India. In 1947 it was divided, with the Gujranwala, Sheikhupura, and Sialkot, and parts of Gurdaspur and Lahore districts assigned to Pakistan. Ambala and Jullundur districts and the remainders of Gurdaspur and Lahore districts were assigned to India. In 1970 Lahore became the capital of the reconstituted Punjab province.

Note 2. This is the earliest document seen for seen for the cultivation of soybeans in Sikkim.

282. Ruhräh, John. 1909. The soy bean in infant feeding; Preliminary report. *Archives of Pediatrics* 26:496-501. July. • ***Summary:*** This pioneering paper was read before the Twenty-first Annual Meeting of the American Pediatric Society, Lenox, Massachusetts, May 28, 1909. "The soy bean (glycine hispida), sometimes incorrectly called the soja bean, is an annual leguminous plant which originally grew in a wild state from Cochin China to the south of Japan and Java."

There follows a brief but accurate history of the soy bean. "In 1875 Professor Haberlandt began a series of investigations with this plant in Austro-Hungary, and in his work published in 1878 he urges the importance of the soy bean as a food both for man and animals. After his death, which occurred in 1878, very little notice was taken of the soy bean in Hungary and the prophecy that he made for its future failed."

"As early as 1829 Thomas Nuttall wrote an article in the *New England Farmer* concerning the bean as a valuable crop for this country. The Perry expedition to Japan also brought back soy beans, but until the last fifteen or twenty years the plant was known only as a curiosity."

"The plant is grown in America, but is used chiefly for the purpose of a forage crop and comparatively little reference has been made to its use as food for man." The plants "bear a remarkable number of beans and the flowers are self-pollinated, making the yield independent of insects. The bean may be easily grown in Maryland. I am indebted to three friends for experimenting with this plant in their gardens and obtaining good crops..."

Note 1. This is the earliest document seen (May 2009) that mentions soybean pollination–quite remarkable since it is by a pediatrician writing about a completely different subject. It is also the earliest document seen (May 2009) that uses the term "self-pollinated" (or self-pollinating, etc., with or without the hyphen) in connection with soybeans.

"At the present time there are seven varieties handled by seedsmen, and some twenty-two distinct varieties are known." The varieties Mammoth Yellow, Hollybrook, and Ito San have been used in infant feeding experiments. "The other varieties are the Guelph (green), the Samarow (green), the Ogemaw (brown), and the Buckshot (black). All of these latter may be grown in the north."

"I am indebted to Mr. Frank N. Meyer, agricultural explorer for the Department [U.S. Department of Agriculture], for information concerning the use of the beans in the East... The light-colored beans are eaten in soups and the pods are sometimes picked green, boiled, and served cold with a sprinkling of soy sauce. The green varieties are often pickled in brine and eaten moist or dried with meals as promoters of appetite." Also discusses soy sprouts, oil, natto, soy bean milk (which "has a composition nearly the same as that of cow's milk" as shown in a table),

tofu, miso, yuba, shoyu, and roasted soybeans used as a substitute for coffee.

"The fact that the soy beans contain little or no starch suggested to Dujardin-Beaumetz that they be used as a food for diabetics. The soy bean flour has been placed on the American market, but was withdrawn owing to the fact that according to the manufacturers it contained 8 per cent. carbohydrate. It contains much less carbohydrate, however, than any of the other diabetic foods."

"As regards the use of the beans in infant feeding it seemed to me that soy bean gruel or milk, either alone or with cow's milk, might be of value in feeding several classes of cases, viz., of marasmus and malnutrition, as a substitute for milk in diarrhea, and in intestinal and stomach disorders, and in diabetes mellitus."

Note 2. This is the earliest document seen (July 2008) that suggests the use of a soybean preparation as a milk substitute for infants."

Note 3. This is the earliest document seen (Aug. 2003) concerning the actual feeding of soymilk to infants or children, or concerning a soy-based infant formula. The author was the world's first pediatrician to use soybeans in infant feeding, and did the first U.S. studies with soyfoods and human nutrition.

Note 4. This is the earliest English-language document seen (Oct. 2003) that uses the term "substitute for milk" to refer to soymilk. Note 5. This is the earliest English-language document seen (Nov. 2002) that uses the word "malnutrition" in connection with soyfoods.

The writer had hoped to conduct experiments and make a more complete clinical report but several misfortunes attended his efforts to secure the beans. "My first crop was eaten by rats, my second moulded in the pods owing to some unusually damp weather, and insects ate about two-thirds of my last crop. Fortunately, the beans may now be obtained from Messrs. T.W. Wood & Son, Richmond, Virginia.

"So far the gruel has been prepared by soaking the beans over night, stirring to remove the envelope surrounding the bean. Three times the amount of water is added to the beans and they are boiled until a smooth gruel results. This is strained if necessary [to make real soymilk]. This has the odor and taste of malt, but with the addition of a little salt is well taken, especially after the first bottle or two. The gruel is retained unusually well and seems to be easily digested. The stools are not more frequent than with other foods. The stools are light brown in color like those from malted milk. This soy bean gruel has nearly the same food value as milk and for certain children may need further dilution. About the same size feedings should be used as if milk were being given. Five percent sugar may be added to increase the fuel value.

"I have not used the beans in a sufficiently large number of cases nor over sufficient periods of time to justify any further statements at this time, but I do feel that properly used they will be a most valuable addition to the dietary of the sick infant. Grinding them to a bean meal would simplify matters very much, and, if success attends their use, a soy bean meal could easily be prepared.

"I hope to be able to make a second report at the next meeting and have called your attention to the bean in hope that other members may try them and report at the same time."

Note 6. Pediatrician Herman F. Meyer (1960, p. x) published a long poem by Dr. John Ruhräh titled "A Simple Saga of Infant Feeding," which described the history and present status of infant feeding. Meyer described Ruhräh as a "philosopher, teacher, poet, pediatrist [pediatrician] and able historian."

Note 7. This is the earliest English-language document seen (Oct. 2001) that uses the term "soy bean flour."

The following photo of Dr. John Ruhräh (1872-1935) was taken in about 1914. Born in Chillicothe, Ohio, he was a graduate of the College of Physicians and Surgeons (Baltimore, 1894), did post-graduate work at Johns Hopkins, the Pasteur Institute, Paris (1897), and in other European schools (1900-1901), and was quarantine physician of the port of Baltimore (1898-1900), where he became Professor of pediatrics in the University of Maryland Medical School and in the College of Physicians and Surgeons.

His autograph is shown below. Address: M.D., Baltimore, Maryland.

283. Piper, Charles V.; Nielsen, H.T. 1909. Soy beans. *USDA Farmers' Bulletin* No. 372. 26 p. Oct. 7. Revised in 1916. [10 ref]

• ***Summary:*** Contents: Introduction. Climatic and soil requirements of soy beans. Varieties of soy beans (12): Mammoth (yellow); Hollybrook (yellow); Ito San (yellow); Guelph (green); Buckshot (black); Ogemaw (brown); Wisconsin Black; Wilson (black); Meyer (mottled black and brown); Austin (greenish yellow); Haberlandt (yellow); Riceland (black). The culture and planting of soy beans. The inoculation of soy beans. Soy beans for hay: Curing the hay. Soy beans for pasturage. Soy beans in mixture: Soy beans and cowpeas, soy beans and sorgo, soy beans and millet, soy beans and corn. Soy beans for ensilage. Soy beans for grain. Soy beans in rotations. Feeding value of soy beans: Feeding value for sheep, feeding value for dairy cows, feeding value for hogs. Storing soy-bean seed. Comparison of soy-bean grain and cotton-seed meal. Comparison of soy beans and cowpeas. Summary.

The bulletin begins: "The soy bean, also called the 'soja bean' (fig. 1), is a native of southeastern Asia, and has been extensively cultivated in Japan, China, and India since ancient times. Upward of two hundred varieties are grown in these countries, practically every district of which has its own distinct varieties. The beans are there grown almost entirely for human food, being prepared for consumption in many different ways. Their flavor, however, does not commend them to Caucasian appetites and thus far they have found but small favor as human food in either Europe or America.

"As a forage crop, however, soy beans have become of increasing importance in parts of the United States, especially southward. They have been tested at most of the State agricultural experiment stations, and it is clear that their region of maximum importance will be south of the red clover area and in sections where alfalfa can not be grown successfully. They thus compete principally with cowpeas, but as cultivation is usually required they fill a somewhat different agricultural need. Their culture has greatly increased in recent years, especially in Tennessee, North Carolina, Virginia, Maryland, Kentucky, and the southern parts of Illinois and Indiana [though no statistics are given]. It seems certain that the crop will become one of great importance in the regions mentioned and probably over a much wider area. The earlier varieties mature even in Minnesota, Ontario [Canada], and Massachusetts."

"Soy beans are also decidedly drought resistant, much more so than cowpeas, and but for the depredations of rabbits would be a valuable crop for the semiarid West. Rabbits are exceedingly fond of the foliage, and where they are numerous it is nearly useless to plant soy beans unless the field can be inclosed with rabbit-proof fencing."

At the present time seven varieties of soy beans are handled by American seedsmen: Mammoth (yellow seeds), Hollybrook (yellow), Ito San (yellow), Guelph (also called Medium Green, Medium Early Green, Large Medium Green), Buckshot (black; a very early variety handled by northern seedsmen), Ogemaw (brown), and Wisconsin Black. A detailed description, with a photo showing the seeds and pods, is given of each. The best of the new varieties, most of which will be available in 1910, are: Wilson (black), Meyer (mottled black and brown), Austin (yellowish green), Haberlandt (yellow; the seed is considerably larger than that of any of the other yellow-seeded varieties), and Riceland (black).

"During the past three years more than two hundred additional varieties have been introduced from China, Japan, and India, most of which have already been sufficiently tested to give some idea of their value. Many of the new varieties are so superior in various respects that they are certain to replace all of the above-named varieties except Mammoth and, perhaps, Ito San."

A table (p. 23) gives a nutritional analysis of seven varieties of soy beans: Austin, Ito San, Kingston, Mammoth, Guelph, Medium Yellow, Samarow.

Illustrations (line drawings) show: (1) A typical soy-bean plant with leaves, pods, roots and nodules (p. 5, by Boetcher). (2) A bunching attachment on an ordinary mower for bean harvesting (p. 19). Photos show: (1) A plant of the Mammoth variety of soy bean (p. 6). (2) Seeds and pods of seven varieties of soy beans (full size; p. 8). (3) A man standing in a field of the Mammoth variety of soy bean in North Carolina (p. 9). (4) Roots of a Mammoth variety of soy bean with characteristic nodules (p. 13).

Note: This is the earliest document seen (March 2002) stating that the USDA has tested more than 200 varieties of soy beans. Address: 1. Agrostologist in Charge; 2. Scientific Asst. Both: Forage Crop Investigations, USDA Bureau of Plant Industry, Washington, DC.

284. Edie, E.S. 1909. Cultivation and uses of soya beans. *Liverpool University, Institute of Commercial Research in the Tropics, Bulletin* 1(1):1-7. Oct. 8. [1 ref]

• ***Summary:*** An excellent article. Contents: Introduction. Uses of the soya bean: Forage, hay, ensilage, soya oil, soya milk, a type of cheese made from soymilk [tofu], soya meal [flour]; use of soya bean oil for soap, illumination, paints and other industrial products, soya bean meal used as a fertilizer on Chinese sugar plantations, soya beans as a legume for enriching the soil with nitrogen, planting between rows of maize. Cultivation of soya beans. Varieties of soya beans.

"The Soya bean *(Glycine hispida)* is a native of South-eastern Asia, where it has been cultivated for centuries in

China and Japan. It was introduced at a later period into India, and arrived in England towards the end of the eighteenth century. A considerable number of experiments were carried out with the plant were carried out in Austria about thirty years ago, but it is only quite recently that it has become an article of commercial importance in Europe."

After discussing uses as hay and silage: "It is in the bean itself, however, that the chief value of the Soya plant lies. As food for man and domestic animals it is used to a very large extent in the East. In some parts of China the bean forms one of the staple articles of food, and it is cooked much as beans and marrowfat peas are, and also in soups and other forms. The oil is used largely for making salads and sauces, and is also mixed with flour in the manufacture of cakes. Mr. Turner tells me that the Chinese extract casein from the bean, and I have also seen this stated elsewhere.

"A liquid closely resembling cow's milk is prepared from Soya beans in Japan." The process is described. "This condensed product is of considerable value as a food, but it is unsuitable for the use of infants. This "Soya Milk" is also used in the preparation of a kind of cheese" [tofu]. Note: This is the earliest English-language document seen (Oct. 2003) that contains the term "Soya milk."

"Soya bean meal is now use in the manufacture of biscuits, and for mixing with flour for making brown bread in this country. In some parts of the Continent Soya meal is now being used in preference to rye meal for making bread."

"One of the most valuable products of the Soya plant is the oil. As mentioned before, it is used largely for eating purposes in the East, and Mr. Turner tells me that on the Continent a greater percentage of Soya oil than of Copra oil is allowed in the manufacture of margarine.

"Soya oil is largely used for soap making in the East, and I understand that it has recently been tried with very good results in this country also.

"As a considerable proportion of oil is left behind in the cake after expression of the oil, it may be more profitable to extract the oil by solvents such as naphtha and use it all for manufacturing purposes, as extraction by means of naphtha renders the oil unsuitable for edible purposes.

"In the East Soya bean oil is used as an illuminant and also in the manufacture of paints. The oil has a comparatively high iodine value, which is an index of the drying quality of an oil of that class." Note: This is the earliest English-language document seen (March 2008) which states that soy oil can be used in paints (or other coatings) in connection with its iodine number.

Cultivation: "Recently the question of raising this crop in various British colonies has been discussed. In most of the African colonies, including West Africa, the Soya bean would probably be successfully grown, and in rotation with, or along with maize and other crops, its cultivation would be a very profitable investment. I have seen samples of Soya beans at least three years old, which showed no signs of weevilling or deterioration in any way. Cargoes of the beans shipped from Vladivostock [Vladivostok] and Dalny to Hull and Liverpool are stated to have arrived in perfect condition."

Varieties: A table (p. 6) gives a nutritional analysis by S.H. Collins of "a sample of Chinese yellow Soya beans." Moisture: 10.23%. Oil 15.62%. Albuminoids 37.54%. Carbohydrates 27.27%. Woody fibre 5.02%. Ash 4.32%.

"I have analysed samples of five distinct varieties of Soya beans, some of which were obtained from the shop of a Chinaman who sells them to the Chinese in Liverpool for food. I do not, of course, know the age of the samples, nor their source..." After describing the shape and color (2 green, 2 brown, 1 black) of each, and noting that No. 4 came from Hong-Kong, he gives a nutritional analysis of each in tabular form, and the weight of 20 seeds of each in grams.

"In conclusion I have to thank Mr. A. Grenville Turner, Grain and Seed Broker, member of the Liverpool Corn Trade Association, for much valuable information regarding the Soya beans and for his kindness in obtaining samples for me. I am also largely indebted to an excellent article on Soya beans in the *Natal Agricultural Journal,* November, 1908.

"Since the above was written I have been enabled, through the kindness of Sir Alfred Jones, to analyse a sample of yellow Soya beans grown in West Africa from seed sent out by him early this summer." A table shows the analysis. Moisture: 10.52%. Oil 17.26%. Albuminoids 36.05%. Carbohydrates 26.16%. Woody fibre 5.39%. Ash 4.62%.

"The results show that in the first season at least the Soya bean underwent no deterioration in West Africa, and the plants also came rapidly to maturity."

Also published in 1909 as a 7-page booklet by C. Tinling & Co., Liverpool. Also published in 1911 Spanish by: Mexico. *Ministerio de Fomento, Colonización e Industria* under the title "Explotación de la soya," by E.S. Edic [sic, Edie]. The last line of the article seems to say that the author is at the central agricultural station *(Estación Agrícola Central).*–San Jacinto [probably in or near Mexico City], January 1911. Address: M.A., B.Sc, Liverpool Univ.

285. *Indian Trade Journal (The) (Calcutta).* 1909. Indian soy beans. 15(189):145-46. Nov. 11. Summarized in Agricultural Journal of India (Calcutta) 5:375 (1910).
• ***Summary:*** "As long ago as 1885 the seed was tentatively grown as a possible food crop by the Agricultural Department at Nagpore; and the annual report of the agricultural stations in the Central Provinces, which has just issued, contains a reference to the cultivation of a small plot and to the absence of a local demand. Other provinces also

made some experiments. In those days, the merits of the soy bean as a source of oil were scarcely recognised, and no demand for it on this account existed in western countries. Consequently the cultivator found small profit and the agricultural authorities as little encouragement in their attempts. But the crop was never quite lost sight of..."

Tables show: (1) Analyses of the moisture and oil content of 14 soybean samples grown from seed of Japanese origin at the Manjri Experimental Farm showed that the products are of good quality, with 6 samples containing more than 20% oil. "The crusher to whom the samples were submitted" commented that 11 of the 14 were distinctly good, and those containing more than 20% oil better in this respect than the best Sakura Manchurian beans.

(2) The range of oil content of soy beans grown in five countries or continents, as quoted by the Reporter on Economic Products: China 17.60 to 26.18. Japan 13.36 to 25.55. Java 18.37 to 26.18. Europe 15.16 to 21.89. North America 18.42 to 19.52.

(3) The yields per acre obtained in 1906-07 on various plots at the Manjri Farm averaged 660 lb, with a high of 1,166 lb. Address: India.

286. *Manshu Nichinichi Shinbun (Dairen).* 1909. The ubiquitous beans. Nov. 25. Lengthy excerpts given by Rea in Far Eastern Review, 10 March 1910, p. 455-56. *

• ***Summary:*** This is the story of how Mitsui & Co. gained control of the [soya] bean trade in Manchuria and exported the first [soya] beans to England and thus to Europe. "Everybody knows that the 'Ubiquitous Beans,' the 'wealth of Manchuria,' are booming up South and North Manchuria as nothing else has ever even come near to, or is ever likely to do. The credit for ushering this new era into the history of Manchurian trade goes without question to Messrs. Mitsui & Co. How this came about will be a matter of interest to many.

"This firm had, before the War, a branch at Newchwang and engaged in the export of Beans to Japan. They thought of shipping Beans, during the winter season when the northern port is closed by ice, to Port Arthur by the Chinese Eastern Railway and induced the latter to publish the freight tariff in the summer of 1903. This led the Mitsuis to consider it worth while to send Beans from Tiehling then taken by them as the buying centre, to Yingkou by junk down the Liao, and then to Port Arthur by rail. In October they made the first purchase of Beans ever undertaken by Japanese in the interior and in this example were followed by the now bankrupt Tungshengho, the then prosperous Newchwang merchants. Hardly had the Mitsui's two Bean steamers sailed out of Port Arthur with the total cargoes of 45,000 piculs when the first guns of the late War were fired. [Note: 1 picul = 132.27 pounds weight.] During the War, Russia saw fit to include Beans in the contraband list, and this effectually blocked all their outlets to Japan. It happened that neither could herrings enter into Japan from Saghalien way. These circumstances quite upset the fertilizer market in Japan. In the mean time, the far-seeing management of the Mitsuis started a painstaking study concerning the Bean producing centres of the world and were quite satisfied, as the result, of there being no others than Manchuria and Japan save for Asia Minor and Cochin China, which produced something like Beans. This discovery set them thinking more seriously than ever and was directly responsible for their undertaking the pioneer shipment of Beans to Europe.

"About the time the Battle of Liaoyang was being fought the Mitsuis bought up all the Beans to be had about Yingkou and dumped them at a fabulous profit on the short stocked market of Japan. They followed up the track of the victorious Army and also their advantage far into the inland and at once began enquiry into the producing capacity of those regions for Beans. It did not take long before they found out to their satisfaction that the output of Beans in South Manchuria has been ludicrously underestimated and then they immediately cast about for the best market in which to offer them, hitting, with a happy stroke of business foresight, upon Europe as such. No sooner was peace restored in October, 1906, than this firm opened its agencies at Tiehling, Mukden, Changchun, Hsinmintun and Kirin and during the winter of '05-'06, sent out their first trial shipment of Beans and Bean Cake to London. This venture proved a miserable failure because, owing to imperfect packaging, the cargoes deteriorated so badly on the way that all were thrown overboard. A second consignment to Europe of 500 piculs reached there in good condition in the spring last year and met such a favourable reception there that an order for 3,000 tons directly followed and then a string of larger ones in quick succession. The Mitsuis were allowed to reap all by themselves the golden harvest of their own sowing till the end of February this year (1909), when a number of strong foreign firms began to appear on the scene to help foster the Bean trade to what it is to-day."

Note 1. The words "Bean" and "Beans" are used to refer to "Soya Bean" and "Soya Beans" throughout this article. The latter two terms are never used.

Note 2. This periodical began in Oct. 1908 as the English-language column in the *Manshu Nichinichi Shinbun* ("Manchurian Daily Newspaper"). Address: Dairen, Manchuria.

287. *Indische Mercuur (De) (Amsterdam).* 1909. De sojaboon [The soybean (Abstract)]. 32(50):965-66. Dec. 14. [1 ref. Dut]

• ***Summary:*** A Dutch-language summary of the following English-language article: Edie, E.S. 1909. "Cultivation and uses of soya beans." *Liverpool University, Institute of Commercial Research in the Tropics, Bulletin* 1(1):1-7. Oct. 8.

288. Wildeman, É. de. 1909. Le soja [The soybean]. *Agronomie Tropicale; Organe Mensuel de la Societe d'Etudes d'Agriculture Tropicale* 1(12):195-200. Dec. 25; 2(1&2):5-8. Jan/Feb. 1910. [10 ref. Fre]

• ***Summary:*** An overview of the subject, including a brief history, based largely on a summary of about ten documents. It begins: "For some years now, attention has been drawn to the soybean *(Soja hispida* (Mönch) or *Glycine hispida* (Max.)), which comes from Manchuria; its products are now used in various ways in our daily lives."

"It is not a question of exhausting the question, but as the *Bulletin of the Imperial Institute* of London has already devoted several articles to this plant this year and that the first part of vol. I of the *Liverpool University, Institute of Commercial Research in the Tropics, Bulletin* [Edie, 8 Oct. 1909] is entirely devoted to it, it appeared useful to us to insist here on the soybean which would also have a certain importance for our colonies."

This legume originated in Southeast Asia, and has been cultivated for centuries in China and Japan. It is now abundant throughout Manchuria, where the seeds are widely appreciated for their nutritive value. It was later introduced into the Indies *(l'Inde)* and arrived in England at the end of the 18th century. About 30 years, it was the subject of numerous trials [by Haberlandt and co-workers] in Austria, but is only recently that it has become an article of commercial importance in Europe.

"The occupation of Northern Manchuria by Russian troops, during the Russo-Japanese War, gave rise to numerous demands for this bean, which stimulated the extension of [its] agriculture. After the departure of the troops, the local demand fell naturally, and it was necessary to find an outlet in foreign markets. From 1906 to 1908, a large part of the products of N. Manchuria were exported to Japan via Vladivostok, but in 1908 the economic crisis of Japan diverted a part of these products to Europe, which actually received large quantities of soybeans, especially in England. The first large shipment of soybeans contained 5,200 tonnes (metric tons) and arrived at Hull on 2 March 1909. The beans arrived at the destination in perfect condition despite the distance. They were classed in three categories: 1. Shipped from Dalny; 2. Shipped from Vladivostock; and 3. Shipped from Hankow. The value of those in category No. 1 is about £6 8*s.*/tonne [metric ton]; those in No. 2 and No. 3 is about £6 6*s.*/tonne, these prices being, naturally, subject to the fluctuations of the market. Most imported beans are monopolized by the manufacturers of oil who obtain 10-18% of the weight of the beans in oil. [The remaining] oilcake can be used in the feed of livestock."

There follows a long discussion of soybean cultivation and production, including soils, fertilizers, nitrogen fixation by root nodules, planting, intercropping, yields of forage and seed, use as silage, soil restoration, soybean varieties, tables showing the chemical composition of the plant and seeds showing their excellent nutritional value.

"Until recently, soybean cultivation has been confined to Asia and some states of the USA. Recently, the question of cultivating this plant in the various British colonies has been raised. In most of the colonies of West Africa, the soybean could probably be cultivated with success in rotation or mixed with maize or other crops, and give significant yields."

"In China, Japan, and Indo-China the seeds are used to prepare a sort of milky liquid *(liquide lactescent)* [soymilk] and a sort of cheese" [tofu]. A brief description of each process is given. The milk has considerable nutritional value "but is not suited for infants."

"The flour of soybeans *(La farine de fèves de soja)* is used to make biscuits, and, mixed with wheat flour, is used to make a brown bread; it is sometimes even preferred in this application to rye flour. Since it contains neither sugar nor starch, the soybean has been recommended as the basis of diabetic diets." Address: Prof., School of Horticulture, Vilvoorde, Belgium (Professeur au Cors colonial de l'École d'Horticulture de Vilvorde).

289. Carson, John M. 1909. Soya bean and products. *Special Consular Report (U.S. Bureau of Manufactures, Department of Commerce and Labor)* No. 41. Part 5. 35 p. Erroneously numbered Special Consular Reports, Vol. XL.

• ***Summary:*** Contents: Introduction. I. Countries of production. China: Newchang (Varieties of beans and amount produced {in centals [hundredweights; 1 cental = 112 pounds]}, methods of cultivating and harvesting, prices and exports, shipments to Europe–use by natives), Dalny (Manufacture of bean cake and oil, preparing the cake, expressing the oil and wages paid, freight charges to Dalny, exports, stock on hand, and prices), Chefoo (Beans imported for cake manufacture, quantity and value of output, bean vermicelli made by a peculiar process [from the small green bean lü tou {mung bean}], preparation of beans, drying of product and prices [for vermicelli]), Shanghai (Extent of export trade in beans), Shantung (manufacture of bean oil and cake, harvesting and pressing, shipping and prices), Swatow, Tientsin (Exports of raw beans, shipments of bean cake, extent of trade at Tientsin). Tables (p. 5) show prices and exports of soya beans, bean cake and bean oil at Newchang for the years 1905-1908. Japan: Cost of production and prices (of soya beans, quite detailed), imports of beans and cakes, use of the bean as food (shoyu, miso, tofu, koya-tofu, natto, flour), Kobe (Beans as human food {eaten boiled with a little soy [sauce], "made into bean curd, and a kind of sauce made of wheat, beans, and salt"}–small exports {"The total exports of beans, pease, and pulse [incl. soy] in 1908 were valued at $25,971, of which about $24,000 worth went to Hawaii, the

United States, and Canada for use by the Japanese residents in those countries as an article of food"}, manufacture of cake), Nagasaki (Production of beans, imports of beans–market prices). Shipments from Vladivostok * [Russia, of soybeans probably grown in Manchuria] (Fluctuations in prices, shipments during present season, immense shipments planned next season (by Mitsui)).

"It is the intention of Mitsui Bussan Kaisha, the largest exporter from this port, to ship about 200,000 tons of beans via Vladivostok during 1909 and about double that quantity via Dalny. Many large contracts have been made for next season, and from present indications a strong effort will be made against the control of Mitsui Bussan Kaisha as the Chinese are making arrangements to deal direct with the European market without the aid of the Japanese" (p. 18).

Tables show: The quantities and value of soya beans, soya-bean cake, and bean oil imported into Japan during the year 1908 (p. 15). The soya bean harvests (in bushels) reported in various Japanese districts (p. 16).

II. Markets. Denmark: Experimental imports made, views of an importer. France: High duties prevent importation of soya beans, soya-bean flour bread used by diabetics, unknown in Calais district. Germany: Danger of feeding cattle on soya-bean products, oil value–prices at Hamburg, comparative food value of the bean. Italy: Beans imported and cultivated in limited quantities, prices of soya products–American cotton-seed oil, not imported into Catania, home products supply Piedmont district. Netherlands: A great future for the soya-bean trade predicted, prices of the bean and bean cake, soya cake as cattle feed, manufacture of soya-bean products begun, English soya-bean cake defective. Norway: Imports of soya-bean meal and cotton-seed meal. Russia: Beans and products unsatisfactory as feeding stuffs. Spain: Soya bean unknown in Valencia district [They are neither cultivated nor imported in this district]. Straits Settlements [Singapore and Malaya]. Sweden: Soya-bean products introduced through England. Comparative value of cattle feed [work by Nils Hansson of Sweden], comparative prices of feed stuffs. Turkey. England: Liverpool (Conversion of the soya bean into cake and meal), Plymouth (Soya cake and meal extensively consumed), Southampton (The bean appreciated as a fattener and as a dairy ration, the soya bean as human food [for use in diabetic diets]). Ireland: Chinese bean products are favorably received, soya bean introduced in Belfast, small imports at Cork. Scotland: Statistics as to use in Dunfermline not available, test of feeding value of soya cake [by Prof. Douglas A. Gilchrist], Edinburgh mills making experiments (based on 1909 report 1909 of U.S. Consul Rufus Fleming from Edinburgh).

III. Competitive American exports. Tables (p. 35) show exports for 1907, 1908, and 1909 of cotton-seed meal, cotton-seed oil, and cottolene, lardine [not defined: presumably shortening made from cottonseed oil], etc. to major countries, especially in Europe.

The Introduction notes: "In compliance with requests from manufacturers of cotton-seed products in the United States, who desired that an investigation be made of the production and use of the soya bean and its manufacturers in the Far East and of the extent to which they compete with American cotton-seed products in the European markets, the reports following have been submitted by consular officers in the various countries concerned...

"The reports of the consular officers have been placed in two groups, the first having to do with the countries that produce the soya bean and the second with the countries that are sought as markets. Statistics as to the imports of soya-bean products in many European countries were not available at the time the reports were submitted, but inasmuch as the prices quoted were generally lower than for other seed products, emphasis has been laid on the relative merits of the two classes of goods as shown by experiments and analyses in these countries. These manufacturers will have to work in meeting this new competition."

Note 1. This is the earliest document seen (Dec. 2007) concerning soybean products (oil or meal) in Turkey, Denmark, Ireland, the Middle East, or Sweden (one of two documents); soybeans as such have not yet been reported in any of these countries. This document contains the earliest date seen for soybean products in the Middle East or Turkey (1909).

Note 2. This is the earliest English-language document seen (Oct. 2001) that uses the term "soya-bean flour." Address: Chief of Dep.

290. Carson, John M. 1909. Soya bean and products: Straits Settlements (Document part). *Special Consular Report (U.S. Bureau of Manufactures, Department of Commerce and Labor)* No. 41. Part 5. p. 26. Erroneously numbered Special Consular Reports, Vol. XL.

• ***Summary:*** "Vice-Consul-General George E. Chamberlin, of Singapore, reports that the soya bean is not cultivated in that district. As to the imports and the uses to which the beans are put, he writes:

"The beans are imported into Singapore and other ports of this district from China, Japan, and India, principally from the former country, in considerable quantities, and are used for making soya [soy sauce] and bean cheese [tofu], or bean cake–popular articles of food among the natives and Chinese. Practically no beans are exported and no bean cake, all being consumed locally.

"Soya beans in this locality are not made into meal, nor are they used for the same purpose as cotton-seed meal and cake. The present market price is about $2 per picul (133 1/3 pounds) for the white soya bean and $1.75 for the black."

Note 1. The Straits Settlements is a former British Colony on the south and west coast of the Malay Peninsula,

including adjacent islands, comprising Singapore, Penang, and Malacca settlements.

Note 2. This is the earliest document seen (May 2010) concerning soybeans in Singapore. This document contains the earliest date seen for soybeans in Singapore (1909). Address: Chief of Dep.

291. Clercq, Frederik S.A. de. 1909. Nieuw plantkundig Woordenboek voor Nederlandsch Indië [New botanical dictionary for the Netherlands Indies]. Amsterdam, Netherlands: J.H. de Bussy. xx + 395 p. See p. 248, no. 1664. [1 ref. Dut]

• ***Summary:*** In the following, we will spell out, then translate, abbreviations in square brackets: "1664 *Glycine Soja* Sieb. et Zucc. * Nat. fam. der Leguminosae. Dekeman, Jav. Kr. D. [Krama-Doesoen of Hoog-Dorps-Javaansch = Mount Dusun high-level village Javanese]; Dele, Jav. [Javaansch = Javanese]; Gadele, Jav. [Javanese]; Kadele, Boeg. [Boegineesch = Buginese, spoken in South Sulawesi], Makas. [Makasaarsch = Makassarese, from Makassar, the provincial capital of South Sulawesi, Indonesia]; Kadale, Jav. [Javanese]; Kadheli, Madoer. [Madoereesch = Madurese, spoken in Madura {Dutch: Madoera}, an Indonesian island off the northeastern coast of Java]; Katjang djepoen, Soend. [Soendaasch = Sunda, the language of the Sundanse people of Western Java]; Katjang kedelai, Mal. [Maleisch = Malay, the language of Malaysia and Brunei, lingua franca of the Malay Archipelago]; Katjang kedele, Mal. Batav. [Bataviiasch-dialect van Maleisch = the Batavian dialect of Malay; Batavia was the colonial Dutch name (1600s to 1942) for today's Jakarta]; Kedangsoel, Jav. Kr. D. [high-level village Javanese]; Kedelai, Mal. [Malay]; Kedele, Balin. [Balineesch = Balinese, the language of the Indonesian island of Bali], Jav. [Javanese], Mal. Batav. [the Batavian dialect of Malay]; Keudeule, Soend. [Sunda]; Lawoeï, Biman. [Bimaneesch = Bima, language of the Bimanese people, spoken on the Indonesian island of Sumbawa and its city of Bima]; Leboewi bawak, Sas. [Sasaksch = Sasak, spoken by the Sasak people on the Indonesian island of Lombok]; Retak medjong, Lamp. [Lampongsch = Lampung, spoken by the Lampung people in the Indonesian province of Lampung, on the southeastern tip of Sumatra].

*"Variëteiten (Varieties) in Soend. [Sunda]: Katjang djepoen beureum; Katjang djepoen bodas; Katjang djepoen hedjo; Katjang djepoen hideung.–Kruid (herb, plant), de sojaboon.*

"Uses: Known for the high protein content of its beans, consumed mostly by indigenous people as green vegetable soybeans (unripe). For the preparation of Batavian ketjap or Soy *(Bataviasche ketjap of soja),* black-seeded soybeans are used. In addition, the beans are boiled, beaten into flat cakes, and inoculated with a particular type of mold to obtain tempeh *(tempe),* which is very much liked in Java." Address: in Leven Oud-Residnet van Ternate en van Riouw.

292. Cornet, Paul. 1909. Le régime alimentataire des malades: Considérations pratiques sur les aliments et les boissons diétéiques et sur l'hygiene de l'alimentation [The dietary regimen for the sick: Practical considerations on dietetic foods and drinks and on the hygiene of feeding]. Paris: G. Steinheil, Éditeur. 484 p. No index. 23 cm. [144* ref. Fre]

• ***Summary:*** In Part III, "Foods drawn from the vegetable kingdom," Chapter 20 titled "Starchy vegetables" discusses various fruits, grains, and legumes. The section on "Soya" (p. 269-70) gives the name of the soybean in various countries (Japan, Annam, and China) and notes that the seeds can be used to make shoyu, miso, and tofu–which are widely appreciated.

"Dietetic uses: Without having recourse to these exotic preparations, the nutritional value of soybeans is not used enough in our country. Soy bread is only used in anti-diabetic diets*, whereas one could prepare a pap and a drink *(boisson,* [soymilk]) no less precious, as well as extracts [soy sauce] which could be substituted for meat extracts." Footnote: *Soya is well suited for diabetics, for the seed contains only 3% starch plus 16% oil and 27% protein.

In Part V, "The regimens," Chapter 30 titled "General solid regimens" has two parts: The first, the "Vegetarian regimen" (p. 341-55) has the following contents: Indications for the vegetarian regimen. Application of the vegetarian cure: Absolute [vegan foods plus water], mitigated (lacto-ovo vegetarian), total vegetarian diet *(régime total)* throughout the seasons (incl. dry legumes such as soybeans, peanuts, etc.), culinary preparations. Vegetal calendar *(Calendrier végétal):* soups, main dishes, and desserts for each month of the year. Address: Dr., Professeur at the municipal schools of the infirmaries of the Hospitals of Paris (aux Ecoles municipales d'Infirmières des Hôpitaux de Paris).

293. Dekker, J. 1909. Voedermiddelen [Feedstuffs]. *Teysmannia (Batavia [Jakarta])* 20(93):632-42. See p. 641. [Dut]

• ***Summary:*** "Also the straw of the soybean *(katjang kadeleh [glycine soja])* is a highly appreciated feedstuff, as are the leaves of the cow-pea *(Vigna Catjang)."* Address: Dr.

294. Heyne, K. 1909. Kedelee op de Europeesche markt [Soybeans in the European market]. *Teysmannia (Batavia [Jakarta])* 20:687-91. [Dut]

295. Itie, G. 1910. Le soja: Sa culture, son avenir [Soya: Its cultivation, its future]. *Agriculture Pratique des Pays Chauds (Bulletin du Jardin Colonial)* 10(82):37-49. Jan.

See also: 10(82):37-49. Jan.; 10(83):137-44. Feb.; 10(84):231-46. March; 10(85):305-07. April; 10(93):485-93. Dec.; 11(94):55-61. 28 cm. [34 ref. Fre]

• ***Summary:*** A superb series of articles reviewing research and current developments with soybeans, and especially with soybean production/culture, worldwide. The extensive bibliography cites many early and rare works for the first time. Interestingly, the series started one year before Li Yu-ying wrote his equally excellent series in the same journal. The author introduced lots of U.S. soybean research to France, citing many U.S. Agricultural Experiment Station publications and early work with growing soybeans in the tropics.

Contents: Introduction. The soybean (Glycine hispida Maxim.). Vernacular names: In China, Tonkin, Cambodia *(Sân dêk),* India, Burma, Nepal, Ceylon *(Bhatwan),* Indo-Malaysia *(Katyang-kadeleh),* England, USA, Germany, Holland, France, Italy. Scientific names and synonyms. Description of the plant. Varieties, general, and in China, India, Hawaii, Japan, USA, Europe (varieties from Hungary, Podolia, Etampes-France, Italy). Origin. History. Climate and geographical area.

Concerning the early history in France: "In France it is very certain that in 1739 missionary fathers sent the soybean to the Jardin des Plantes, along with other plants from China. There exists, in any case, in the Museum, a sachet having contained seeds from the harvest of 1779, and the soybean has been cultivated here in an almost uninterrupted fashion since 1834.

"In France, large scale production of soybeans began in 1821 at Champ-Rond, near Etampes, where large yields were obtained. But above all, starting in 1855, the Society for Acclimatization made great efforts to introduce it. They distributed seeds and conducted tests in various regions, but the methods of culture were not progressive (advanced), and the soybean did not take the place in France that was hoped for."

A table (p. 490) shows the name, yield (in hectograms/ hectare; 1 hectogram = 100 gm), and source (a U.S. agricultural experiment station) for the following soybean varieties: Medium Black (12.1, Massachusetts Hatch), Very Dwarf Brown (8.4, Indiana), Early Brown (10.54 to 13.58, Indiana), Early Green (7.80 to 14.00, Delaware & Virginia), Medium Green (12.10 to 36.30, Massachusetts Hatch & Illinois), Hollybrook (8.7 to 10.0, Indiana), Guelph (5.70 to 7, Indiana), Ito San (11.4 to 28.70, Indiana & Wisconsin), Japanese Pea (13.20, Virginia), Mammoth Yellow (7.5 to 18.20, Mississippi), Michigan Green (19.10 to 34.80, Wisconsin), Green Samarow (11.00+, Kansas), Tokyo (7+, Kansas), Early White (15.90 to 33.00, Massachusetts & Illinois), Dwarf Early Yellow (11.00+, Kansas), Early Yellow (13.10 to 22.00, Ontario, Canada), Medium Early Yellow (8.70 to 33.00, Indiana), Yellow (11.00+, Kansas), No. 9407 (43.5, Wisconsin), No. 19.186 (28.0, Delaware).

Other tables show: (1) The chemical composition of the stem, leaves, and pods (p. 138-39, 243). (2) Yields with different fertilizing methods (p. 139). (3) Number of pods and seeds in different varieties of soybeans (p. 236). (4) Spacing at different experiment stations for 3 years that gave the best yield (p. 239). (5) Number of plants and seeds, and yield for 3 different brown or yellow varieties of soybeans from China and Manchuria (p. 491). An illustration (p. 40, line drawing by A. Berteau) shows a cultivated soybean plant and its different parts, including leaves, pods, and flowers. The leaves of the wild soybean, *Glycine angustifolia* (Miq.), are also shown. Note: The *Jardin Colonial* (Colonial Garden) is located in Paris, France. Address: Ingenieur d'Agriculture coloniale.

296. *Weekly Consular and Trade Reports (U.S. Bureau of Manufactures, Department of Commerce and Labor).*1910. Oil trade. 1(3):114-16. March 19.

• ***Summary:*** The first section, written by the U.S. Consul in Bradford, England, describes the "unexpected decrease in the output of cotton-seed oil [worldwide] and the increase in the use of soya bean and other oils and fats" [in England]. Soya beans are discussed in detail in three other sections: (1) Soya bean and other oils (p. 114-15). "The Liverpool firm also makes the following report on Chinese and Eastern oils and fats which are becoming important in Europe. "Shipments of soya beans from Manchuria during 1909 amounted to about 350,000 tons, and also a large quantity of soya oil from China and Japan. European markets welcomed this new supply, which has prevented a further rise in lower grades of vegetable oils. The greatest interest is shown as to the supplies of soya beans during 1910, but owing to the undeveloped state of the (Chinese) interior, reliable figures of stocks and available supplies can not be obtained."

(2) Soya bean transportation: Freight rates from Newchwang to the United States [San Francisco, California; and Seattle, Washington] (p. 115). (3) Dalny: Prices and cost of shipment.

A table (p. 115) shows exports of [soy] beans, bean cake, and bean oil, during the first three-quarters of 1909, from Newchwang to: Hongkong, Great Britain, Samarang [Semarang, Central Java], Germany, Japan, Chinese ports, and total.

297. Le Goff, Jean. 1910. Sur l'emploi de la graine du "Soja Hispida" de Chine dans l'alimentation des diabétiques [On the use of soybeans in diabetic diets]. *Gazette des Hopitaux* 83(34):476-78. March 22. Also published as a brochure. [5 ref. Fre]

• ***Summary:*** The writer is interested in using diet to treat or manage diabetes. As early as Feb. 1908, she suggested the use of almond cake in diabetic diets. The almond is not the only oilseed that is available. Nuts, poppy seeds, roasted

peanuts, etc. also taste good. "I am here today to call attention to a legume, *Soja Hispida* (Moench), popularly known as the oil-pea of China *(pois oléagineux de Chine),* which serves as the basis of the diet for the inhabitants of that vast country.

"Like wheat, it is an annual plant. It has been cultivated in China since antiquity, and is likewise found in Cochin China, Cambodia, the Indies, and Japan.

"Its cultivation not been tried much in France. The trial by Lechartier (1903), with the goal of using soya as a forage plant, has not yet been repeated.

"Desiring to increase the number of foods permitted for diabetics and, above all, providing them with a fresh vegetable capable of replacing [dry] peas and haricot beans, I had the idea of trying to cultivate soybeans in France. The trials I made in 1909 were very encouraging.

"The soybean *(Le soja)* planted last May in the department of Loir-et-Cher [in north-central France] gave a magnificent stand of plants 100 to 110 cm in height, which bore fruit in September, even though that month was very rainy.

"Just like grapes, soybeans need plenty of heat to mature. The soybean harvest will be greatest in areas which are dry and warm. In short, the best regions for growing grapes would also seem to be preferable for soybean cultivation.

"It seems to me this demonstrates that the soybean can be cultivated in our country, like peas and haricot beans. It is the one new resource for diabetics who are living in the countryside where it is often difficult to obtain starch-free foods.

"Introduction of the soybean as a vegetable garden crop may be easier, since the trade has usually sold seed from the previous year's crop–or even older. Seeds that were not fresh contributed to the poor quality of foods made from them, and contributed to the discredit into when they fell."

"If soybeans are crushed in a mortar and mixed with water, you get a vegetable milk, resembling almond milk. With this milk, as with animal milk, one can make a cheese [tofu], the cost of which is practically insignificant. In China it is consumed in large quantities."

A table, by Mr. Balland, shows the chemical composition of soybeans from Cambodia and Tonkin.

"It is not only because of its low starch content or its richness in protein that one can recommend the soybean to diabetics; it is also because of the oils that it contains. From that point of view its action approaches that of almond cake.

There follows a long discussion of the action and importance of oils in diabetic diets.

Note: This is the earliest article seen (July 2001) by Dr. Le Goff on soy and diabetic diets. Address: M.D., Lauréat de la Faculté de médecine de Paris [France].

298. *Bulletin of the Imperial Institute (London).*1910. Cultivation and utilisation of soy bean. II. 8(1):40-42. Summarized in Agricultural Journal of India (Calcutta) 5:375 (1910). [2 ref]

• ***Summary:*** "A study is now being made by the Reporter on Economic Products to the Government of India of the composition of soy beans of established Indian races, with a view to the determination of the proportion of oil which they contain as compared with that contained in Manchurian beans. The quantity of soy beans at present produced in India is not sufficient for the creation of an export trade, but there is ample evidence that the beans could be grown extensively if desired.

"The introduction of the soy bean into India is of comparatively recent date and the product is not grown to any large extent except among people of Mongolian races and particularly in Burma. Experiments on the cultivation of the plant have been carried out at various times at Nagpur, Lahore [later divided between India and Pakistan], Madras, at several localities in the Bombay Presidency, and at Saharanpur in the United Provinces. Further experiments, however, are required in order to prove that the crop would be remunerative before it can be safely recommended to the ryots. Reference to small trials recently carried out in the Central Provinces has been made in the Annual Report on the Agricultural Stations for 1908-09...

"With regard to the possibility of growing the crop in West Africa, it may be mentioned that supplies of the seed were forwarded last year to the Governors of the various Colonies by the late Sir Alfred Jones, and the following results have been already reported. Experiments carried out at the Agricultural Station at Olokemeji, Southern Nigeria, have indicated that the crop can be grown there satisfactorily, but it is considered doubtful whether the farmers would take up the cultivation of a product of such low commercial value. Some of the beans were sown at Axim in the Gold Coast [later Ghana] and germinated in three days. Trials are also in progress at Abuko in the Gambia...

"It is considered that the bean could probably be grown with success in the Cape of Good Hope, but the crop would not prove very remunerative on account of the high cost of labour. An extensive trial, however, will, if possible, be carried out in the west of the Colony.

"Attempts are being made to encourage the cultivation of the crop in Natal [in South Africa]... The soy bean forms the principal leguminous crop of the Cedara Experiment Farm; twelve acres were planted during last season, and the best variety yielded 513 lb of seed per acre.

"The cultivation of this crop is regarded as a promising industry for the East Africa Protectorate [renamed Kenya Protectorate in 1920]. Two tons of seed have been forwarded, and trials are now in progress.

"Soy beans are already grown by several planters in Nyasaland [later renamed Malawi] as a green manure in the coffee plantations...

"The cultivation of the bean would probably prove successful in Rhodesia, and a supply of seed is being forwarded for purposes of trial.

"A small consignment has been sent by the Imperial Institute to the Sudan for experimental cultivation on the Government Farm at Khartoum."

Note 1. This is the earliest document seen (Aug. 2009) concerning soybeans in Nigeria, or the cultivation of soybeans in Nigeria. This document contains the earliest clear date seen (April 2004) for soybeans in Nigeria, or the cultivation of soybeans in Nigeria (1910). The source of these soybeans is unknown.

The agricultural station at Olokemeji in Nigeria is located in the city of Olokemeji, which is in the Olokemeji Forest Reserve, located 27 miles west of Ibadan and 22 miles north-northeast of Abeokuta. According to the Nigerian Embassy in Washington, DC, the station was closed by the federal government in about 1965 and consolidated at Ibadan. Contact: Federal Ministry of Agriculture, Ibadan, Oyo State, Nigeria.

Note 2. This is the earliest document seen (Aug. 2009) concerning soybeans in Ghana (formerly Gold Coast), or the cultivation of soybeans in Ghana.

Note 3. This is the earliest document seen (Aug. 2009) concerning soybeans in Rhodesia. later documents (Dickson 1911) indicate that these soybeans were first grown in 1911. It is not known whether the soybeans were sent to Northern Rhodesia (which became Zambia in 1964) or Southern Rhodesia (which became Zimbabwe in 1980).

Note 4. This is the earliest document seen (Aug. 2009) concerning soybeans in Sudan. This document contains the earliest date seen for soybeans in Sudan (1910); later documents (Kaltenbach 1936) indicate that these soybeans were first grown in 1912; they came from India and South Africa.

Note 5. This is the earliest document seen (Aug. 2009) concerning soybeans in Nyasaland (renamed Malawi on 6 July 1964), or the cultivation of soybeans in Nyasaland. This document contains the earliest date seen for soybeans in Nyasaland, or the cultivation of soybeans in Nyasaland (1910). The source of these soybeans is unknown.

299. Itie, G. 1910. Le soja: Sa culture, son avenir [Soya: Its cultivation, its future]. *Agriculture Pratique des Pays Chauds (Bulletin du Jardin Colonial)* 10(84):237-46. March. [51 ref. Fre]

• ***Summary:*** Contents: Duration of vegetation (2 harvests per year in warm areas). Culture. Soil preparation. Time of planting. Selection of seeds (varieties), seed weight (number of seeds per kg for different European varieties), and weight to plant per hectare for forage or seed. Distance between seeds. Method of planting. Germination. Cultural care (crop management). Irrigation. Flowering and setting seeds. Harvest. Time of harvest.

Concerning germination (p. 241-42): Soybean germination in Europe is often unequal and unsure. It is also necessary to plant fresh seeds; otherwise, many will not develop or the weak seedlings rot quickly.

The nature of the soil has a marked influence. A hard soil that offers little resistance to Vigna, to the contrary stops the growth of soybeans that come up with difficulty in a dried-out or insufficiently prepared terrain. Hence the importance of careful farming methods.

Germination is rather long in temperate countries, quicker in the intertropical zone. It takes place after four or five days in Vietnam and in general in a week prohibiting very unfavorable circumstances. The young plant then develops slowly, but soon it does not delay to shoot up and attains rapidly 0.3-0.35 meters.

Note: This document contains 7 tables, mostly from other sources. Address: Ingenieur d'Agriculture coloniale.

300. *USDA Bureau of Plant Industry, Inventory.* 1910. Seeds and plants imported during the period from July 1 to September 30, 1909. Nos. 25718 to 26047. No. 20. 34 p. April 23.

• ***Summary:*** Soy bean introductions: *Glycine hispida* (Moench) Maxim.

"25778-81. From Buitenzorg, Java. Presented by Dr. M. Treub, director, Department of Agriculture. Received July 19, 1909. Seeds of the following:

"25778. Black.

"25779. Yellow.

"25780. Yellow.

"25781. Brown."

"25913/25920. From Hangchow, China. Presented by Rev. W.S. Sweet, Wayland Academy, Baptist Missionary Union, Eastern China Mission. Received August 2, 1909. Seeds of the following; notes by Mr. Sweet.

"25919-20.

"25919. Yellow. Vine 1 foot high; ripe from November to December. The cheese made from this bean forms a large element of food here; if adapted to American tastes a profitable business could be established in the States.

"25920. Black. Ripe from June to August; used the same as No. 25919." Address: Washington, DC.

301. Brenier, H. 1910. La question du soja [The soya question]. *Bulletin Economique de l'Indochine (Hanoi)* 13(83):105-28. March/April. Series 2. [22 ref. Fre]

• ***Summary:*** This is an in-depth look at the relevance of the soybean to France, both now and in the future. It is prompted by the rapid growth of soybean imports to Europe from Manchuria. The author has a good knowledge of the

literature on soybeans and a familiarity with the crop in the field in French Indochina and China.

Contents: 1. Soybean cultivation: Species and varieties, major soybean producing countries (China, Japan, Korea, Indochina), other countries (Java and the Dutch East Indies, France, USA. The Imperial Institute of London is conducting trials in the Cape of Good Hope and Natal [South Africa], in British West Africa, and in Gambia), methods of cultivation and yield. 2. Commerce: Exports of soybeans and soybean cake (beancake, *tourteaux de soja)* from China and especially Manchuria (Newchwang, Dairen/ Dalny, Antung, Ta tung kow, Suifenho [Suifenhe] / Sui-fen-ho), importing countries in 1908 in descending order of amount imported (Russian ports on the Pacific [Vladivostok, for re-export to Europe], Great Britain, France, Holland, Italy, Belgium, Germany), prices. 3. Soybean utilization: Chemical composition, use as a forage plant and for improving the soil, use in human foods (tofu, shoyu, Worcestershire sauce, tuong [Annamite soy sauce], miso, natto, soymilk), the soybean as an oilseed (yield of oil from various oilseeds), soybean cakes. Conclusions.

Page 109 discusses soybeans in Indochina, according to information received from M. Crevost, Curator of the Agricultural and Commercial Museum of Hanoi, and from the article by Bui-quang-Chiêu (Dec. 1905). The names of the soybean are different in the various parts of Indochina. In Cochin China (especially in the provinces of Chaudoc and Baria), in Annam (sporadically), and in Tonkin it is called *dau-nanh* or *dau-tuong (Tuong* is a sauce made with soybeans, described later under "Uses"). In Cambodia *(Cambodge)* it is called *sandek sieng.* The variety most widely cultivated in Indochina seems to be one with a yellowish-white color, more oblong than round, a little flattened *(soja platycarpa* of Harz [1880, 1885] (?)), different therefore from the fine *(belle)* varieties of Manchuria and Japan that are well rounded and pure yellow.

A table (p. 112) shows soy bean grain exports (in 1,000 metric tons) from different Manchurian ports for the years 1905-1908. The author notes that Indochina could be exporting soybeans to France. One factor that stimulated the large exports of soybeans from Manchuria in 1908 (besides an excellent harvest in 1907) was a program to suppress the cultivation of opium by expansion of soybean acreage (p. 113). The author uses the scientific *Phaseolus radiatus* to refer to the *petit haricot vert* (probably mung bean). He observed soybeans planted in mixed culture in Szechuan.

Page 116 notes that the rise of soybeans in Manchuria is due in part to the power of the Japanese commercial house Mitsui Bussan Kaisha and the large English oil mills, which joined to develop an industry that had not previously existed. At the end of 1906, which had a dominant commercial role in Southern Manchuria, sent one or two trial shipments of soybeans to England. Mitsui was followed mainly by the British trading houses (Samuel & Samuel, Jardine, Matheson), then by the Germans (Otto Reimers, Arnhold Karberg), and the Russians. Continued suppression of opium growing led to further expansion of soybean cultivation.

A table (p. 117) gives the price of soybeans (per picul of 300 catties = 180 kg), soybean cake (per 10 cakes of 53 catties each or 318 kg for the 10), and soybean oil (per picul of 100 catties = 60 kg) in New chwang [Newchwang] taels and in French francs in the average year from 1882-1891, and in the year 1897. Prices were up in 1897.

Page 124 states: "A factory was recently founded near Paris (at Saint Germain en Laye), with Chinese capital, for the preparation of a series of products derived from soya: milk, *"caséo-sojaïne,"* cheese [tofu], sauce, and sweet soya preserves *(confiture (?) de soja)."* A footnote states: "I owe this curious piece of information to the amicability of the secretary of *Ecole française d'Extrême-Orient,* Mr. Ch. Maybon, who pointed it out in the January 1910 issue of the *Bulletin de l'Association amicale franco-chinoise.*

A table (p. 125) shows that the soybean gives the lowest yield of oil of all major oilseeds: copra (from coconut) yields 67-70% oil, sesame seeds 50-56%, poppy seed *(pavot)* 43-50%, castor oil plant 42-50%, rapeseed (colza) 42-45%, linseed 43%, peanuts 35-47%, cottonseed 21-26%, soybeans from Manchuria 16-18%.

Note: This is the earliest document seen (March 2000) that describes *caséo-sojaïne* as a product. Yet this may well be a mistake since its source of information is given as *Bulletin de l'Association Amicale Franco-Chinoise* (Jan. 1910)–which uses the term to refer to a business name. Address: Inspecteur-Conseil des Services Agricoles et Commerciaux de l'Indochine.

302. *Monthly Consular and Trade Reports (U.S. Bureau of Manufactures, Department of Commerce and Labor).*1910. Soya Beans. China. No. 356. p. 92-93. May.

• ***Summary:*** Having received several inquiries from interested firms, Vice Consul C.C.L. Williams secured freight quotations on the shipment of Manchurian soya beans and bean cake from Newchwang to San Francisco, California, and Seattle, Washington.

Writing from Dalny at the end of January 1910, regarding soya beans, Vice-Consul A.A. Williamson states that "the whole market has been in an unprecedented state of upheaval this season." "Beans are now at prohibitive prices, higher than ever before–$1.66 gold per 133.3 pounds. Absolutely no guarantees as to oil contents or moisture can be given."

"On account of the high duty on beans–45 cents per bushel of 60 pounds–very few have gone to the United States. The chief product which Americans buy is oil." A table (p. 93) shows exports (in tons) of beans, bean cake and bean oil from Newchwang to Hongkong, Great Britain, Samarang [Semarang, Central Java], Germany, Japan, and

Chinese ports during the first 3 quarters of 1909. Address: Washington, DC.

303. *Monthly Consular and Trade Reports (U.S. Bureau of Manufactures, Department of Commerce and Labor).* 1910. Oil-seed products. No. 356. p. 83-93. May. See p. 91-93.
• ***Summary:*** In the section titled "Cotton-seed oil and meal," under "England" there is a long subsection on "Soya Bean and Other Oils." In the section titled "Soya Beans" are the following subsections: (1) "China: Freight rates from Newchwang to the United States." A Japanese shipping company, Nippon Yusen Kaisha, has quoted a rate from Kobe to Seattle, Washington, and a French company has quoted rates from Chingwantao* to San Francisco, California, by direct steamer. Exports of "beans, bean cake, and bean oil" from Newchwang to the following ports are given for the first 3 quarters of 1909: Hongkong, Great Britain, Samarang [Semarang, Central Java], Germany, Japan, Chinese ports, and total. The leading buyer is Japan, and the leading export product is bean cake.

(2) "Dalny: Prices and cost of sbipment." "Beans are now at prohibitive prices, higher than ever before–$1.66 gold per 133.33 pounds." A table (p. 93) shows the exports during the first 3 quarters of 1909 from this port to Hongkong, Great Britain, Samarang, Germany, Japan, and Chinese ports for beans, bean cake, and bean oil.

* Note: Chingwantao, also spelled Chinwangtao or Ch'in-huang-tao, is seaport town on the Gulf of Chihli, in northeast Hopeh province, northeast China (former Manchuria); a former treaty port. Address: Washington, DC.

304. *Bulletin van het Koloniaal Museum te Haarlem.* 1910. Inlichtingen, correspondentie, enz. [Information, correspondence, etc.]. No. 45. p. 118-69. July. See p. 128-33. [Dut]
• ***Summary:*** On pages 128-33 is a section titled "The soybean" *(De sojaboon),* which consists mostly of long passages translated into Dutch or excerpted from other publications, especially: (1) Edie, E.S. 1909. "Cultivation and uses of soya beans." *Liverpool University, Institute of Commercial Research in the Tropics, Bulletin* 1(1):1-7. Oct. 8. (2) Heyne, K. 1909. *Kedelee op de Europeesche markt* ["Soybeans in the European market"]. *Teysmannia* 20:687-91.

305. Lemarié, Charles. 1910. Les sojas du Japon [The soybeans of Japan]. *Bulletin Economique de l'Indochine (Hanoi)* 13(85):493-98. July/Aug. [4 ref. Fre]
• ***Summary:*** "As a contribution to the study of the question of soybeans, so clearly revealed by the Inspector-Consul Mr. Brenier in a recent edition of this Bulletin, he judged it useful to ask me for the notes hereafter collected as much over the course of my lectures as upon the occasion of my voyage to Japan in 1903.

"I borrow much from Rein *(The industries of Japan)* and from Messrs. Paillieux and Bois *(Le Potager d'un Curieux* or *The Kitchen-garden of a Curious One)* who summarized all that we know about soybeans *(soja)* in Europe up until recently" (p. 493).

Describes and gives the names of more than twenty cultivated varieties, using the classification system of Rein and the Japanese based on seed coat color.

"I have already said that it [the soybean] needs heat and frequent watering. These considerations explain, in part, the failures encountered up to now in the attempts to introduce this crop into Europe. I fear the same obstacles for Mr. Li-yu-Ying, of Chinese nationality, formerly a student at the school of practical agriculture at Chesnoy, near Montargis (Loiret).

Note: Loiret is a department of France just south of Paris. Montargis is a commune in the Loiret department; the ancient town is located about 110 km (68 mi) south of Paris.

According to a lecture he gave last year to his former classmates, Li set himself the task of taking up these trials on the outskirts of Paris: or was it on the manure fields / sewage farms *(champs d'épandage)* of Gennevilliers or Achères.

"But even if the cultivation of soybeans in France is not profitable, nevertheless the popularization of the diverse products that come from them is no less useful; Indochina, if the need be, could provide for new industrial ventures. With Mr. Albert Demolon, a scientifically educated agriculturist *(ingénieur-agronome),* then professor at Chesnoy, and today director of the Agricultural Station of Aisne [northeast of Paris] and of the Laboratory of Bacteriology at Laon, Mr. Li-yu-Ying again took up his previous studies related to these various products. In particular, he compared soymilk, which he calls *Caséosojaïne,* with animal milk, and he believed [it] possible, employing the highly developed procedures of handling and fermentation used [in France] with cow's milk, to obtain forms of tofu *(Téou-fou)* acceptable for our Western palates. That is to say: first, before any fermentation, a liquid [form of tofu] lends itself to the same uses as milk, especially useful for artificial feeding of livestock; then, after coagulation: 1. a hard cheese, corresponding to cheese of the firm sort *(fromage à pàte ferme),* cooked egg, or cooked meat in richness of protein; 2. a soft cheese, corresponding to fresh cheese *(fromage frais)* and able to be consumed as a legume; 3. a fermented cheese, after sterilization then inoculation with microorganisms of certain special cheeses, corresponding to these diverse fermented animal cheeses" (p. 497-98).

Also discusses: Azuki (p. 497). Address: Directeur des Services agricoles et commerciaux du Tonkin.

306. Société Française des Distilleries de l'Indo-Chine. 1910. Nouveau procédé de traitement des légumineuses et

particuliérement du Soja (Glycine hispida) pour la fabrication des sauces, condiments ou produits alimentaires [New process for the treatment of legumes and particularly of Soya (Glycine hispida) for the making of sauces, condiments or food products]. *French Patent* 415,026. Sept. 16. 3 p. Application filed 1 July 1909. [Fre]

• ***Summary:*** Soya or other leguminous seeds, with or without addition of cereals, are suitably cooked, and after being cooled aseptically are seeded with pure cultures of the organisms necessary to produce the desired results. They are then aged. The process is very delicate and the aging sometimes very long (as in the preparation of *shoyu,* which can last from 8 months to five years). Other products include *tao-yu, miso tao-tjing, and tuong.* The sauces or condiments produced are sterilized or pasteurized in trade packages. Address: Boulevard Gia-Long 53, Hanoï [Hanoi] Tonkin [French Indochina].

307. Higeta Shoyu Jozosho (The "Higeta" brand soy brewery.) Main office: Choshi, Chiba Prefecture (Document part). 1910. In: Japan's Industries: And Who's Who in Japan. 1910. Osaka, Japan: Industrial Japan. vi, iii, 687 p., iv p. See p. 152-53. Undated. Translated from unpublished Japanese manuscripts. 29 cm. [Eng]

• ***Summary:*** History: The 'Higeta' is one of the brands of soy made in Choshi. The concentrated kind of soy from which it is derived was first brewed in the second year of Genna (1616) by a brewer named Gemba Tanaka. After the quality had been greatly improved, a new variety of the brand was made in the second year of Bunsei (1819), known as 'Horai.' When the metropolis was moved from Kyoto to Tokyo in 1868, the firm was honoured by being appointed supplier of soy to the Imperial Household. Since then the business has greatly increased. In 1898 the firm, in conjunction with the Iwasaki and Hamaguchi concerns, started an experimental laboratory, under superintendence of Dr. Ryojun Tawara, and a staff of experts, in which a study was made of soy fermentation. As a result of the investigations, much improvement was effected in the quality of soy generally. In that year, 1898, the Imperial Household ordered a special supply of the 'Higeta' brand, and this fact, coupled with the improved methods of salt refining, greatly extended its sale. When the grand military manoeuvres were held in the vicinity of Kumamoto in 1902, attended by His Majesty the Emperor, an order was placed with the firm to supply the army with bottled soy; to commemorate this honour the brewer has sold bottled soy ever since.

"During the Russo-Japanese war, 'Higeta' soy was used by the Army Department for seasoning canned foods sent to the front. In 1905 a new kind of soy bottle, with a screw stopper, was made for the troops. Soy was afterwards sold to the public in this form. Since then the firm has gone on flourishing, nothing being left undone to maintain the quality of the brand, and improve it if possible.

"The firm possesses two breweries, fitted up with steam engines, and employing altogether 320 workmen. The 'Higeta' brand soy is used all over the country, especially at Tokyo and Yokohama. It goes also to the United States, Canada, Siberia, China, Korea, Hawaii, the Philippine Islands and the Straits Settlements [later Singapore], being much appreciated in all these markets.

"In addition to being suppliers to the Imperial Household, the brewer has been honoured in other ways. At the Milan Exhibition of 1906, the 'Higeta' brand, which was selected by the Japanese Department of Agriculture and Commerce as a typical soy, was awarded the highest order of the Grand Prix; besides this, the soy was presented to Their Italian Majesties by the Japanese Commissioner for the Exhibition, and they are reported to have expressed to him their high appreciation of its flavour. The following are the principal honours conferred upon the firm by various exhibitions:

"A First Prize at each of the five National Exhibitions.

"The Grand Prize at the Chicago [Illinois] Exhibition, 1890.

"A Gold Medal at the Asian Exhibition (Hanoi, French Indo-China), 1903.

"The highest Grand Prize at the St. Louis [Missouri] Exposition, 1904.

"The Grand Prize of Honour at the Seattle Exposition, 1909.

"Mr. Gemba Tanaka, the proprietor, who was born in 1871, studied political economy at Keio University. On succeeding to the business of his ancestors, he entered into his work with enthusiasm, and by his strenuous exertions did much to extend the sale of the 'Higeta' brand. Owing to the esteem in which he is held in the district, Mr. Tanaka has been elected to represent the highest taxpayers of his prefecture in the House of Peers."

A large photo shows "the interior of a Choshi soy brewery."

Note: This is the earliest document seen (April 2001) concerning Higeta Shoyu. Address: Japan.

308. Kushigata Shoyu Jozosho (The "Kushigata" brand soy brewery.) Main office: Noda, Chiba Prefecture (Document part). 1910. In: Japan's Industries: And Who's Who in Japan. 1910. Osaka, Japan: Industrial Japan. vi, iii, 687 p., iv p. See p. 165-67. Undated. Translated from unpublished Japanese manuscripts. 29 cm. [Eng]

• ***Summary:*** "History: As will be seen by the accompanying articles, most of the soy brewers of Noda are distinguished by the surname of Mogi, and the family of Mr. Hichizayemon [Shichizaemon, Hichizaemon] Mogi, proprietor of the firm of 'Kushigata' brand soy is, in fact, the head and originator of all these distinguished so brewing

firms of the same name. One of the ancestors of the Mogi family was a distinguished Samurai in the service of the celebrated warrior and statesman–Toyotomi Hideyoshi–and his daring and deeds of valour are matters of history. With the overthrow of the Toyotomi family he laid aside his sword and entered the field of business. It was 290 years ago that the founder of the firm, the ancestor of Mr. Hichizayemon Mogi settled in Noda as a soy brewer. His distinguished personality and lineage gained for him the deep respect of the inhabitants and he was appointed the headman of the place, thus being called upon to engage in public business as well as his own. At this period, soy was brought over from Osaka to Tokyo, the capital of the Tokugawa Shoguns. The quality of this sauce, however, was very inferior and in view of this Mr. Mogi instructed a member of this branch of the family–Mr. Saheiji Mogi–to brew the 'Kikkôman' soy as an experiment. The results having proved very satisfactory, that brand was brewed on a large scale, and Mr. Mogi subsequently inaugurated the brewing of the 'Kihaku' brand, the two firms being allowed to engage in the brewing of so-called Noda Soy on an extensive scale. These two brands of soy having proved very well suited to the tastes of the citizens of Yedo, the demand increased to such an extent that the output was hardly sufficient to meet the demand. Such being the case, Mr. Hichizayemon Mogi himself engaged in the brewing of soy also. The ripe experience gained by supervising the work of the branch firms in brewing superior varieties of soy proved very valuable to him, and his business also proved a very great success, the name of the new brand of soy 'Icbiyama' becoming quite celebrated within a comparatively short period of time. However, another new branch of the Mogi family's firm being inaugurated under the proprietor-ship of Mr. Yuyemon Mogi, the brand 'Ichiyama' was transferred to the new firm so as to ensure its prosperity and the brand 'Kushigata,' at present in use, was then adopted. Such proceeding may appear somewhat strange, but it was in compliance with the legacy left by the ancestors of the Mogi family that the various branches should unite for the general sharing of profits in their business undertakings. At the time when the fame of the 'Kushigata' brand was at its height, in 1871, the whole premises of firm were unfortunately destroyed by fire. This proved a great blow to the fortunes of the firm but the present proprietor, by dint of sheer energy and perseverance, succeeded in retrieving the lost fortunes of the firm, the yearly output at present far exceeding the former production. Although the yearly output of the main house of Mogi ('Kushigata' brand soy) is below that of the branches, namely the 'Kihaku' and other brands, it has been entirely owing to the good will of the former that the latter firms have been enabled to attain their present prosperous state, the outcome of the traditional legacy of the Mogi family having been carried out by the head of the house

"Present conditions: The firm has at present two factories, the number of hands employed being 600. The factories are provided with two sets of boilers and steam engines for motive power. The firm produced about 5,270,000 gallons of soy per year, of which about 336,000 gallons are exported to foreign countries, the places of destination being Hawaii, Australia, China, Korea, Canada, British Columbia, the United States, the Philippine Islands, and the Straits Settlements [today's Singapore]. The export trade shows a tendency to increase year by year.

"Honours Awarded: The following are some of the principal prizes and medals awarded to the 'Kushigata' brand soy at the various exhibitions where the firm's products have been shown:–The National Industrial Exhibition from the First to the Fifth. First Prize on each occasion. International [Columbian] Exposition held in Chicago [Illinois], 1893. Gold Medal. International Exhibition held in Paris, 1899. Gold Medal. St. Louis International Exposition [Missouri], 1904. Grand Prix. Alaska-Yukon International Exposition at Seattle, 1908. Grand Prix.

"Proprietor: The present proprietor of the famous firm of the 'Kushigata' brand is Mr. Hichizayemon Mogi, who is the eleventh of the line. Although he is yet young, he places business before pleasure, strictly adhering to the precepts of his ancestors and is devoting his entire energy to the development of his business and the improvement of the particular brand for which the firm is responsible. Having selected a most favourable locality he is, at present, constructing a new factory with the producing capacity of 2,000,000 gallons per year, which promises to be the best equipped factory of its kind in Japan. The machinery employed is to be of the latest pattern, and it is intended that electricity be used as the motive power."

A photo (p. 166) shows "The pumping machinery of soy." Around the pump are many brick walls. Address: Japan.

309. Yamasa Shoyu Jozosho (The "Yamasa" brand soy brewery.) Main office: Choshi, Chiba Prefecture (Document part). 1910. In: Japan's Industries: And Who's Who in Japan. 1910. Osaka, Japan: Industrial Japan. vi, iii, 687 p., iv p. See p. 156-58. Undated. Translated from unpublished Japanese manuscripts. 29 cm. [Eng]

• ***Summary:*** "History: The Hamaguchi Soy Company, which was formed in 1906, with a capital of ¥500,000, is the continuation of a very old firm founded 265 years ago [i.e., in about 1641] by the brothers Kichiyemon and Gihei Hamaguchi, ancestors of the present Mr. Kichiyemon Hamaguchi, the proprietor of the firm. These two brothers, natives of what is now Wakayama Prefecture, settled down in Chôshi, and opened a soy brewery, which has gone on progressing from that day to this. In 1825, the Yamasa brand was one of those accorded the privilege of being called

"The Best Soy" by the Tokugawa Shogunate. Mr. Goryo Hamaguchi, the father of the present proprietor, after a visit to Europe and America, in 1833, introduced some radical changes in the brewing of soy in his brewery, by an application of the most scientific principles. Mr. Kichiyemon Hamaguchi, the present head of the firm, continued the same enterprising policy of his father, and the business began to extend very much in consequence. In 1894 the firm was appointed supplier of soy to the Imperial Household by special warrant. On being transformed into a partnership concern, the business of the firm increased considerably, while experts were engaged to conduct scientific investigations. Dr. Kendo Saito, the well-known scientist, was entrusted with the study of soy fermentation.

"At present the firm owns two breweries, installed with steam plants, and employing over 600 hands. The annual output is approximately 8,000,000 gallons. Tokyo, Yokohama, and other large business centres, consume great quantities of the 'Yamasa' brand, and much of it is exported to Great Britain, the United States, Germany, Australia, China, Korea, Hawaii, and Vladiovstock. The soy which goes abroad is contained in bottles of artistic appearance, well packed in boxes. The Hamaguchi Company was the pioneer in the export trade of soy, this being due to Mr. Goryo Hamaguchi's tour in 1883, when he made a special study of the foreign taste for the Japanese sauce.

"As above mentioned, 'Yamasa' brand soy is supplied to the Imperial Household by special warrant. A great honour was done the firm when His Highness Prince Kan-in, the President of the Fifth National Industrial Exhibition, paid a visit of inspection to the brewery. In 1907 their Imperial Highnesses, Princes Kitashirakawa and Higashikuni went over the brewery, and made some observations highly complimentary to the proprietor. In the same year a further honour was done the proprietor, when he was appointed supplier of 'Yamasa' soy to His Imperial Highness the Crown Prince of Korea.

"Space does not permit of a full list of the prizes won by the company at various exhibitions. 'Yamasa' brand soy was awarded a first prize at every one of the five National Exhibitions which have been held in Japan. Abroad, either a gold medal or the Grand Prix was awarded at each of the following Exhibitions: Chicago [Illinois/Columbian] International Exposition, 1893; Paris International Exhibition, 1899; The Asia Exhibition (Hanoi, French Indo-China), 1903; St. Louis [Missouri] International Exposition, 1904; Milan Exhibition [Italy], 1905; and Seattle Exhibition, 1909.

"Mr. Kichiyemon Hamaguchi, the President of the company, was born in Wakayama Prefecture in 1862, and was educated at Keio University. In 1960 he made a tour round the world, and since his return has done much to assist in extending the nation's commerce and industry. In order to enlarge his business he converted it into a company, and owing in great part to his energy and enterprising spirit, the company has proved a conspicuous success. Indeed, the whole soy industry has profited by his labours. A gentleman of excellent character and reputation, he has sat in both Houses of the Legislature. Mr. Hamaguchi has been ably assisted in his work by Mr. Kichibei Hamaguchi, a director, and Mr. Tetsujiro Midzushima, the superintendent of the works, as well as by an industrious and efficient staff."

Photos show: Yamasa soy in casks and bottles. Yamasa brand soy brewery from an angled aerial view; smoke rises from two tall smokestacks. Address: Japan.

310. *Board of Trade Journal (London).* 1910. Foreign trade of China in 1909. 71:20-25. Oct. 16. See p. 23-24. [1 ref]
• ***Summary:*** "The following article on the foreign trade of China in 1909 is based on the 'Abstract of Statistics and Report on the Foreign Trade of China' for 1909, recently published by order of the Inspector-General of the Chinese Imperial Customs...

"Apart from tea, silk, and two or three other articles, a marked general increase occurred in the leading exports to foreign countries; but the rise of a great export trade in beans is the fact which overshadows all others. From the earliest days of the Foreign Customs beans and beancake have been the principal exports from Newchwang, but for many years the trade was exclusively domestic. About the year 1890 a beginning was made with shipments to Japan, and the traffic soon rose into importance, Japan being practically the only foreign buyer of these products until 1908. During the eight years 1900-7 the average annual value of the beans exported abroad was 4.37 million taels [a unit of currency. The average value of the Haikwan tael is 2*s.* 7.19*d.* in 1909, 100 Haikwan taels = 111.40 Shanghai taels, for which exchange quotations are made]. In 1908 the total export of beans abroad rose to 4,770,000 piculs [1 picul weighs 133.33 lb], valued at 9 million taels, and in 1909 to no less than 14,438,000 piculs, valued at 32.78 million taels. The soya bean thus took at a bound a position equal to that of tea in the list of exports, and if to the shipments of beans be added those of beancake, giving a combined value of 52 million taels, even the position of silk at the top of the list is challenged. Of the beancake exported (10,088,359 piculs), all but an inappreciable quantity was of Manchurian origin; and of the beans, 10,915,000 piculs were sent out from Manchurian ports, 1,173,000 piculs from Hankow, 1,737,000 piculs from Chinkiang and Shanghai, and 600,000 piculs from Amoy [Xiamen] and Kwangtung [province in southeast China] ports. The ultimate destinations of the consignments of beans are less easy to determine with accuracy. There went directly to Japan 4,945,000 piculs; to Great Britain, 1,158,600 piculs; to Hongkong, 2,010,800 piculs; to Port Said ('for orders'), 2,021,600 piculs; and to Vladivostock [Vladivostok] through Suifenho [Suifenhe], 3,842,000 piculs. The

statement, on good authority, that 400,000 tons of beans were shipped to the United Kingdom in 1909 may be accepted as not far from the mark, and would account for 6,800,000 piculs. Add the shipments to Japan and 460,000 piculs declared as for the Straits, Dutch Indies, and European countries, and there still remains a balance of over 2,000,000 piculs of which the destination is uncertain."

Tables show the net imports of foreign and native goods, and exports for the years 1907-09 of: Manchuria (p. 21). China (p. 22).

Note: This is the earliest document seen (March 2010) that gives soybean trade statistics for Southeast Asia (imports to Dutch Indies).

311. Wildeman, E. de. 1910. La question du soja [The soybean question]. *Matieres Grasses (Les) (Paris)* 3(30):1958-59. Oct. 25. (Chem. Abst. 5:1685). [1 ref. Fre]
• ***Summary:*** Summary and analysis by É.D.W. of an article having this title by H. Brenier published in *Bulletin Economique de l'Indochine* (Hanoi) 13(83):105-28. March/ April. Series 2.

312. *Agricultural J. of India (Calcutta)*.1910. Cultivation and utilisation of soy bean. 5(4):375. Summary from the Bulletin of the Imperial Institute, Vol. 7, No. 1 (1910). [3 ref]
• ***Summary:*** "A study is now being made by the Reporter on Economic Products to the Government of India of the composition of soy beans of established Indian races, with a view to the determination of the proportion of oil which they contain as compared with that contained in Manchurian beans. The quantity of soy beans at present produced in India is not sufficient for the creation of an export trade, but there is ample evidence that the beans could be grown extensively if desired.

"The introduction of the soy bean into India is of comparatively recent date, and the product is not grown to any large extent except among people of Mongolian races and particularly in Burma. Experiments on the cultivation of the plant have been carried out at various times at Nagpur, Lahore, Madras, at several localities in the Bombay Presidency and at Saharanpur in the United Provinces. Further experiments, however, are required in order to prove that the crop would be remunerative before it can be safely recommended to the *ryots*."

Note: In 1947 Lahore was divided between India and Pakistan. It is not clear whether the soybean experiments in Lahore were conducted in what later became India or Pakistan.

313. Lewkowitsch, Julius. 1910. Die Industrie des Soyabohnenoeles [The soya-bean oil industry]. *Chemische Industrie (Berlin)* 33(22):705-08. Nov. 15. Whole number 670. (Chem. Abst. 5:597). [3 ref. Ger]

• ***Summary:*** This is a major report on the world soybean oil industry. "In an astonishingly short period of time, the almost unknown soybean has become a major oilseed in Europe." The method of separating the oil from the soya bean in Manchuria is to soak the seeds in water overnight, to crush them, and, after boiling the mass with a little water, to express the oil in a primitive form of press. Owing to the length of time during which the pressure is continued, the yield of oil is as high, if not higher, than is given by the modern hydraulic presses [used in Europe]. The expressed oil is mainly used for food, while any that is unfit for that purpose is burned in lamps. The residual cakes in the press, which are about 3 inches thick and 2 to 3 feet in diameter, form a staple food product. The bean cakes in China are called *teou-fou-tcha* [sic, actually this term refers to okara].

Some idea of the trade done in these soya bean cakes may be formed from the fact that during the year 1904 no less than 160,000 tons of soya bean cake (not including the beans themselves or the oil) were exported to Japan alone, although that country itself produced about 2,500,000 hl. (1 hectoliter = 100 liters, so 6,875,000 bushels) of beans, which were utilised in 11,000 factories that manufacture soy sauce. In the year 1909 the quantity of beans exported from Manchuria to Japan reached 600,000 tons.

Until two years ago considerable difficulties stood in the way of the trade with Europe, for the long sea-voyage through the tropics and especially through the Red Sea, had such a deteriorating effect upon the beans, that, after removal of about 10 per cent of oil, the residual oil cake was quite unsuitable as a feeding stuff. Only a small amount arrived in Liverpool, where the resident Chinese created an insignificant demand for their favorite dishes. Nevertheless, small amounts of soybean cake *(Soyakuchen)* were imported to England for use in mixed feeds, although this branch of trade had but a paltry existence. Therefore the confluence of a number of particularly favourable conditions were required to introduce the beans into the world and European markets. During the Russo-Japanese War, soybeans served as a staple food for the Japanese, and later the Russian soldiers. After the war, Manchuria was thrown open to the commerce of the world. Thanks to the industrial activity of the Japanese and the decline in the shipping rates, a favorable opportunity arose, after the soldiers left, for exporting large quantities of the beans to England.

The first large consignment reached Liverpool towards the end of 1908, and its arrival coincided with a period of great scarcity of other oils and fats, due to various causes, and, in particular, to the increased consumption of edible fats, and the growing demand for dynamite glycerin for the Transvaal mines and the construction of the Panama canal. In addition to this, the cotton-seed harvest in the United States had been poor, and this had caused a considerable increase in the price of Egyptian cotton-seed, so that many oil-mills in England had been forced temporarily to suspend

work. Hence attention was at once directed to the new raw material, large quantities of which were available at favourable prices.

The imported beans had the following average composition: Water 10%, oil 18%, proteins 40%, carbohydrates 22%, fibre 5%, and ash, 5%. It was not possible to reckon upon a higher yield of oil than 10 per cent. from the beans, but feeding experiments with the oil-cake showed that while it produced as much flesh as cotton-seed oil-cake, it caused the cows to yield a milk richer in cream. Thus for some time past soya cake has fetched higher prices in the market than cotton-seed cake.

Had it not been for the timely appearance of soy-bean oil the already high price of cotton-seed oil would have been at least 25 per cent. higher, and there would have been a corresponding increase in price of all the fats used in the soap industry. Immense quantities of the new oil were employed in the manufacture of soap, and during the year 1909 more than 400,000 tons of the beans were imported into England. Only small quantities were sent to America, and, relatively, very little to the continent of Europe.

The high tariff on raw materials in Germany and in France prevented the importation of the seed, and at first the English oil manufacturers took advantage of this, and exported large quantities of soya oil and soya cake both to America and the Continent. Only within the last few months have the German oil manufacturers succeeded in obtaining the concession that soya beans may be imported into Germany free of duty, but in the near future the production of soya oil and soya cake may become an important branch of the German oil industry.

The chief use of the new material in the manufacture of soap is as a partial substitute for cotton-seed oil in the production of hard soaps, while for soft soaps it can completely replace cotton-seed oil and partly replace linseed oil. Soya-bean oil has also been extensively used as an edible oil, and in admixture with cotton-seed oil large quantities of it have been consumed in England. It has also been employed as an oil for the preservation of sardines. Attempts were made to use it as a substitute for linseed oil in the color and varnish industries, but it can never replace the latter oil completely.

The composition of soya-bean oil renders it particularly suitable for the adulteration of both linseed and cotton-seed oils, while it is also frequently employed as an adulterant of Japanese rape oil.

The chief ports for the export of soya beans are Newchang, Dalny, Vladivostok, and Hankow, while the principal European ports for their importation are Hull, London, and Liverpool, and, more recently, Hamburg. The supply of the beans is assured for several years, for, in addition to that produced in Manchuria and South China, attempts, which appear likely to be successful, are being made to cultivate the plant in West Africa and in the East Indies.

In the Southern States of North America the soya plants are already grown for fodder, and experiments are now being made to cultivate them for the production of oil seed. It has already been proved that the beans grown in West Africa from Asiatic seed do not yield less oil than the original seed. The author lived 1857-1913.

Note 1. This is the earliest document seen (March 2001) concerning soybeans in connection with (but not yet in) Panama or the Canal Zone. Address: London.

314. *Agriculture Pratique des Pays Chauds (Bulletin du Jardin Colonial).*1910. Analyses de soja [Analyses of soybeans]. 10(92):427-28. Nov. [Fre]

• ***Summary:*** "The Colonial Garden *[Jardin Colonial,* probably located in Paris, France] has recently had the opportunity to conduct a number of analyses of samples of the soybean [Soja] and of products made from these seeds. A compositional analysis is then given for white soybeans and black soybeans from northern China, white soybeans imported from Denmark, dehulled white soybeans, flour of white soybeans, soybean cake (from white soybeans), and bread made from white soybeans. The bread contains 15.53% moisture, 3.74% minerals, 30.25% nitrogenous (protein) materials, 7.36% fat, and 17.88% saccharifiable materials.

Page 428 contains an analysis of soy sauce *(la Sauce de Soya),* which is said to be known, in China and Japan, under the name of "Schoyu." Solids comprise 39.59% of the product on a dry-weight basis. These solids are composed of ash 41.70%, nitrogenous materials [proteins] 18.00%, and oil 4.2%. The mineral portion is very rich in chlorine, potash, and soda or kali *(soude [sodium]),* and rather rich in sulfuric acid; it contains traces of phosphate.

Note: This is the earliest document seen (Feb. 2001) concerning soybeans in Denmark. This document contains the second earliest date seen for soybeans in Denmark (Nov. 1910). According to Thompson (1914, p. 15) Denmark first started importing commercial quantities of soybeans in 1911; that year they imported 20,000 metric tons. Address: Le Jardin Colonial, Paris, France.

315. Piper, Charles V.; Morse, W.J. 1910. The soy bean: History, varieties, and field studies. *USDA Bureau of Plant Industry, Bulletin* No. 197. 84 p. Dec. 31. Includes 8 plates showing plants, pods, and seeds, and an excellent 6-page index. [27 ref]

• ***Summary:*** Contents: Botanical history and identity of the soy bean. Botanical classifications of soy-bean varieties. Varietal characteristics of soy beans: Habit of growth, foliage, pubescence, flowers, pods, seeds. Frost resistance. Period of maturity (soybeans were planted at the Arlington Experimental Farm, near Washington, DC, from 3 June

1905 to June 1909). Changes in life period (soybeans were planted at the Arlington Farm in 1902). Pollination and hybridization. Mutations. Nomenclature and classification. Early agricultural history in the United States. Varieties introduced in the United States independently of the Department of Agriculture or previous to 1898: Enumeration, Ito San, Mammoth, Buckshot, Guelph, or Medium Green, Butterball, Kingston, Samarow, Eda, Ogemaw, or Ogema.

Varieties grown in Europe (p. 32-33; Early history, Samarow, Etampes, Chernie [from Khabarovsk, Siberia], "Yellow Riesen," Buckshot, "Yellow," "Brown," Butterball, S.P.I. No. 5039. European seed companies carrying soybeans include Dammann & Co., Naples, Italy; Haage & Schmidt, Erfurt, Germany; Vilmorin-Andrieux & Co., Paris, France).

The soy bean in Asia (p. 34-35): Asiatic sources of soy beans, list of varieties with SPI numbers from each of the following countries and places: Siberia (South Usuri [Ussuri], Khabarovsk, Merkoechofka), Manchuria (Newchwang, Harbin, Tieling), Korea (Pinyang, Ko-bau), Japan (Tokyo, Kobe, Yokohama, Hokkaido, Anjo), China (many places), Formosa (Taihoku), Cochin China (Saigon), India (Darjiling [Darjeeling] and Khasi Hills–Assam; Pithoragarh–Kumaon Dist.; Safipur, Hasangani, Ranjitpurwa–Unao, Uttar Pradesh; Etawah, Manipuri–Uttar Pradesh; Cawnpore, Dehra Dun, United Provinces; and Poona Bombay), Java (Buitenzorg), Celebes (Macassar).

Desirable characters in soy-bean varieties (p. 36-37): Considerations governing choice, habit of the plant ("Erectness of stem with upright or ascending branches is a prime requisite of a desirable variety. A tall habit is also important, as dwarf varieties usually bear pods very close to the ground, so that many will be left on the stubble..."), coarseness (a coarse, woody stem makes mowing difficult. However slender varieties often have small pods and seeds, often with vining tips and a tendency to lodge), ability to retain leaves, color of the seed ("Yellow or green seeds are preferable to darker colors, as the shattered seeds are more easily found by hogs pasturing the field or stubble"), shattering, resistance to disease ("In sections where nematodes and cowpea wilt occur most soy-bean varieties are seriously affected by both these diseases"), nonfilling of pods. Synopsis of the groups (plants bushy vs. twining). Synopsis of the varieties (within each group lists the total number and acquisition numbers of varieties with various colored seeds and germs: Group I–190 varieties (seeds straw-yellow, germ yellow–71 varieties; seeds olive-green, germ yellow–45 varieties; seeds chromium-green, germ green–17 varieties; seeds brown to olive, germ yellow–28 varieties; seeds black, germ yellow–18 varieties; seeds black, germ green–7 varieties; seeds bicolored, germ yellow–4 varieties). Group II–4 varieties. Group III–8 varieties. Group IV–76 varieties. Group V–7 varieties.

Of the 285 varieties in the five groups, 152 varieties (53.3%) have yellow (straw-yellow or olive-yellow) seeds, 55 varieties (19.3%) have black seeds, 44 varieties (15.4%) have brown seeds, 24 varieties (8.4%) have green seeds, and 10 varieties (3.5%) are bicolored).

Catalogue of soy-bean varieties (by S.P.I. number, from no. 480 in 1898 to no. 27,501 in 1909; p. 39-74). In 1908 USDA acquired soybean seeds from Vilmorin-Andrieux & Co. (Paris, France), Haage & Schmidt (Erfurt, Germany), and Dammann & Co. (Naples, Italy) (p. 57-60).

The best varieties of soy beans (p. 75, in 7 groups from very early to very late). Explanation of plates. Index.

The "Catalogue of soy-bean varieties" (p. 39) is "a complete list of soy beans imported by the United States Department of Agriculture, arranged chronologically in accordance with the sequential S.P.I. (Seed and Plant Introduction) numbers assigned to them by the Office of Foreign Seed and Plant Introduction." These numbers start at #480 (imported from South Ussuri, Siberia, in 1898) and end at #27501 (imported from Shanghai, Kiangsu, China, in 1909). Concerning No. 21825 (p. 58): "From Hokkaido, Japan, 1908... This variety is said to be used principally in the manufacture of 'soy,' 'miso,' 'tifu' [sic, tofu], etc. It has also been obtained again from the same place and grown under Nos. 21830 and 21831."

"The best varieties of soy beans" (p. 75) lists 35 varieties, each with a name and S.P.I. number, arranged in seven groups based on time to mature, from "Very early.–Ogemaw, 17258" to "Very late.–Barchet, 20798; Riceland, 20797 (In 1908 at Biloxi, Mississippi, it displayed astonishing diversity)." This list is "based primarily on the results at Arlington Experimental Farm [in Virginia], but those obtained in cooperation with various experiment stations have also been given due consideration:

"Very early.–Ogemaw, 17258.

"Early.–Early Brown, 25161 (from Indiana Agric. Exp. Station, 1909); and Vireo, 22874.

"Medium early.–Chernie, 18227; Auburn, 21079 A; Merko, 20412 (from Merkoechofka, Siberia); Elton, 20406; Chestnut, 20405 B.

"Medium.–Ito San, 17268; Medium Yellow, 17269; Tashing, 20854; Shingto, 21079; Swan, 22379; Brindle, 20407; Sedo, 23229; Lowrie, 22898 A.

"Medium late.–Brooks, 16789; Flava, 16789 A; Cloud, 16790; Ebony, 17254; Haberlandt, 17271; Peking, 17852 B; Wilson, 19183; Taha, 21999; Austin, 17263.

"Late.–Mammoth, 17280; Edward, 14953; Acme, 14954; Flat King, 17252; Tokyo, 17264; Hope, 17267; Hollybrook, 17278 (from Arkansas Agric. Exp. Station, 1904); Farnham, 22312.

"Very late.–Barchet, 20798; Riceland, 20797."

Matsuura (1929 and 1933) cites this as the world's earliest publication on soybean genetics: "Recording segregation of seed- and flower-color in its natural hybrids."

Page 11 notes that soybeans named "New Japan peas" were obtained from Norway (Source: Martens 1869). Page 20 notes that the Ogemaw variety of soybeans, which takes 92-97 days to mature, was obtained in 1908 from the Idaho Agricultural Experiment Station, where it had been grown for several years. Note 1. This document contains the earliest date seen for soybeans in Idaho, or the cultivation of soybeans in Idaho (about 1906).

Page 20 also notes that Buckshot variety of soybeans, which takes 92 days to mature, was obtained in 1908 from the Minnesota Agricultural Experiment Station, where it had been grown for several years. This is the second earliest document (April 2004) seen concerning the cultivation of soybeans in Minnesota. "Potomac Flats" is not mentioned in this report.

Concerning "Habit of Growth" (p. 12-13), the author states: "All soy beans are strictly determinate as to growth; that is, the plants reach a definite size according to the environment and then mature and die. The great majority of the varieties are erect and branching, with a well-defined main stem (Plates I and III)... In other varieties the stems and branches, especially the elongated terminals, are more or less twining, and usually weak, so that the plant is only suberect or even procumbent (Plates I-III)."

Photos show: (1) Plants of a wild soy bean grown in a greenhouse in a pot. (Fig. 1) Plants of a wild soy bean from Soochow, China, grown at the Arlington Experimental Farm. (2) Plants of a soy bean from Cawnpore, India. (3) Rows of different varieties of soy beans at Arlington Farm. (4) Plants of seven varieties of soy beans, showing types of habit: Meyer, Peking, Austin, Pingsu, Hollybrook, Haberlandt. (5) The same seven varieties shown in plate 4 after hanging in a dry room for 6 months. (6-7) Eleven soy bean pods, ranging in size and shape. (8) 36 varieties of soy bean seeds, showing variation in size and form.

Note 2. This is the most important document ever published on early soybean varieties in the USA. Note 3. This is the earliest document seen (June 2008) that uses the word "determinate" in connection with soybeans. Determinate plants terminate main stem elongation at, or soon after, the onset of flowering. Indeterminate cultivars continue main stem elongation several weeks after beginning flowering.

Note 4. This is the earliest publication see (Feb. 1999) written jointly by Piper and Morse, two of the most influential early advocates of the soybean in the USA. It is also the earliest document by or about Morse in connection with soybeans. Morse graduated from Cornell University, New York, on 20 June 1907 and 2 days later reported for duty at the Bureau of Plant Industry in Washington, DC, to work under Dr. C.V. Piper.

Note 5. This is the earliest document seen (Feb. 2004) in which Piper or Morse mention miso, tofu, or the use of soy beans as a coffee substitute.

Note 6. This is the second earliest document seen (July 1998) that uses the word "shatter" (or "shattered" or "shattering") in connection with soybeans. The earliest document (in 1854) used the word "shatter" in a very general sense. This document uses it more precisely, as the title of a section and for comparing varieties (p. 36): "When grown for grain alone, shattering is a serious fault. Some varieties, like Guelph, shatter inordinately; others, like Peking, scarcely at all... As a rule the varieties with large pods and seeds shatter much worse than those with small pods and seeds..."

Note 7. This is second the earliest English-language document seen (Oct. 2004) that uses the term "germ" to refer to a part of a soy-bean seed. The germ or embryo is the part of the seed inside the seed coat. The section titled "Seeds" (p. 15) states: "The germs or embryos of soy-bean seeds are yellow, except in the green-seeded and part of the black-seeded sorts, in which they are green." Address: 1. Agrostologist; 2. Scientific Asst., Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

316. Piper, Charles V.; Morse, W.J. 1910. The soy bean: History, varieties, and field studies: Botanical history and identity of the soy bean (Document part). *USDA Bureau of Plant Industry, Bulletin* No. 197. p. 9-11. Dec. 31.
• ***Summary:*** "The soy bean was first made known to Europeans by Kaempfer, who spent three years, 1690 to 1692, in Japan. Kaempfer (Amoenitatum Exoticarum, 1712, p. 837) gives the Japanese name 'Daidsu Mame' and describes it as an erect bean, with the pod of a lupine and the seeds like a large white pea. Linnaeus (Flora Zeylanica, 1747, p. 534) describes the plant briefly under 'Dolichos' and states that it is cultivated in Ceylon. This last statement is probably an error. He also cites the descriptions of Kaempfer. In 1753 Linnaeus repeats the description of the Flora Zeylanica and formally names the plant *Dolichos soja,* giving its habitat, however as India. What Linnaeus's Ceylon or India plant may be is not certain, as will appear.

"Moench in 1794 rechristened the Linnaean plant *Soja hispida.* Savi in 1824 called the Japanese soy bean *Soja japonica.* Miquel in 1855 named a narrow-leafed form from Java *Soja angustifolia,* and Maximowicz in 1873, using Moench's specific name, published the soy bean as *Glycine hispida,* which name has been generally adopted. Siebold and Zuccarini had previously (1843) named a plant from Japan *Glycine soja,* supposing it to be the *Dolichos soja* of Linnaeus. This plant, however, was not the soy bean cultivated by the Japanese but the wild plant later described as *Glycine ussuriensis* by Regel and Maack. Under existing botanical rules, the soy bean, which is known only as cultivated, has been called *Glycine hispida* (Moench) Maximowicz, and its nearest relative *Glycine soja* Siebold and Zuccarini *(G. ussuriensis* Regel and Maack).

Maximowicz considered that the soy bean was probably derived from the latter by cultivation, but this idea has not generally been accepted.

"*Glycine soja,* as heretofore known, differs from *G. hispida* in its more slender and more vining stems, in being less hairy, in bearing smaller pods and seeds, and especially in having smaller flowers. The flower is 3 to 5 mm. long, while that of *G. hispida* is 6 to 7 mm. The structure of the flower is the same in both, but the calyx lobes are usually longer in proportion to the tube in *G. hispida* than in *G. soja.* It is apparent, therefore, that the fundamental differences between the species are slight. The smaller flower we regard as the best single character to separate *G. soja* from *G. hispida,* but using this as a criterion *G. soja* is also a cultivated species."

Note: This is the earliest English-language document seen (Nov. 2002) that uses the word "vining" in connection with soybeans–in this case *Glycine soja,* the wild soybean.

"Among numerous lots of seeds received from India (S.P.I. Nos. 24672 to 24693 inclusive) representing seven varieties, there are at least two (see Nos. 24675 and 24682) which have very small flowers, 3 mm. long, indistinguishable from those of the wild *G. soja* that we have grown. Typical plants of *Glycine soja* obtained from the Botanic Garden, Tokyo, Japan (S.P.I. No. 22428), and from Soochow, Kiangsu, China (S.P.I. No. 25138), have been grown three seasons. The India plants are coarser stemmed, less vining, and bear somewhat larger pods and seeds, but the flowers are much smaller than those of any variety of *G. hispida* and precisely like those of *G. soja.* Other numbers from India are probably *G. hispida,* but the flowers are somewhat smaller than the Japanese varieties and the pods and seeds as small as any variety of *G. hispida.* It is therefore apparent that both *G. soja* and *G. hispida* are cultivated in parts of India, if we accept the flower character as decisive. This fact makes it doubtful which of the two plants Linnaeus named *Dolichos soja.* There seems no good reason why *G. hispida* may not have been derived from *G. soja* by cultivation, the smaller flowers of the latter being the principal difficulty to explain. In all other respects the two supposed species seem to merge completely. The identity of the plant cultivated in India has been commented on by Watt (Dictionary of the Economic Products of India, 1890, p. 509)...

"Prain apparently does not apply the size of the flower as a critical character. Applying this, however, two of the Indian varieties (see No. 24675 and 24682) are certainly *Glycine soja,* but the plants are stouter and less twining, and the pods and seeds larger than the wild form from Japan. Three other varieties (Nos. 24672, Khasi Hills, and 24673 and 24674, Darjiling [Darjeeling in West Bengal, India]) we would refer to *G. hispida,* though the flowers are somewhat smaller than the Japanese and Chinese varieties. The first is erect and bushy, but the other two are procumbent and vining. A variety from Taihoku, Formosa, No. 24642, is very similar to the two varieties from Darjiling. On the whole, we are therefore inclined to believe that there is but one botanical species, which has been profoundly modified by cultivation."

To summarize: In most botanical works the soybean is named *Glycine hispida* (Moench) Maximowicz. By a few writers it is named *Soja hispida* Moench. The use of either of these names is based on the idea that the wild soybean *Glycine soja* Siebold & Zuccarini or *Glycine ussuriensis* Regel & Maack is a different species. Piper and Morse (above) have shown that this view is untenable, the wild and cultivated plants representing but one species. Address: 1. Agrostologist; 2. Scientific Asst., Forage-Crop Investigations, Bureau of Plant Industry, USDA, Washington, DC.

317. Hooper, D. 1910. Indian oils. *Indian Museum Industrial Section, Annual Report.* For the years 1909-10. p. 26-31. *

• ***Summary:*** Soy beans–The amount of oil in 91 samples received from the different districts where the seeds are grown ranged from 13.5 to 22.4 per cent., those from Poona yielding the most. The beans grown in India yield almost as much oil as those from Manchuria and Japan. Only certain districts, such as upland areas in Burma and Assam and the lower valleys of the Himalayas, are suitable for the cultivation of Glycine. Address: India.

318. Hosie, Alexander. 1910. Manchuria: Its people, resources, and recent history. Boston, Massachusetts: J.B. Millet. x + 320 p. Illust. Index. 25 cm. Oriental Series Vol. 14

• ***Summary:*** This book is similar in many ways to the 1901 edition with the same title except: (1) It contains 25 more total pages. (2) Chapters 7-10 in the 1901 edition have the same titles, are in the same order, and contain most of the same information as chapters 4-7 in the 1910 edition. (3) Most of the information on soybeans and soyfoods in this 1910 edition is identical or similar to that in the original 1901 ed, but usually on different pages. For example, the long, excellent section on tofu and related products on pages 183-84 in the 1901 edition is identical to that on pages 78-79 in this 1910 edition. And the description of how a traditional crush-stone mill and wedge press are used to make bean-cake and bean-oil, on pages 218-24 of the 1901 edition is identical to that on pages 121-27 of this 1910 edition. Many more such examples could be cited. (4) There is extensive and very interesting new information on railways, which are discussed at great length in this 1910 ed.; they are found in a separate record in this database as a "document part."

Editorial note by Charles Welch (p. ix-x): The whole world is now closely linked together as newspapers keep us

informed of the events in far-of lands. Manchuria was practically unheard of until the last two wars which Japan had to fight there against China (1894-1895) and Russia (1904-1905). Port Arthur fell easily when held by the Chinese, but its strong defense by the Russians "turned the eyes of the world to the citadel which lay at the point of the far Eastern peninsula called Manchuria." The Trans-Siberian Railway, started in 1889, ran east-west, eventually connected St. Petersburg (the capital of Russia from 1712 to 1918) to the Pacific Ocean port of Vladivstok–a distance of 5,772 miles. The Chinese Eastern Railway, started in 1897, ran north-south, connecting Mukden and Port Arthur. The building of these two railroads has shown to the world the great wealth of Manchuria, a province of China.

The war between Japan and Russia was fought in large part because Russia claimed special exclusive rights to mining, timbering, etc. in Manchuria. Japan fought for an "open door" policy in this wealthy region, the right to trade and commerce in Manchuria. Sir Alexander Hosie has been a resident of China for practically 40 years.

The Chinese call Manchuria the Tung-san-shêng (Three Eastern Provinces); it "is an agglomeration of petty Tartar or Manchu principalities, lying to the north-east of China Proper" (p. 3).

Soy beans or [soy] beans, bean oil, bean cake, or soyfoods are mentioned or discussed on the following pages of this 1910 edition: 69 (outer leaves of kao-liang or tall millet are woven into mats used for packing loads of grains and beans), 71 (barley in large amounts is ground with peas or beans as a ferment in the distillation of native spirit *{Shao chiu}* from tall millet / kao-liang), 75-80 (beans are the most important agricultural crop for external trade, and the second most important article of cultivation after kao-liang. The most important bean, considered together with its products bean-cake and bean oil, is the soy bean–*Glycine hispida;* discusses the many varieties of soy beans and soy bean products), 82 (Mao-Tou, soy beans cultivated as a garden bean for food), 84 (soy bean is one of six plants grown in Manchuria whose seeds yield oil), 101 (each skein or hank of silk is dipped in bean-flour water), 121-28 (how the oil is expressed from soy beans; Recent prices of soy beans and products. 1896 bean oil factory driven by steam), 142 (how boats carry soy beans and other export crops down the Liao River each spring after the ice breaks up), 146-47 (value of exports of soy beans and products; total value in Manchuria), 168 (the flourishing bean-oil and bean-cake industry at Dalny started in 1908, practically speaking), 172 (the 1907 depression in Manchuria's soy bean market), 174 (the 1907 depression is now over and the outlook for American goods in Manchuria is hopeful), 181-84 (value and amount of exports of soy beans and products from Dalny and other ports, mostly in 1908; ports of destination and uses at each), 196 (the matting, woven by hand from the outer sheaths of millet stalks, that rises high around every large cart carrying loads of loose beans and millet), 208-11 (city of T'ieh-ling on the Liao and its growing importance in the soy bean trade; met 1,000 carts heavily laden with produce from the interior), 216 (a large cart carrying beans and pulled in an ongoing sort of race by mules or ponies, has overturned, and the beans are scattered all over the roadway; such accidents are taken as a matter of course, and the way is cleared so that traffic can resume), 234 (Yi-t'ung [pinyin: Yitong, in central Jilin province] Chou, like T'ieh-ling [pinyin: Tieling], is a great storehouse for beans and grain, and there is extensive trade between the two cities), and 237 (met several caravans laden with empty "bean-oil boxes." Beans are carried from Newchwang by boats when the river is open and by carts when it is closed by ice).

Also discusses (see index): Job's tears or pearl barley. *Phaseolus radiatus* (the ray-fruited dwarf bean [azuki] which is red or white). Hemp *(Cannabis sativa)* and Abutilon hemp, the true hemp plant, *Abutilon avicennæ,* both valuable fiber crops. Sesamum seed. Ground-nuts [peanuts] *(Arachis hypogæa,* L.) Seaweed. Address: British Consul-General at Tientsin [Tianjin, China].

319. Hosie, Alexander. 1910. Manchuria: Its people, resources, and recent history. Railroads (Document part). Boston, Massachusetts: J.B. Millet. x + 320 p. Illust. 25 cm. Oriental Series Vol. 14

• ***Summary:*** Railroads in Manchuria are discussed at great length in this book. These include the Chinese Eastern Railway Co., the Siberian Railway (incl. the Trans-Baikal and the Southern Ussuri sections), South Manchuria Railway, Trans-Manchurian Railway, and the Trans-Siberian Railway.

The South Manchuria Railway, the newest, is discussed in the most detail, especially in Chapter 7, titled "Trade of Manchuria" (p. 138-191). Page 145: "In addition to the purely foreign imports, however, there should be mentioned an item of $10,000,000 worth of railway materials imported from the United States by the South Manchuria Railway Company, on which no duties were paid, and which was omitted from the Chinese Customs Returns."

Page 149: "Although considerable interest in the mineral deposits of Manchuria has been evinced by American, British, and German engineers during the year, but little has been accomplished by them toward the development of the country's mineral resources. The South Manchuria Railway Company, on the other hand, has pushed forward development work on the Fu-shun (pinyin: Fushun) coal mines with great energy, and extensive additions to the equipment of the mines have more than doubled the output" daily during the year from 500 tons the beginning to 1,200 tons by the end of December. The Fu-shun coal mines constitute one of the chief assets of the Company."

Page 153. "Railway developments: The South Manchuria Railway has been standardised and the installation of new rolling stock has greatly increased the road's carrying capacity. Under the narrow-gauge regime the line's daily carrying capacity was about 2,000 tons, whereas at the present time, with its standard gauge, new American rolling stock, and improvement in its freight service, the capacity is more than 6,000 tons. Similar improvement has been made in the passenger service."

Page 154: "These trains are thoroughly modern in every respect, the cars and locomotives being of the latest designs of American make. Each train is composed of a mail car, a Pullman sleeper, a diner, and a combination day coach and baggage car. In addition to these improvements the South Manchuria Railway Company has established a weekly steamship service between Dalny and Shanghai, which shortens the time of travel between the latter city and Manchuria by two to five days, and will also bring about a reduction of freight rates. The Company is already issuing through bills of lading between Shanghai and Manchurian points."

Page 162: "The net increase of the Japanese population in Manchuria for the year 1908 was 14,149, of whom 5,296 settled in the leased territory and 8,853 scattered throughout the country, mostly along the line of the South Manchuria Railway. A conservative estimate of the number of Chinese immigrants during the year would place the figure at 25,000, the majority of the newcomers being of the agricultural class, who have come to Manchuria to find permanent homes and have settled in the fertile regions surrounding Fakumen and Chengchiatun. Should the plans of the Government for the settlement of waste lands meet with success, the number of Chinese arrivals will rapidly increase."

Page 165: "The general plans sanctioned by the management of the South Manchuria Railway provide for a northern terminal at Suchiatun, a station on the main line of the South Manchuria Railway some 10 miles south of Mukden. Suchiatun is already the junction of the branch line to the Fu-shun collieries, having the necessary yards and transshipping facilities. By making Suchiatun instead of Mukden the terminal of the line the company will obviate the necessity of bridging the Hun River and at the same time will save several miles of track."

Page 169-70: "First place in the import trade of Dalny is held by goods from Japan, which were valued by the customs last year at $6,824,440, but which Japanese figures place at $8,429,393. This total is made up of a large variety of articles, from lumber and railway material to notions and a great part simply represents the supplies of food, clothing, furniture, etc., drawn from Japan by Japanese residents in Manchuria for their own use. Of the staple goods for the Chinese market, the most important are cotton goods and cigarettes."

"The United States is second in the import list, with $3,762,653, according to customs figures, or about 32 per cent. This was almost entirely trade with the Japanese in Manchuria, and was made up mainly of supplies for the South Manchuria Railway Company. The figure seems to be too small, as the value of railway supplies ordered in America and received during 1907 and 1908 was approximately $10,409,000, of which much less than half came in during 1907. The explanation may be that entries of duty-free goods for the railway or for general consumption in the leased territory are less carefully prepared, as to details, by the consignees."

Page 171: "The domestic goods brought in from Chinese ports were valued at $1,310,622. The rails, locomotives, bridge work, and most of the cars purchased on the first orders for supplies for the South Manchuria Railway were bought in the United States and delivery was completed in 1909. Of the new purchases under this head, the most important were an order placed in Russia for some 6,600 tons of steel rails worth about $250,000, a new electric-power outfit costing $135,000, ordered in the United States; rails, cars, and trucks for the Dalny street railway, ordered in Germany and England and costing approximately $277,000; and a gas-generating plant and distributing pipes, purchased in Germany and Great Britain, respectively."

Page 182-83: "Coal seems destined to become an important item among the exports, but the business is still in an experimental stage. In 1908 shipments to foreign countries amounted to 4,686 long tons. Already the South Manchuria Railway Company has a contract for furnishing coal to the mail steamers of the Osaka Shosen Kaisha, which come here twice a week from Osaka and Kobe. The price has not been made public, but it would seem to be not far from $2.75 to $3 per ton delivered on board, and at this low cost it is said to be quite satisfactory. With the exception of $239,828, representing the customs valuation of [soy] beans shipped to England, and $1,209 for exports to Korea, the entire foreign export trade of Dalny is with Japan, the total value of exports to that country being $4,574,057."

Page 186: "In August, 1908, the South Manchuria Railway Company began a weekly freight and passenger service between Dalny and Shanghai, and while little business offered at first, both the number of passengers and the freight tonnage seem to be steadily increasing, as the railway company is making special efforts to develop this line by selling through tickets and by offering through bills of lading to interior stations at moderate rates.

"The trade to South China ports continues in the hands of two leading British coasting lines, whose business has greatly increased of late, so that they have had as many as eight ships in port at one time loading cargo or waiting for berths." Address: M.A., F.R.G.S., Once Acting British

Consul, Tamsui; Now at Aberdeen (Scotland or Hong Kong).

320. Li, Yu-ying. 1910. Ta tou: Le soja [The soybean]. Paris: Societe Biologique de l'Extreme Orient. 66 p. Illust. 28 cm. [Chi]

• ***Summary:*** This remarkable work, written entirely in Chinese, was the first of Li's major works on soybeans and soyfoods. Published in Paris, it was written in Chinese and meant to be read by young people in China interested in coming to Paris to study or in helping Li with research on Chinese soybean varieties. An expanded and revised version was published into French the next year (1911).

Contents: Soybeans: 1. Introduction. 2. Names and varieties (colors, sizes, and shapes) of soybeans. 3. Where soybeans are produced and their history. 4. The place of soybeans in the hierarchy of plants (taxonomy). 5. Nutritional composition of soybeans. 6. Characteristics of soybeans (physiological, morphological, etc.). 7. Food uses of soybeans (incl. tables comparing the price of tofu with various meats, and the various sicknesses associated with eating different types of meat). 8. Equipment used in making soyfood products (a photo shows the equipment in Li's modern soymilk and tofu plant near Paris; p. 37), and compares soymilk with cow's milk. A large soybean utilization diagram in Chinese (p. 44) shows all the products that can be made from soybeans using the wet process (from soymilk) or the dry process (from flour). Note: This is the earliest document seen (July 2002) that contains a diagram of this type.

9. Value of soybeans in agriculture (incl. fertilizer use). 10. Conclusion. Appendixes: (1) About the *Société biologique de l'Extrême Orient* (Far-East Biological Society). (2) Membership form for the Far-East Biological Society (Paris): Date, name, A.K.A., Address, Occupation or subject of study, Place of birth. Please enclose 2 yuan membership fee (p. A6). (3) Bibliography of publications on soybeans by the Society of the Far East (p. A7-8). (4) Special announcement concerning soybean research (p. A9).

Illustrations (line drawings) show: (1) Comparison of shapes and colors of 7 different colors of soybeans (p. 5). (2) Five views of soybean pods with beans, incl. outside of pod, inside of both halves when open, with beans in one half, the two cotyledons of a single soybean (p. 11). (3) Soybean plant with pods (p. 12). Photos show: (1) The cellular components and layers of soybeans and hyacinth beans (p. 22, 23). (2) The interior and equipment in Li's soymilk and tofu plant on the outskirts of Paris (p. 37). (3) Microscopic views of soymilk *(doujiang)* and a liquid resembling soymilk made from soy flour (p. 38).

Tables show: (1) Size range (length, width, and thickness; maximum, average, and minimum) of 7 colors of soybeans: yellow bean, green skin bean, green bean, dark bean {"black" or "crow" bean}, black bean, red bean, spotted bean (p. 4). (2) Composition of four parts of a soybean plant: Comparison, water, protein, oil, carbohydrates, ash (p. 18). (3) Comparison of oil and protein content of 5 colors of soybeans (red, black, green, white, yellow) from various countries and regions: China, Japan, Southeast Asia, Russia, Hungary, and France (p. 19). (4) Composition of soybeans, hyacinth beans, and wheat (p. 21). (6) Comparison of the price of tofu with that of various meats (p. 29). (7) Ash content of soybeans, hyacinth beans, duck, uncooked rice, cabbage, egg, beef, chicken, lamb, pork, carp, wheat flour (p. 31). (8) Carbohydrate content of uncooked rice, wheat flour, hyacinth bean, soybean (p. 32). (9) Weight of products containing 100 gm of protein: Soybeans, tofu (somewhat firm), hyacinth bean, uncooked rice, bread, cooked rice, vegetables (p. 32).

Publications listed in the Bibliography (p. A7-8): *Ta tou–The soybean* (this book; published 1909). *Bean curd–20 centuries of great craftsmanship around the world* (1908). *Soycrafting–China's manufacturing specialty* (1908). *The Paris Bean Curd Company* (1908, illustrated). *An outline of the agricultural societies of France* (1908). Note: the above publications concern industrial matters.

*A description of herbs (Chinese medicinal plants etc.)* (1909). *TB [Tuberculosis] and its cure* (1909). Note: the above publications concern medicinal herb and health matters.

*The benefits of soyfoods* (1909). *Smoking and its relationship to health, economics and industry* (1909). Note: the above publications concern industrial and health matters.

Special announcement concerning soybean research (p. A9): "Gentlemen–Many of us in this society are researching the benefits of the soybean. It may be considered as China's greatest resource. We have already published a number of specialized reports. These have been made available to you. In view of the fact that there are so many varieties of soybean in China and that the regions of cultivation are so extensive, we must rely upon you, our colleagues, in all parts of the country to go into the field and collect data for us. Only then will we be able to complete our research into every variety of Chinese soybean. If we should receive your kind consent, we beg you to be so good as to send the soybean varieties to the Peking postal address of this Society (address is given). We are interested only in soybeans (see pages 1-6 of this book) and need one or two catties (0.5-1.0 kg) of each. Once our research into the benefits and properties of these beans is complete, we will submit a further report to this Society, in order to repay your goodwill. If you would please advise us of the cost of the beans and the postal charges, we will make the appropriate refunds. We will also send you a copy of this book as a modest token of our gratitude. Enclosed please find an explanatory document. Please take the trouble to complete this and send it together with the beans.

"The Paris/Far-East Biological Research Society"

On page A-10 is a form to be used when submitting the Chinese soybean varieties.

321. Macmillan, Hugh Fraser. 1910. Handbook of tropical gardening and planting, with special reference to Ceylon. Colombo, Ceylon: H.W. Cave. xii + 524 + xvi p. See p. 188. Illust. 22 cm. [15 ref]

• ***Summary:*** In chapter 4, titled "Green manuring and mulching," is a list of suitable plants including (p. 35) "*Glycine hispida.* Soya Bean. Small herb, 12-15 inches. [Grows at altitudes] Up to 2,500 ft." Note: No Sinhalese or Tamil names are given.

In chapter 12, on "Tropical vegetables and food products," section 1, "Leguminosæ, including beans, grams and pulses," contains the following (with Sinhalese and Tamil names given for most): *Cajanus indicus.* Pigeon pea; Congo bean *Canavalia gladiata.* Sword bean. *Cicer arietinum.* Chick pea; Bengal gram. *Cyamopsis psoraliodes.* Guar, or cluster bean. *Dolichos bracheata. Dolichos lablab, var.* Four varieties. *Lens esculenta (= Ervum lens).* Lentil. *Mucuna nivea.* Velvet bean is one variety. *Glycine hispida.* Soya bean. *Pachyrrhizus tuberosus.* Yam bean. *Phasaeolus lunatus.* Lima bean; Tonga bean. *Phaseolus vulgaris, var.* Climbing, or Runner beans. *Phaseolus vulgaris, var.* Dwarf French or Kidney bean. *Psophocarpus tetragonolobus.* Winged bean; Goa bean; Manilla bean [Manila bean]. *Vigna sinensis.* Cow pea; Yard-long bean.

The section on the Soya bean (p. 188) begins with a botanical description. "In India they are sometimes eaten in the form of 'dhal.' The famous Soya-sauce, said to be the basis of many popular sauces made in Europe, is made from these seeds. A useful domestic oil is also obtained from them, and the residual cake resulting from the expression of the oil forms a nutritious cattle-food. According to Sir George Watt, 'Soya Bean is extensively cultivated in Eastern Bengal, Khasia Hills, Burma, &c.' Yet I can find no mention of it in either Firminger's or Woodrow's works on gardening in India. Cultivation is very simple. A loose rich soil is preferable."

Chapter 26, "Pasture, grazing, and fodder plants," has a section titled "Other forage plants (leguminous)," which includes (p. 463) "*Glycine hispida.* Soya bean–A quick-growing annual, 15 inches high, producing a heavy crop of herbage, much relished by stock. See *Tropical Vegetables.*" Address: F.L.S., Curator, Royal Botanic Gardens, Peradeniya, Ceylon.

322. *Tijdschrift voor Economische Geographie.*1910. De sojaboonen, een nieuw artikel voor den wereldhandel [Soybeans, a new article for international trade]. 1:435-36. [1 ref. Dut]

323. Shaw, Norman. 1911. The soya bean of Manchuria. *Shanghai, Statistical Department, Inspectorate General of Customs. China Imperial Maritime Customs. II. Special Series* No. 31. 32 p. Also published by P.S. King & Son, 2 Great Smith St., Westminster, London SW, England. [6 ref. Eng]

• ***Summary:*** Contents: Introductory. Varieties. The plant. Soil and climate. Cultivation. Soil infestation. Yield. Uses of the soya bean: In the Far East: Bean sauce or soy (called shoyu in Japan [whence the name "soya"] and *chiang-yu* in China), the Chinese paste *chiang* (incl. *ta chiang* {great, made with yellow soybeans} and *hsiao chiang* {small, made with soybeans and maize}), tofu (incl. firm tofu *{tou-fu kan-tzu}*, tofu curds *{tou-fu nao*, curded with calcium sulphate instead of brine}, curd skin or yuba *{tou-fu p'i}*, layers of tofu pressed in cloth [pressed tofu sheets] *{ch'ien-chang tou-fu}*, and "frozen curd" *{tung tou-fu,* tofu that is frozen then dried}), bean flour, bean refuse {okara}, bean oil for food or industrial uses. Beancake and its uses. Uses in the Western world (beancake in Europe, and bean oil in Europe). The bean oil and cake industry in Manchuria. Trade development (statistics on exports from Newchwang have been kept since 1864). Beginnings of the European trade. Bean oil and cake production in South Manchuria. Chief sources of supply. Map references. Supplementary note.

Appendixes: 1. Table showing values (in Haikwan taels) per picul of [soya] beans, beancake, and bean oil at Newchwang, 1864-1909. 2. Graph showing monthly values (in silver yen) at Dairen of beans, bean oil, and beancake, 1907-10. 3. Table showing estimated [soya] bean production of Manchuria in normal years, compiled by the South Manchuria Railway Co. in 1909. 4. Estimates of [soya] bean production of Manchuria for the last 5 years by province and territory, compiled by the South Manchuria Railway Company in 1909: Fengtien province 1,092,350 tons. Kirin province 626,500 tons. Heilungkiang province 280,250 tons. Grand total for all Manchuria: 1,999,100 tons. Estimated soya bean production in Manchuria has increased from 600,000 tons in 1906 to a peak of 1,500,000 tons in 1908, to 1,400,000 tons in 1910. Percentage contributed by various colors of soya bean in 1910: Yellow 80.1%, green 9.4%, white-eye 3.8%, black-eye 3.2%, and black 3.4%. 5. Table showing total export of [soya] beans and bean products from Manchuria, 1909. For export of soya beans: Dairen 51% of total, Suifenho [Suifenhe] 25%, Newchwang 23%. For export of bean cake: Newchwang 50%, Dairen 44%, Antung 2%. For export of oil: Newchwang 75%, Dairen 21%, Harbin 1%. The writer frequently refers to Sir Alexander Hosie's book on Manchuria (1901, 1904).

The introduction begins: "It is only in the last three years that soya beans have become important in intercontinental commerce, and their rapid emergence from obscurity has, indeed, been one of the most remarkable

commercial events of recent times. The circumstance that 'the rise of a great export trade in beans is that fact that overshadows all others,... the soya bean thus taking at a bound a position equal to that of tea in the list of exports and, with the addition of beancake, even challenging the position of silk at the top of the list'"* (Footnote: * = "Statistical Secretary's Report on the Foreign Trade of China in 1909").

The "bean district *par excellence* is the upland country beyond Moukden [Mukden] where the hills... are overlaid with wind-deposited soil..."

"Cultivation: In Manchuria the beans are produced almost entirely by hand methods. The plough, which is drawn by quaintly mixed teams of oxen, mules, and donkeys, has only one handle and a rough steel-tipped cutter. The seed is sown by hand, on top of the drills, in April, and is covered by hand. A heavy hoe is used for a good deal of the turning and breaking. When the plant appears the earth is heaped up round it, so that the roots may derive the maximum of nourishment from the soil."

"The harvest takes place in September, and the pods are usually harvested before they are quite ripe, as otherwise they are liable to burst on drying, a loss of seed being thus occasioned. The plants are pulled up by hand or cut with a straight-bladed sickle in Manchuria, and collected into small heaps in order to facilitate drying, and, when dry, the seed is separated by means of a cylindrical stone roller having longitudinal cuts on its surface, which is dragged over the plants by a mule as they lie on the threshing-floor. After this primitive threshing operation has been completed, the beans are winnowed in the usual Chinese method–that is, by throwing them against the wind. The only manure used is a compost of stable manure and earth, which is often taken from the miry pools formed in the roads–the despair of the carter but a boon to the farmer. In countries where chemical manures are used, it is only necessary to apply potash and phosphoric acid where they are lacking, for nitrogenous manure is unnecessary, owing to the property which the soya bean possesses, in common with other leguminous plants, of obtaining nitrogen from the air by means of colonies of bacteria."

Yield: In 1867 the Rev. A. Williamson, who travelled in the upper Sungari district at the time and who appears to have been a very close observer, estimated a maximum yield of 2,000 lb., or 15 piculs, to the acre.

The Chinese paste *chiang* is not the same as the Japanese paste miso. Chiang "is made by farmers and eaten with fish, meat, and vegetables, while the more expensive Chinese soy [sauce] is only made by wealthy families and restaurant keepers and is not consumed by the very poor. There are two kinds of *chiang: ta* (great) and *hsiao* (small)." Describes in detail how each is made. Great chiang is made from yellow soybeans, salt, and water. Small chiang contains a small amount of maize (p. 7).

Industrial uses of bean oil: (1) As an illuminant, where it has not been superseded by kerosene oil. One advantage is that "no lamp is needed to hold it, the wick being inserted into the basin or plate containing the oil." (2) As a lubricant, bean oil is used to a very considerable extent in north China and Manchuria "for greasing axles and parts of native machinery" (p. 8-9).

In China, bean oil "is used as a substitute for lard, in cooking. Although it is inferior to rapeseed and sesamum oils for this purpose, these oils cannot compete with it in point of price... In spite of its unpleasant characteristic odour and unpalatability, the poorer classes in China consume it in its crude state, but among the rich it is boiled and allowed to stand until it as become clarified" (p. 8). In Europe "Refined bean oil may be used as a salad dressing in place of other oils (but, owing to its unpleasant odour, is usually mixed with an oil of animal origin or with rapeseed oil), or in the manufacture of margarine, when a greater percentage of soya oil than of copra oil is allowed" (p. 10).

Traditional methods of pressing out the oil yield only about half of that present in the seed (9% of the weight of the beans); the rest is left in the cake, and this distracts very much from its fertilizing value. "By gasoline extraction the beans give up practically all their oil, which, as refined by this process, is a clear, pure liquid, hardly resembling the muddy, dark oil produced in the old way" (p. 14).

Photos on unnumbered pages show: (1) Seven varieties of soya beans: Large black, small black, large flat black, small flat black, two green, and two yellow. (2) Soybean root nodules. (3) A massive granite roller for crushing beans. (4) "Steaming vat with grating on which [soya] beans are placed in gunny bags during the steaming process. (5) Native bean press, showing cakes in receptacle and log wedges driven in to press out the oil. (6) Modern bean press [hand turned screw?] set up in bean mill. (7) Oil-motor and crusher. (8) Modern crushing machinery. (9) Piles of beans in sacks awaiting loading onto trains at Changchun. (10) Color fold-out map titled [soya] "Bean districts of Manchuria." A schematic diagram (in the form of a rhombus / diamond) shows the probable relationships of the different groups of soya beans based on their color. A beautiful map, approximately 17 by 22 inches, is attached between page 26 and page 27. "Wuchang" [not Wochan] is in the area labeled "Yellow Beans" in the map. Other labeled growing areas on the map include "Grasslands," "White eye," "Black beans" [soy], "Maize" and "Green beans." The major railways, rivers, roads, and towns / cities (with their Chinese characters) are shown. The major soybean markets (underlined) are Fenghwa / Maimaikai, Kungchuling, Changtufu, Tungkiangtze, Sinminfu, Tienchwangtai, Newchwang, Kaiyüan, Tiehling, Mafengkow, Moukden, Takushan, Antung, Harbin, and Shwangcheng.

Shaw finished writing this yellow book on 31 December 1910.

Note 1. This is the earliest document seen (July 2000) that mentions the South Manchuria Railway Company in connection with soybeans. This company was run by Japan. According to the *Encyclopedia Nipponica* (vol. 22, at "Minami"), the South Manchuria Railway Company *(Minami Manshu Tetsudo K.K.)* was established in 1905 based on the Portsmouth Treaty ending the Russo-Japanese War; Japan took over the rights to the railway from Russia. The company started to actually run the railway in 1907.

Note 2. This is the earliest English-language document seen (Feb. 2004) that uses the term "frozen curd" to refer to dried-frozen tofu.

Note 3. This is one of the earliest English-language documents seen (Sept. 2006) that repeatedly uses the word "bean" (not preceded by the word "soya") to refer to the soya bean.

Note 4. This is the earliest English-language document seen (Oct. 2008) that uses the term "toufu p'i" to refer to yuba. Address: 4th Asst., Custom House, Dairen.

324. *A Travers le Monde.* 1911. Cultures exotiques: Le soja [Exotic crops: The soybean]. 17(6):48. Feb. 11. Bound in the back of *Le Tour de Monde.* [Fre]

• ***Summary:*** Two years ago the soybean suddenly assumed an important role in world trade. Exports from Manchuria have surpassed 500,000 tonnes. It is important as a food in East Asia. "Naturally it constitutes an excellent feed for animals, and soybean cakes are already highly praised. One can extract from the soybean an oil, which easily finds industrial uses. For this reason, soya becomes a high quality industrial raw material. Soybean oil, which has an agreeable odor and taste, is even well accepted in China and Manchuria in culinary uses; but it is appreciated above all in England, where this industry has been especially developed for the manufacture of soap.

"Indochina can take an important place on the soybean market which, in the ports of Dalny and Newchwang alone, has exceeded 120 million French francs."

325. *Bulletin Economique de l'Indochine (Hanoi).* 1911. Culture du soja à la station expérimentale de Yên-dinh en 1911 [Cultivation of soybeans at the experimental station of Yên-dinh in 1911 (Abstract)]. 14(88):711-12. Jan/Feb. [1 ref. Fre]

• ***Summary:*** This is a French-language summary of a French-language report by a Mr. Gilbert. Even though the results of cultivation are not very encouraging (in terms of yield per hectare), we will reproduce here the report of Mr. Gilbert for the practical details which it contains.

The soybean was cultivated in 1911 on a piece of land at the station, 1.5 ha in area, in silaceous-clay soil. Tables analyze the chemical and physical composition of the soil. Details of cultivation, growth, and yield are given.

326. Quintus Bosz, J.E. 1911. De samenstelling van Indische voedingsmiddelen [The composition of Indonesian foods]. *Bulletin van het Kolonial Museum te Haarlem* No. 46. 261 p. March. Also published in Amsterdam by J.H. de Bussy as a book. [8 ref. Dut]

• ***Summary:*** The nutritional composition and the source of information is given in a table for the following: Soybean seeds (p. 74-77). Soybean oil *(sojaboonen-olie)* (p. 76-77). Soybean flour or meal (p. 154-55). Soybean biscuit *(Beschuit,* 170-71). Japanese soy sauce and soybean tempeh *(Japansche soja, Tempé kedeleh* p. 242-43). Indonesian soy sauce *(Ketjap, Bataviasche soja* p. 244-45). Firm tofu *(Tao-koan,* 79.8% water. p. 244-45). Address: Dr., naar onderzoekingen in het Laboratorium van het Koloniaal Museum verricht onder leiding van Dr. M. Greshoff.

327. Magelssen, William C. 1911. Soya-bean culture in Ceylon. *Daily Consular and Trade Reports (U.S. Bureau of Manufactures, Department of Commerce and Labor)* 14(85):169. April 12.

• ***Summary:*** "The soya bean, which has come into prominence recently owing to its commercial value, has now been successfully experimented with in the island of Ceylon. The Agricultural Society secured a large quantity of seed some years ago from the Far East, and experiments were carried out at the botanic gardens at Peradeniya, but the cultivation proved a failure. The secretary of the Ceylon Agricultural Society has now succeeded, however, in turning out a large crop in the Government stock gardens in Colombo, producing two varieties, the Japan (white seed) and the Java (black seed), and seed will shortly be available for distribution.

"It is expected that the cultivation of the soya bean will be taken up largely in Ceylon, for besides its value as an article of food it can be exported to the European and American markets." Address: Consul, Colombo.

328. Bontoux, Emile. 1911. Le Soja et ses dérivés [The soybean and its products]. *Matieres Grasses (Les) (Paris)* 4(36):2195-99. April 25; 4(37):2239-43. May 25; 4(39):2326-29. July 25; 4(40):2364-66. Aug. 25; 4(41):2405-07. Sept. 25. [48 ref. Fre]

• ***Summary:*** Contents. Introduction. The plant: origin and history, species and varieties, culture, and production: USA, Japan, Manchuria, France, England, China, Korea, Indochina (it is cultivated for the needs of the population in Cochin China {especially in the provinces of Chaudoc and Baria}, Annam, Tonkin, Cambodia), Formosa, Java, India, Africa. The soybean–a food plant: The plant, the seed, large table showing many analyses from many countries of the chemical composition of many soybean seed varieties.

Introduction to food products made from soybeans in East Asia. Shoyu [soy sauce] (and koji). Miso. Natto. Tao-yu. Tao-tjiung (doujiang, from China). Tuong (from

Annam). Tofu. Li Yu-ying. Table showing composition of powdered soymilk, fresh tofu, and soy flour.

The soybean–an oilseed plant. The soybean as an oilseed in the Far East. Table showing exports of soybean cake and oil from various Manchurian and Chinese ports in 1908 and 1909. The soybean as an oilseed in Europe and the United States. Table showing imports of soybeans to various British ports in 1909 and 1910 (the leading port by far is Hull, followed in 1909 by Liverpool, London, Bristol Channel, Scotland, and Other ports {Rochester, etc.}). Table showing exports of soy oil from Great Britain in 1910: To Germany, Austria, Australia, USA, Belgium, Denmark, Egypt, France, Holland, Italy, the Indies *(Indes)*, Norway, Russia, Sweden, other, total (115,372 barrels, each weighing 175 kg). Discussion of soy oil and cake in most of the above countries.

Trade in soybean seeds: Mitsui Bussan, Manchuria, England, China, Japan. Soybean cake.

Soy oil: Physical and chemical properties. Applications and uses as food and in industry: Margarine, for illumination, soaps, as a drying oil, paints and varnishes, linoleum, artificial rubber. An extensive bibliography is at the end of the last article in the series.

Note: This is the earliest document seen (May 2010) concerning the cultivation of soybeans in Cambodia. This document contains the earliest date seen for the cultivation of soybeans in Cambodia (April 1911). Earlier documents imply that soybeans were being cultivated in Cambodia by 1900, and it is highly likely that they were being cultivated for at least a century before that time. Address: Ingénieur-chimiste E.C.I.L., France.

329. Dubard, Marcel. 1911. A propos de quelques variétés de soja [Concerning some varieties of soybeans]. *Agriculture Pratique des Pays Chauds (Bulletin du Jardin Colonial)* 11(98):422-26. May. [1 ref. Fre]
• ***Summary:*** "The *Jardin Colonial* (Colonial Garden) is involved in the study of soybean varieties, and starting this year 15 of them have been grown out." Discusses the characteristics of the seeds and of the plant. Varieties described include Shirasaya, Akasaya, Gowari, Nakade, Dozan, and Juninzuki (all of Japan), and a soybean from Laos.

330. Beltzer, Francis J.-G. 1911. Études sur la caséine végétale du "soja" et ses applications [Studies on the vegetable casein of soybeans and its applications]. *Revue Scientifique* 49(23):716-20. June 10. [4 ref. Fre]
• ***Summary:*** The author did his research in Cochin China [today's Vietnam], then a French colony. Contents: Introduction. Vegetable milk [soymilk]. Vegetable cheese [tofu and fermented tofu]. Industrial vegetable casein *(La caséine végétale industrielle;* i.e. soy protein). Production of vegetable casein: Cleaning and washing the soybean seeds, extraction of the oil (which can be used in soap), extraction of the casein. Industrial [non-food] applications of vegetable casein: Paint, paper coating, Galalith, etc. Conclusion.

The preparation of vegetable milk and vegetable cheese are widely practiced today in Cochin China and in Annam [today's North Vietnam], as recently discussed by Mr. Henri Labbé in *Revue Scientifique* (11 Feb. 1911).

Soymilk *(lait végétal)*. After describing the process for preparing soymilk, the author notes: "This soymilk serves for the feeding of infants and for general nutrition; it can also be used for the production of a vegetable cheese.

Tofu *(fromage végétale):* When vegetable milk is treated with a mineral salt or an acid, playing a role analogous to that of rennet, it produces curds through coagulation, resembling those of ordinary casein. By draining and washing, one obtains a sort of white cheese *(fromage blanc)* which plays a major role in the nutrition of the peoples of the Far East. In Indochina the milk is coagulated by the addition of a very small quantity of a powder called Tchach-Kao or plaster [calcium sulfate], which comes from a selenite pulverised by the action of fire.

Tofu is generally eaten fresh, the same day it is made, but it can also be preserved by salting or smoking. In Annam, three main varieties of tofu are found: 1. Fermented tofu, gray or yellow in color, with a flavor resembling Roquefort cheese; 2. White or salted tofu resembling goat's cheese; 3. Baked or smoked tofu, resembling Gruyere cheese. At the market in Saigon, Chinese sell regular tofu to the natives for one-tenth the price of Gruyere cheese.

Industrial vegetable casein: Defatted soybean meal from oil presses is ground between millstones with cold water to give a slurry that is filtered to obtain soymilk. The soymilk is heated to boiling, then calcium sulfate is added to precipitate the protein, which is collected (just like tofu curds) on filter cloths. The presscake is mixed with forage and molasses, then fed to livestock. The curds are then dissolved in diluted soda lye (sodium hydroxide), filtered, precipitated with acetic acid. The finely divided precipitate is filtered out, washed on the filter, left to evaporate in the open air, then dried to a yellowish powder at a low temperature. The casein thus obtained is white, and, from an industrial viewpoint, very pure. It is insoluble in water, but soluble in dilute caustic alkalies and in ammonia. It exhibits almost precisely the same properties as the casein obtained from ordinary milk. It is found on experiment to be susceptible of the same industrial applications as animal casein, and may come to largely supersede this because of lower cost. 100 gm of soybeans yields about 25 gm of this "vegetable protein," which has both food and industrial uses.

Note 1. This is the earliest French-language document seen (Aug. 2003) that uses the term *caséine végétale du*

*"soja"* or *caséine végétale industrielle* to refer to isolated soy protein.

Industrial applications of vegetable casein: "Like animal casein, industrial vegetable casein, free of fat or buttermilk, can be used in a host of applications. It can be used in making paints, and for the preparation of moisture-resistant products. Note 2. This is the earliest document seen (Oct. 2001) that mentions the use of soy protein in paints.

"It may be used also for the sizing (coating used to fill the pores) of paper, which consumes such large quantities of ordinary casein. Being soluble in ammonia and caustic solutions it is capable of forming a smooth and solid size.

Note 3. This is the earliest document seen (Oct. 2001) concerning the use of soy protein as a sizing for paper.

"Other uses are in certain manufacturing processes in the preparation of silks and artificial textiles, as well as of rubber, leathers, plastic materials, films, photographic emulsions, etc. Note 4. This is the earliest document seen (Sept. 2001) concerning the use of soy protein to make silks, artificial textiles, or other industrial (non-food) fibers. Note 5. This is also the earliest document seen (Dec. 2001) concerning the use of soy protein as a raw material for making plastics.

Large amounts of animal casein are at present employed in the manufacture of 'Galalith,' from which are made numerous objects which imitate articles made from ivory, tortoise-shell, bone, horn, etc. The Soya casein, when free from fats, is equally well adapted for these purposes.

"Formol acts upon this casein in the same way as on ordinary casein, rendering it insoluble. Hence it may be used for the water-proofing of fabrics, straw hats, etc., as well as for the preparation of sizes and dressings... A solution of vegetable casein and borax can be successfully utilized in the process of calico printing."

"It will be seen from the foregoing rèsumè, that the fabrication of vegetable casein for industrial purposes has immense possibilities, only exceeded in importance by the alimentary value of its food products for man and for beast.

Note 6. *Webster's Third New International Dictionary* (1963) defines Galalith (a registered trademark)–as "used for a hornlike plastic [also resembling ivory or bone] made from casein [milk protein] and formaldehyde and used especially in making small molded objects (as buttons, beads, or combs)." This is the earliest document seen that mentions Galalith in connection with soy protein. Galalith, "a new horn-like product from cow's milk," was sold commercially by Nov. 1905 and the process was protected by patents "in all civilized countries" *(Monthly Consular and Trade Reports,* USA. 1905. No. 302. Nov. p. 243.)

Conclusion: "A Chinese factory has already been established on the outskirts of Paris (at Vallées near Colombes) to make food products based on soya *(produits alimentaires à base de Soja).* This factory now produces tofu *(Caséo-Sojaïne)* and the following food products: Soy flour, soy bread, soy sauce, sweet soya preserves *(confiture de Soja),* soymilk *(lait de soja),* fermented soymilk *(lait de Soja fermenté),* tofu *(fromage de Soja),* etc.

"The Indochinese prepare, in addition, a fermented liquor, a concentrated milk, an alimentary flour, and a casein which forms the essential food of the people... Many Europeans are preoccupied with extracting part of the nutritive principles that exist so abundantly in the seeds, for the feeding of armies at war and of colonial troops... Hopefully the question of food uses of soy will be taken up at the same time as the manufacture of industrial casein, and that this will permit the utilization of the immense resources that our Indochinese colonies offer as raw materials."

Note 7. Later in 1911 this article was summarized in *Scientific American* Supplement and printed as a special booklet.

Note 8. This is the earliest document seen (May 2000) that uses the term *la Caséo-Sojaïne* to refer to a food–clearly to tofu. Li Yu-ying coined this term, apparently after considerable thought and research. Martine Liguori, a native French speaker who is interested in tofu, noted in an interview (May 2000): "This term for tofu doesn't sound foreign. Rather it sounds somewhat scientific, learned, and upper-class, as from the techno-elite. If you don't know what it means, that's because you are not well enough educated. In France, people will adopt something that is upper class, but they resist foreign things–even foreign words. This whole idea originated in France when Napoleon created the *Grandes Ecoles* (French graduate schools) to develop an intellectual elite to replace the royal elite."

Note 9. This is the earliest document seen (April 2001) that mentions dried tofu. Address: Ingénieur-chimiste.

331. Figart, D. Milton. 1911. Notes from Malaysia. *Daily Consular and Trade Reports (U.S. Bureau of Manufactures, Department of Commerce and Labor)* 14(135):1114-16. June 10. See p. 1116.

• ***Summary:*** "The valuable soya bean: The soya bean has lately come into some prominence by reason of its extensive uses in the manufacture of oil and soap, and also because it forms return cargoes for tramp steamers bringing coal to the East. Dr. Gilbert Brooke, port health officer of Singapore, describes some new uses for the article:

"'The object of this paper is to show that we have at hand an article of diet which is cheap, which can be grown over large areas of the globe, which is palatable, which is not attacked by any known insect or fungus, which forms valuable by-products, and–most important of all–which contains, more nearly than any other known animal or vegetable substance, all the essential and properly proportionate constituents of a perfect diet.

"'Rice is a very badly balanced food, consisting mainly of starch, having next to no nitrogen, and hardly any fat or salts. In this rice stands, in the scale of food values, almost

at the bottom, whereas the soya bean stands at the top. But it is remarkable that nature and experience seem to have taught rice-eating races that on of the best accompaniments to rice is some form of leguminous food, such, for instance, as dhal, the small yellow pea so much used by natives of India. Following out this analogy it would seem to be most desirable to foster among Asiatic races that depend mainly upon rice as a staple the simultaneous consumption of the soya bean as supplying in abundance those essential food elements that can not in the least be derived from rice.'

"Among the economic products derived from the soya Dr. Brooke enumerates these:

"'(1) Bean curd. A most nutritious jelly can be made from the soya bean. This has been known and widely used by all classes in north China for the last 2,000 years.

"'(2) Bean milk. The beans are dried, very finely ground, and made into an emulsion with water. This forms a valuable milk, which resembles cow's milk in that it coagulates when heated and acidified. The possibility of this is due to the fact that the proteid is composed of casein, as in the case of animal milk.

"'(3) Bean cheese. A nutritious cheese is frequently made in Japan from bean milk.

"'(4) Bean flour. The dried and pulverized bean is most valuable as a soup basis. It is also useful for making biscuits and infant foods. Soya biscuits, produced by a Scotch firm, are supplied on several P. & O. mail boats.

"'(5) Bean oil. There is a very high percentage of fat in the soya bean. This is of commercial value. It is edible, and also forms an excellent basis for candle and soap manufacture.

"'(6) Bean cake. The seed cake left after expression of the oil from the soya bean forms one of the most valuable and rich cattle foods known.

"'(7) Bean sauce. The soya bean ground up and steeped in vinegar or brine forms a basis for Worcestershire and other sauces.

"'(8) Bean coffee. A substitute for coffee may be made from the soya bean, by dry toasting and grinding it, then adding boiling cow's milk or hot soya milk.

"'(9) The straw surpasses in nitrogenous value that of wheat or even hay. It is quite possible that the leaves or root may have medicinal properties, but this has not yet been worked out.'"

Note: This is the earliest English-language document seen (Feb. 2008) that uses the term "bean cheese" to refer to fermented tofu. Address: Vice Consul General, Singapore.

332. *Los Angeles Times.*1911. Wonderful soya bean: Has great food possibilities and is grown in great quantities in China and Japan. July 16. p. II-11.

• ***Summary:*** From *The Pathfinder.* "The Western world is only just beginning to appreciate the possibilities of the soy, soja, or soya bean, which is produced in such vast quantities in China, Japan and other parts of the East and which is adapted to so many different purposes. Large quantities of these beans are now being brought to Europe and this country, as they form a good return cargo for vessels that carry manufactured goods to the oriental markets."

"Dr. Gilbert Brooke, British health officer at Singapore, has issued a paper emphasizing the merits of the soya bean. He recommends it as a very desirable food... and–most important of all–which contains more nearly than any other known animal or vegetable substance, all the essential and properly proportioned constituents of a perfect diet. Among the economic products derived from the soya Dr. Brooks enumerates these:" Bean curd, bean milk, bean cheese [probably fermented tofu], bean flour, bean oil, bean cake, bean sauce ("the well-known 'soy' sauce"), and bean coffee.

"The straw surpasses in nitrogenous value that of wheat or even hay. Like other leguminous plants it enriches the land on which it grows, instead of impoverishing it."

333. Beltzer, Francis J.-G. 1911. Le lait végétal, la caséine végétale et les produits industriels retirés des graines de "soja" [Vegetable milk, vegetable casein, and industrial products extracted from soybeans]. *Revue de Chimie Industrielle et le Moniteur Scientifique, Quesneville* 22(259):209-15. July; 22(260):241-51. Aug. (Chem. Abst. 5:3597). Also published in Paris by Librairie Bernard Tignol (1911). Bibliotheque des Actualites Industrielles, No. 144. [13 ref. Fre]

• ***Summary:*** Contents: Introduction: Chemical composition of the soybean and of soy oil. Fermented soyfoods and koji: Li Yu-ying and his soyfoods plant established near Paris (at Vallées, near Colombes), the products it makes (tofu or soy casein *[Caséo-Sojaïne],* soy flour, bread, sauce, confections, milk, fermented milk, tofu, etc.), soyfoods made in French Indochina. Soymilk *(lait végétal).* Tofu *(fromage végétal* or *to-fou):* fresh tofu, fermented tofu *(La variété fermentée,* which is gray or yellow and has a piquant taste resembling that of Roquefort cheese), white and salted tofu (which resembles a goat's cheese), smoked tofu (which resembles a gruyère cheese)...

Industrial production of vegetable casein from soybeans (cleaning the seeds, extraction of the oil), cost of a plant to make vegetable casein, industrial applications of vegetable casein: in paints, glues, paper coatings, plastics resembling Galalith, conclusion. An illustration (schematic drawing; p. 248) shows two views (a cross-sectional side view and an overhead floor plan) of a factory for producing vegetable casein, with a capacity to process 10 tons of soybeans per day.

Note: This is the earliest document seen (Sept. 2001) concerning the use of soy protein in glues or adhesives. Address: Ingénieur-chimiste, Expert, Professeur de Chimie Industrielle, France.

334. Piper, Charles V. 1911. Forage crops and forage conditions in the Philippines. *Philippine Agricultural Review* 4(8):394-428. Aug. See p. 400, 407.
• ***Summary:*** "Soybeans are not a native crop in the Philippines, but several varieties have been tried at different times with fair success. During the present season the 'Acme' variety was sown in March at Alabang and Lamao. The plants grew normally in every way but are 1/3 smaller than plants of the same variety in Virginia. Further testing should be carried on with this crop, especially the varieties from southern China, Java, and India. At the present time they can not be recommended for general culture."

Also mentions chufas (p. 400, 408, 428), adsuki bean *(Phaseolus angularis)* (p. 409, 428), and mayuen *(Coix lachryma-jobi* var. *mayuen)* (p. 402, 428). Address: USDA, Washington, DC.

335. H.L. 1911. Le Haricot soja ou Fève de Mandchourie: Cultures exitoques [The soybean or Manchurian bean: Exotic crops]. *A Travers le Monde* 17(36):288. Sept. 9. Bound in the back of *Le Tour du Monde.* [Fre]
• ***Summary:*** Contents: Introduction. Its utilization by the Japanese: Fertilizer, oil, and oil cakes. Its utilization by the Annamites [Vietnamese]: Milk and cheese. How will soybeans be used: The first exports to Europe. Some figures on the present trade in soybeans. The Germans are becoming masters of the European soybean market. Soya in France: It is utilized by foreigners.

Concerning the Germans: "Until the spring of 1909, the Japanese were the masters of the soybean market. Some German companies have in turn entered into competition in places of production, and there followed a rather significant rise [in production]. There resulted as a counter-measure some soybean cultural trials in terrains that seemed favorable to them in China. The result of these trials is not yet known.

"Be that as it may, the Germans hasten to assume first rank among the importers of soybeans in Europe.

"In effect, it follows from a report published by *The Chemical Trade Journal* (10 June 1911) that the port of Stettin recently received from Vladivostok a shipment of 4,823 tonnes (metric tons) of soybeans; the manufacturers of Stettin have established a society with capitalization of 1,875,000 francs for the utilization of this product.

"Its importation into Germany duty-free will favor its use for several reasons: first, soybean oil, a substitute for linseed oil, can be sold at a price that is one-third lower; secondly, it can be used in soap-making; thirdly, the cakes remaining after the extraction of oil can be used to feed livestock in the same way as cottonseed cakes. Finally, after the appropriate extraction of oil, the pulp, reduced to a flour and mixed with cereal flour, yields an edible bread or biscuit.

"The nascent industry in Germany of cottonseed oil, flour, and oil cakes, whose primary material is cottonseed imported from America, will have before long to struggle against the formidable competition of soybean products."

Concerning soya in France. "Soya *(soja)* is hardly known in France except by a few products that are found in certain food stores and that are bought sometimes, but without realizing their origin. (Footnote: Notably many flour products whose fortifying qualities are incontestable.)

"For, there would be every advantage to introduce this industry into our country where the mechanical and chemical resources would permit an improvement of yields. The example, moreover, is already given, not by French industries, but by the Chinese, who have established a factory at Vallées, Colombes, near Paris, where a Chinese workforce, exclusively employed, make all types of soy-based food products.

"Our industries would draw great profit from entering this path and not allowing themselves to be surpassed by German chemistry any longer."

336. Michael, William H. 1911. Notes from India. *Daily Consular and Trade Reports (U.S. Bureau of Manufactures, Department of Commerce and Labor)* 14(217):1263. Sept. 16.
• ***Summary:*** "Experiments with oil seeds:... As far as oil content is concerned, the Indian-grown soya beans afford as much as is found in the beans from Manchuria and Japan. Unfortunately, only certain localities in India are suitable for growing the bean, and these are upland situations in Burma, Assam, and the lower valleys of the Himalayas." Address: Consul General, Calcutta.

337. *Matieres Grasses (Les) (Paris).*1911. Culture du soja a Ceylan [Soybean cultivation in Ceylon]. 4(41):2429-30. Sept. 25. [Fre]
• ***Summary:*** "Soybean cultivation is the order of the day. It has been tried with success in Ceylon. The Agricultural Society obtained a large quantity of seeds from East Asia some time ago and agronomic trials were conducted at the botanical garden at Peradeniya–but the crop did not succeed very well. However now the secretary of the society has attained success and has been able to obtain a good harvest at the Colombo garden. He obtained two varieties; a white-seeded one from Japan and a black-seeded one from Java. Shortly he will be able to provide seeds, then one must wait to see cultivation of this new crop undertaken in Ceylon. We predict that it will undergo a large expansion."

338. Li, Yu-ying; Grandvoinnet, L. 1911. Le soja [The soybean]. *Agriculture Pratique des Pays Chauds (Bulletin du Jardin Colonial)* 11(102):177-96. Sept. See also: 11(103):270-94. Oct.; 11(104):360-75. Nov.; 11(105):459-74. Dec.; 12(106):28-38. Jan.; 12(107):120-32. Feb.;

12(108):213-23. March; 12(109):302-08. April. 28 cm. [33 ref. Fre]

• ***Summary:*** This series of articles, published in book form in 1912, is one of the earliest, most important, influential, creative, interesting, and carefully researched documents ever written about soybeans and soyfoods. Contents: Introduction. Origin and history of the soybean. Soybean culture. 1. Species and varieties of soybeans (botanical characteristics, species {vernacular names in Asia}, varieties {from China, Japan, India, Indochina, Hawaii, United States, and Europe}). 2. Needs of the soybean: Climatic (temperature, humidity), geographical area and varieties grown (in Asia [Manchuria, Japan, Formosa, Korea, Indochina], America, Guyane ("En Guyane, le soja mûrit" [ripens or matures]. Note: This probably refers to French Guiana *[Guyane française],* where Sagot and Raoul reported in 1893 that soybeans had been grown successfully), Europe [France, Italy, Russia], Southeast Asia *(Océanie* / Oceania) [Philippines, Java, Borneo], and Africa [Algeria, Tunisia, South Africa]), agrological needs of the soybean (physical, chemical).

"Oceania.–The soybean has been cultivated for a very long time in the Philippines, Java, and Borneo" (p. 194).

Illustrations (line drawings) show: Soybean plant with roots (p. 182). Soybean pods and beans (p. 183). A table (p. 191) and a graph (p. 192) show trade of soybeans, soybean cake, and the total of the two from five Manchurian ports (Newchwang, Antung, Ta-tung-ho, Dairen, and Suifenho [Suifenhe]) from 1905 to 1909; all have increased dramatically. Also contains 12 other tables from other sources. Note that this influential series of articles, like its predecessor by Itie in the same journal, were in large part prompted by the huge rise in imports of soybeans to Europe, starting in 1908. The contents of these articles is almost identical to that of the book by the same name, published in 1912, which see. Address: 1. Counseiller de 1ere classe au Ministère de l'Agriculture de la Chine; 2. Ingénieur agricole (G.).

339. Williamson, A.A. 1911. Commerce of the Liaotung Peninsula. *Daily Consular and Trade Reports (U.S. Bureau of Manufactures, Department of Commerce and Labor)* 14(255):535-40. Oct. 31.

• ***Summary:*** "The Dalny (Manchuria) consular district comprises the entire territory held under lease by Japan from China, lying at the extreme southern end of the Liaotung Peninsula, and is known and officially designated by the Japanese as the Kwangtung Province. Its area is given as 205 square 'ri,' or 1,220.57 square miles, and it has a population of 462,399 or 379 persons per square mile.

"The country is very hilly in the southern part of the Province, the elevation, however, seldom reaching over 900 feet above the sea. Toward the north the surface gradually becomes more level and partakes of the nature of the flat bean fields of north Manchuria."

"Dalny, the chief city and port of Kwantung Province, is said to have the finest wharves in the Far East., vessels drawing up to 28 feet being moored alongside the quay. Goods can be discharged from a ship and placed aboard the freight cars, which run out onto the wharves, in one operation. While ice forms in the protected parts of the bay at Dalny, it never becomes sufficiently thick to interfere with navigation, so that the port is open the year round and, Dalny being the southern terminus of the main line of the South Manchuria Railway, the advantages offered are at once evident."

The export returns for 1910 "show a decided decrease in shipments of beans and bean cake. The causes of this are undoubtedly the (for the farmers) favorable preceding year and the outbreak of plague with which the country was smitten during the export season. The first caused the farmers to sell rapidly in 1909 and to hold back in 1910; the latter, because of isolation and segregation measures, brought measures, brought traffic to a standstill. Undoubtedly the bean season will, in the end, show no falling off, as the estimates of production which have been obtainable show a considerable increase in cultivation."

The section titled "The export trade" states that "the Chinaman" has a strong hold upon the trade passing through Dalny; a high percentage of the imports came in the shape of native products and "the export trade with native products showed the greatest increase, over 90 per cent." A table shows "the principal articles exported through the Maritime Customs at Dalny during 1909 and 1910 by steamer and by junk." For 1909 and 1910 by steamer: Bean cake 615,252,933 / 526,030,267 pounds. [Soya] beans 981,274,267 / 713,489,867 pounds. [Soya] bean oil 19,021,067 / 31,642,267 pounds. For 1909 and 1910 by junk: Bean cake 22,398,000 / 28,863,733 pounds. [Soya] beans 43,657,007 / 13,827,333 pounds. [Soya] bean oil 2,679,000 / 2,864,133 pounds.

Under "Soya-bean trade," another table shows the destination of these three products (in pounds) during 1910 from the Dairen customs district, as given in the Imperial Chinese Maritime returns: Bean cake: Japan (incl. Formosa) 443,406,267 (99.9% of overseas total). Korea 307,333. Total overseas 443,730134. Chinese ports 111,163,866 (20.0% of grand total). Grand total 554,894,000.

[Soya] beans: Egypt 302,240,800 (#1). Japan 192,499,733 (#2). United Kingdom 59,455,867 (#3). Other: Denmark, Hongkong, Netherlands, Straits Settlements [today's Singapore]. Total overseas 603,120,800. Chinese ports 124,196,400 (17.1% of grand total). Grand total 727,317,200.

Bean oil: Japan 17,208,133 (#1). Belgium 6,097,200 (#2). Other: Denmark, Egypt, Hongkong, Netherlands, Straits Settlements. Total overseas 27,829,333. Chinese

ports 9,677,067 (25.8% of grand total). Grand total 37,506,400.

A 3rd table shows prices of the three products month by month in 1910 in U.S. currency as reported by the Manshu Juyo Bussan Yushutsu Kumiai (Manchurian Staple Products Export Association). For bean cake, the price is per 61.33 lb. For soya beans and oil per 133.33 lb.

"There are still no American export and import houses in this district, and until some thoroughly American house opens here, trade with the United States will necessarily remain half-hearted, being in the hands of natural competitors." The main export from this district to the USA is soya bean oil, of which $93,974 was exported in 1910; only $8,532 worth of soya-bean cake was exported. Address: Vice Consul, Dalny, Manchuria.

340. Kent, William P. 1911. Manchurian trade and commerce: Newchwang. *Daily Consular and Trade Reports (U.S. Bureau of Manufactures, Department of Commerce and Labor)* 14(271):888-93. Nov. 18.

• ***Summary:*** Table 2 (p. 891) shows that significant "decreases occurred in the 1910 [soy] bean, [soy] bean-oil, and [soy] bean-cake shipments through the Newchwang customs. Beans were exported to Japan, Hongkong, and Samarang [Semarang, a port city on the north coast of the island of Java]; bean oil to Japan, the United Kingdom, Samarang, and Belgium; while Japan imported all the bean cake not consumed locally. All units for these three commodities are in piculs; A picul is equivalent to 133.33 pounds.

"The soya bean and its products... continue to grow in importance throughout Manchuria and to furnish the principal articles of commercial activity at Newchwang. When it is recalled how recently the soya bean and its extensive uses have come to the knowledge of the commercial world and how rapidly it has taken its place as an article of commerce, it must be regarded as a marvel of agricultural transformation, comparable alone in modern times to the discovery of Indian corn, tobacco, and the potato. The average price for 1910 of beans, bean cake, and bean oil, laid down at Newchwang, was: Beans, $4.90 per 400 pounds; bean cake, $5.55 per 687 pounds; and bean oil, $5.75 per 133.33 pounds.

"One of the by-products of the soya bean whose manufacture is increasing is soy sauce, a condiment much used in Japan and other parts of the East. The Japanese established a factory at Newchwang in 1903 for the manufacture of soy, starting with a small capital. It has been so successfully conducted that from the profits the plant is being englarged by an expenditure of $30,000. Some prominent Chinese capitalists from the south of China propose erecting two additional factories at Newchwang during the coming season.

"The most important and profitable adjustment of the bean trade is bean milling, and during the 1909-10 season great progress was made in the substitution of modern machinery for the old type of press, in which a system of wooden wedges was used. Up to December, 1910, the number of bean mills in operation at Newchwang was as follows: Seven steam mills with an average capacity of 5,000,000 pieces of bean cake and 21,000,000 catties (catty=1.33 pounds) of oil per annum; 7 smaller ones with an average annual capacity of 1,800,000 pieces of cake and 7,900,000 catties of oil; and 3 others with an average annual output of 300,000 pieces of cake and 1,300,000 catties of oil. One of steam mills employs hydraulic power on the mold presses; all the others utilize steam and oil engines simply to crush the beans preparatory to their being placed in the molds, which are worked by hand on a cog and screw system.

"What is desired is a machine similar to a cottonseed press, meeting certain requirements peculiar to the bean. This suggestion implies a matter of great importance to the first devisers of a machine meeting the approval of local bean-mill owners. To accomplish this end will require a personal investigation to acquire a close knowledge of the minor details of the industry. Descriptions and details are of no avail, owing to the probable omission of some item overlooked by an inexpert investigator.

"Declared exports–shipping: Beans have not as yet been shipped direct from Newchwang to the United States. A small shipment of bean oil was sent on trial to a New York firm, and should this prove satisfactory larger returns may confidently be expected." Address: Consul, Newchwang.

341. Barrett, O.W. 1911. Rice ally crops. *Philippine Agricultural Review* 4(11):592-98. Nov. See p. 594-96. [1 ref]

• ***Summary:*** The section titled "Soybeans" (p. 594-96) begins: "Probably every tourist who has visited any of the cities of Japan or China has noticed in the markets these peculiar blocks of a grayish white, jelly-like substance and wondered whether they were really good to eat, but comparatively few have ever tried there the three or four varieties of vegetable 'cheese' prepared from the soybean*."

*Footnote: A 3/4 page footnote, extracted from USDA Farmers' Bulletin No. 58 by Langworthy, discusses five preparations commonly made in Japan from the soybean: natto, tofu or bean cheese (eaten in the fresh state or frozen), miso, yuba, and shoyu.

"Experts in threpsology, the new science of nutrition, seem to be in accord on the fact that in dietary matters two kinds of food are at least four times as good as one... Recently the European food experts have realized the high nutritious value of the soybean and a factory has been

established near Paris [by Li Yu-ying] for the manufacture of various food products from this wonderful seed."

"Now is the time for the Philippine Agriculturist to take up soybean culture in earnest, and to develop it in the same way, even if not to the same degree, as our neighbors across the way have been doing for centuries. The fact that there are practically no seeds of this valuable crop at the present in the Philippines is a sad commentary on the progressiveness of the Philippine farmer; but it is never too late to learn" (p. 596). Address: Chief of the Div. of Exp. Stations, Philippines.

342. Backer, Cornelis Andries. 1911. Schoolflora voor Java [The flora of Java–a textbook]. Weltevreden: Visser & Co. clxxix + 676 p. See p. 357-58. 24 cm. [Dut]
• ***Summary:*** A botanist, he lived 1874-. This is a botany of Java. Three members of the genus *Glycine* are described on pages 357-58: *Glycine soja* (the soybean), *G javanica,* (the wild soybean), and *G Koordersii.* Address: Assistent aan het Herbarium te Buitenzorg [Bogor, Java].

343. Hooper, David. 1911. Soy bean in India: Glycine hispida. *Agricultural Ledger (Calcutta)* No. 3. p. 17-33. (Vegetable Product Series No. 114). Also reprinted in Tropical Agriculturalist, 1912. 38:11-15, 99-103.
• ***Summary:*** Contents: Introduction. Experimental cultivation in India. Vernacular names of the soybean. Method of cultivation: Green manure, harvesting. Races and varieties. Races in India: Yellow [grown in Poona Experimental Farm, Burma, Darjeeling, Dehra Dun, Simla, Punjab], green [Poona], black [Poona, Kashmir to Darjeeling, Simla], brown [Kashmir, Kalimpong to Darjeeling], mottled [Shillong, Assam]. Composition of the seed: From Church, from König, from Dr. J.W. Leather (1903), tables showing analyses made in India of Indian-grown Soy beans from various provinces (Burma, Hill Tracts, United Provinces [black seeds], and Poona). Soy bean oil. Soy bean oil-cake. Composition of hay. Use as food: Soy-bean milk, bean cheese (topo, sic tofu, or "Soy-bean cheese"), shoyu ("Under the name of 'Soy sauce' and other fanciful names it has formed the basis of most of the important sauces of Europe for many years."), roasted soy beans as a coffee substitute, soy beans in diabetic diets. Trade (exports of Soy bean from Manchuria to England). Price.

"The plant was introduced into the United States of America in 1854 and was grown to a small extent in the Southern States, but from the year 1885 its cultivation as a forage crop has gained in importance in all the agricultural centres. Within the last two or three years a great deal of interest has been taken in the cultivation of Soy, and experiments are in progress in Government Farms in Cape Colony, Natal [South Africa], East Africa, Gambia, Mauritius and Australia.

Contains a good early history of the soybean in India: "It is difficult to ascertain the date of the introduction of Soy beans into India. There is no doubt that certain hill tribes, mostly of Mongolian origin, have cultivated the bean for a long time. At the Punjab Exhibition held at Lahore [later divided between India and Pakistan] in 1864 Soy beans identified by Dr. Cleghorn, were sent from the Hill States. This is the first record of the beans being exhibited in this country, and shows that the cultivation was on a insignificant scale.

"Experiments in India. In 1882 Messrs. Jardine, Matheson & Co. of Hong-Kong sent a sample of Soy beans for experimental cultivation in the Saidapet Experimental Farm, Madras. The plants raised from these seeds were healthy but the yield of the crop was small.

"In 1897 Surgeon-Colonel W.G. King, Sanitary Commissioner, Madras, strongly advocated the cultivation of Soy bean as a valuable food worthy of the attention of the people. In two experiments carried on at Saidapet during 1897-98, the yield of seed per acre was 468 to 495 lbs., respectively. Recent enquiries in Madras resulted in the opinion that the cultivation in the Presidency is still in an experimental stage.

"In 1882 some Japanese Soy beans were sent by the Government of India for trial to Saharanpur. In 1885 very good results were obtained, the black seeded variety giving a yield of 1,124 lbs. per acre, and the white seeded variety giving a yield of 561 lbs. per acre. In 1886 the acclimatised seed was widely distributed; in some cases the crop failed and in others it was fairly successful, but as a rule where seed was harvested it was said that the pulse was not popular in any form. The Botanical Gardens grew the crop for a few years longer but as there was no demand for the seeds the cultivation was abandoned. An interest in Soy bean, however, seems to have revived for the Agricultural Department has this year sent to the Reporter on Economic Products samples of the black variety of Soy beans from forty villages of the United Provinces.

"At the Experimental Farm at Nagpur, Central Provinces, the bean was grown experimentally from Japanese seed first planted in 1885. The yield at the end of the first year was at the rate of 180 lbs. per acre, but taking the average of five years the result was 88 lbs. per acre. In the Report for 1908-09 it is stated that Soy beans were grown on a small area under field conditions and the yield was fair, but there was little local demand for the seed. It was, however, ground and formed an excellent addition to the diet of the farm cattle. Last year only 43 lbs. were obtained on light soil on the Nagpur Farm, the crop being practically a complete failure; on heavier soil 380 lbs. of seed were raised.

"Soy beans have been grown at Poona for nine or ten years with varying results, and they have also been tried at Nadiad in Gujrat [Gujarat] and elsewhere in the Bombay

Presidency. In the Experimental Farm Report for 1901 a large yield was chronicled, but next year the crops at Poona and Surat failed. In 1904 a yield of 300 lbs. per acre was obtained in light land. One year later nineteen plots were under trial but with unpromising results, for only five yielded seed enough to repay the cost of cultivation. The yield varied from 50 to 293 lbs. per acre, and it was found that only when the yield exceeded 200 lbs. was the crop profitable. In 1905-06 the Manjri Farm, Poona, grew nineteen plots with better results, probably due to better soil. The yield of some of the plots was on an average of 680 lbs. per acre–a highly remunerative return. A year later it was reported by Mr. Fletcher, Deputy Director of Agriculture, that an experiment made on the edge of black cotton soil gave a yield of 1,166 lbs. per acre, while adjacent plots gave from 395 to 650 lbs. per acre.

"In the Agri.-Horticultural Gardens at Lahore Soy bean planted on a small area in 1894 yielded an estimated crop of 349 lbs. of seed per acre and 349 lbs. of fodder. Evidently it varies greatly in suitability to different soils and climates and does not seem to be adapted to the sea level plains of India.

"Gollan observed that the Japanese plant is erect, attaining a height of 12 to 15 inches, while the Himalayan form is a trailing plant. So far this vigorous growing plant does not appear in India to have been attacked by any insect or parasitic fungus.

"With regard to Burma, Mr. Burkill remarks: 'The Burmese grow it under the names of Pe-nga-pi and Pe-kyat-pyin, sowing it never in great quantities along with other beans on the mud banks as the falling rivers leave them bare in October, or more sparingly still away from the rivers. The Kachins and other hill tribes grow a little of it on their hill clearings, the Kachins call it Lasi. The Khasis, the Nagas and other tribes between the Brahmaputra and Upper Assam cultivate it similarly... In the Brahmaputra Valley it is grown as far as known only towards Barpeta in the Kamrup District.'

"Soy beans are called 'Bhut' in the Punjab, 'Bhat', 'Bhatwas' or 'Bhatmas' in the United Provinces and in the hills as far as Darjeeling, and 'Rymbai ktung' in Shillong and the Khasi Hills. Mr. B.C. Basu gives the Assamese name for *Glycine* as 'Patani jokra' and the corresponding Bengali name as 'Chhai.' In the Naga Hills it is called 'Tsudza' or 'Sudza.' It is grown by the Lepchas in Sikkim and is called by them 'Salyang' or 'Silliangdun.' 'Pe-nga-pi' is the usual name for Soy bean in Burma, but it has been received under the name of 'Lasi shapre tum' from Bhamo, and as 'Lasi N'Loi' and 'Lasi N'Hti' from Myitkyina. The Santali name appears to be 'Disom Horee.'"

"Dr. J.W. Leather in 1903 analysed the seeds of seven samples of Soy bean from Japanese seeds cultivated at Manjri, near Poona. The amount of oil in them varied from 14.92 to 23.05 per cent. being on the dry weight 15.97 to 24.41 per cent. with an average of 19.99. In 1902 Dr. Leather examined five samples grown on the Dumraon Farm. They yielded from 14.27 to 19.72 per cent of oil on the air-dried seeds.

"Fourteen samples of the seeds grown from Japanese seeds at the Manjri Experimental Farm were again analysed last year by a leading European firm. The percentage of moisture varied from 9.90 to 12.06, and the percentage of oil from 16.80 to 22.48...

"The following analyses of Indian-grown Soy beans were made in the laboratory of the Indian Museum in 1909 and 1910." Gives names and composition (oil [as is and on a dry basis], water, and ash) for 17 varieties from Burma, 21 from the Hill Tracts, 11 from the United Provinces [black seeds], and 15 varieties from Poona. "An attempt in 1903 to extract oil from these beans with the country *ghani* or indigenous oil-mill was a failure in Bombay."

Note: This is the earliest English-language document seen (Feb. 2004) that uses the term "soy-bean cheese" to refer to tofu.

344. Lafar, Franz. 1911. Technical mycology: The utilization of microorganisms in the arts and manufactures. Vol. II. Eumycetic fermentation. Translated from the German by Charles T.C. Salter. London: Charles Griffin & Co. ix + 558 p. Illust. Index. 23 cm. [3240* ref. Eng]
• ***Summary:*** An extensive bibliography (3,240 references) for both this volume and volume I appears at the back of this volume (p. 417-518). The opening chapter begins: "Already in the first volume (sect. 22) the algae and the fungi were arranged in a single group. that of the Thallophytes, in contradistinction to all other plants, the latter being classed in the group Cormophytes." The latter group has "an articulation of the body of the individual organism into leaf and stem."

Chapter 43, titled "Morphology and systematology of the Mucors (p. 48+) contains sections on "Subdivision of the Mucor family" (p. 49-51), "The genus Mucor" (p. 51-53; The genus was established by Micheli as far back as 1729. It contains *Mucor Rouxii* and *Mucor mucedo),* and "Rizopeæ" (p. 53-56). An illustration (p. 55) shows *Rhizopus nigricans* (After Brefeld). *Rhizopus nigricans* is the best and longest known member of this family. In 1818 it was described by Ehrenberg under the name *Mucor stolonifer,* which is still used by several workers." "The name *Rhizopus oryzae* has been given by Went and Prinsen Geerligs (I.) to a fungus discovered by them in Ragi (sect. 241), the sporangia and spore of which organism are considerably smaller than those of *R. nigricans.*

Chapter 44, is titled "Fermentation by Mucors" (p. 57-62). Chapter 45, titled "The use of Mucoreæ in the spirit industry" (p. 63-71) has three sections: Sect. 240. "Mucor rouxii and other species of Amylomycetes" (p. 63-67) states: "For the preparation of rice spirit there is produced in

China, Cochin China, and neighboring countries, an article known as Chinese Yeast, and put on the market in the form of flat mealy balls, about the size of a half-crown. Its preparation, composition, and application were first described in 1892 by E. Calmette (I.), whose reports were extended and supplemented by C. Eijkman (II.) in 1894." The method of preparation is given. More important than its bacteria are "the yeast cells, which must be regarded as the exciting agents of the alcoholic fermentation; and certain Mucors, which affect the saccharification of the starch. Of the last-named organisms, which concern us here,. Calmette isolated a species which, in honour of his teacher and colleague, E. Roux, he named *Amylomyces Rouxii.*" Two illustrations show this organism, which produces a "diastatic enzyme" (p. 65). The so-called amylo process and the work of Colette and Boidin with *β-Amylomyces* and *α-Amylomyces* in this process are discussed (p. 65-66).

Sect. 241 titled "Ragi and tapej" [tapé or tapeh] (p. 67-69) states that "Tapej... is prepared from rice by the aid of a secondary auxiliary material, which the Malay natives of Java term Ragi or Raggi, and the Chinese settlers call Peh-Khah." A.G. Vorderman (1893) describes the preparation of Ragi. According to Eijkman (1894) Tapej, which is also called Tsao, is prepared with the aid of Ragi, by boiling husked Mochigome rice *(Oryza glutinosa [Oryzae sativa glutinosa],* known as "Ketan" in Java) in water until soft. The flora of Ragi and Tapej comprises three groups of microorganisms; bacteria, budding fungi, and fungi belonging to the family *Mucoraceæ.*

Sect. 242, titled "The so-called Amylomyces process," (p. 69-71), or Amylo process for short, states that "this is the name given to the process for the industrial utilisation of the diastatic activity of *Mucor Rouxii* and several allied fungi. A company, the *'Société d'Amylo,* was founded by A. Collette and A. Bodin (I, 1897), who also, in 1897, took out in the name of this company a German patent for a 'process for producing alcohol from starchy materials, by means of aseptic saccharification and fermentation with *Mucedineæ,...'"*

Fernbach (II, 1899) has given a lucid description of the practical performance of this process in the patentees' works, the maize distillery at Seclin near Lille, France. This description is summarized. "An English patent for the mechanico-technological modification of the process was also taken out by Collette and Boidin (III.) in 1898." See also two other 1897 English patents by Collette and Boidin No. 19858 and No. 1155. "The reader interested in this matter will find more precise data in the review published by M. Delbrück (III, 1899). The chief advantage of the Amylomyces process is the abolition of the expensive additions of malt requisite in the older method of saccharification, the amount formerly needed being up to 15 per cent. in the case of maize, and 2 to 3 per cent. in the case of potatoes. With regard to the yield furnished by the Amylomyces process, it is stated that in the Seclin works, 37.8 litres of absolute alcohol are obtained per 100 kilos. of maize containing 57.5 p, a yield corresponding to 66.2 litres per 100 kilos of starch. Owing to the large amount of mycelial hyphae, the residue filters easily." "Finally it should be said that, since 1898, the aforesaid patentees have replaced *Mucor (Amylomyces) Rouxii* by another species, namely, so-called *β-Amylomyces,* or *Mucor β.* This organism is capable of dealing with more highly concentrated mashes that the other, and enables a charge of 25,000 kilos. of maize to be mashed to 1000 hl (22,000 gallons) of goods. per cent. of starch

Page 213 states that *Pichia farinosa* (Synonym: *Saccharomyces farinosus* Lindner, a film yeast) has been found by K. Saito (II, 1905, *Botanical Magazine,* Tokyo) in Japanese Soja sauce.

Chapter 51 discusses the genus *Aspergillus* (p. 228-31) with many fine illustrations, including conidiophores, conidia, ascospores, different stages of *A. oryzae* and *A. glaucus.* Page 228-29 state: *"Aspergillus Wentii,* Wehmer, was observed by Went in the preparation of Tao Yu *(see* vol. I, p. 248) according to the method practised in Java, and was described by Wehmer (XIX.) in 1896. It appears spontaneously on the boiled Soja beans that have been covered with *Hibiscus* leaves, and affects a loosening and disintegration of the firm tissue of the bean. The species forms a pale coffee-coloured, dense mold vegetation (Fig. 167)."

In Chapter 57 titled "Chemical activity of the Aspergillaceæ," by Prof. Dr. C. Wehmer, page 270 states: "Two species, *Asp. oryzæ* and *Asp. Wentii* are reported as able to grow through the substance of soft-boiled rice and Soja beans..." The "enzyme mixture from *Asp. oryzae* (the so-called 'Takadiastase')" is also mentioned.

Chapter 62 titled "The Monillæ and Oidia," by Dr. H. Wichmann mentions *Monilia javanica* (occurring in association with others in Ragi, p. 333)., *"Monilia sitophila* (Mont.), Saccardo, is said by Went (IV.; reference missing) to be used by the natives in West Java in the preparation of a sweetmeat known as 'ontjom' composed of the seeds of the ground-nut or earth-nut *(Arachis hypogæa).* The ground-nuts, which are thoroughly permeated by the fungus, are made up in the form of small, orange-colored cakes, the surface of which is covered with the conidia, whilst the interior is both chemically altered and loosened in structure by the mycelium." Sect. 315 (p. 336-39) is titled "Oidium lactis and allied species." Also discusses *Oidium lupuli,* Matthews and Lott (p. 338). Address: Prof. of Fermentation-Physiology and Bacteriology, Imperial Technical High School, Vienna.

345. Ward, Artemas 1911. The grocer's encyclopedia–Encyclopedia of foods and beverages. New York, NY: Published by the author. 748 p. Illust. (color). 29 cm.

• ***Summary:*** Soy-related entries: Bean (p. 49-54): "The bean of European history is the Broad or Windsor variety,..." "The principal beans of United States cultivation are the Kidney and Lima, both of them believed to be native of South America. The Kidney Bean is the Haricot of the French and in Great Britain is sometimes called the French bean." The many varieties can be classified into "tough podded" and edible podded." "The 'tough podded' class produces the bulk of the dried beans of commerce, variously known as 'Kidney Beans,' 'Navy Beans,' 'Marrow Beans,' 'Black Beans,' 'Turtle Beans,' etc., in many colors, shapes and sizes." "'Flageolets' are cultivated with special regard to the consumption of the fresh seeds or beans." To the "edible podded" class of kidney beans belong Wax or Butter Beans, the Cranberry Bean or Red Speckled Bean, String Beans, Snap Beans, French Beans. "Pea Beans are the Cowpeas of the agriculturist." "Among numerous other 'special' varieties are the Soy Bean (which see), Asparagus Bean, Frijole, Lab-lab (or Egyptian Kidney), Red Bean, and Scarlet Runner." Asparagus Beans are known as *Tou Kok* by Chinese gardeners in California.

"Catsup, Catchup, Ketchup: a word derived from the name of an East Indian pickle, which was formerly applied specifically to the boiled spiced juice from salted mushrooms, but is now freely attached to various sauces (sold both bottled and in bulk) which consists of the pulp–bottled, strained and seasoned–of various fruits, as tomatoes, green walnuts, etc." Note: At "Catchup" and "Ketchup" we are told to see "Catsup."

Locksoy ([Lock Soy], p. 346): "Rice boiled into a paste and drawn into threads, imported from China. It is used to thicken soups."

Nuts (p. 412-13): A table shows the nutritional composition of all major American nuts, including almonds, chincapin [chinquapin] or water chestnut, chufa (earth almond), cocoanut, peanut, and peanut butter. "Many special nut foods, such as malted nuts, meat substitutes, etc., have been devised and extensively advertised by manufacturers for general dietetic use and for the special needs of vegetarians and fruitarians. It is said that some of these products contain soy beans, but apparently the peanut is very important in their composition.

Sauces (p. 552-53): In bottled sauces, vinegar is the most common liquid ingredient. "Commercial sauces of the Worcestershire kind, if of good quality, generally have Soy (which see) as their chief character ingredient. A typical formula of Worcestershire-style includes, in addition to Vinegar and Soy, a considerable percentage of lime juice, onions and tamarinds and small quantities of garlic, fish (as anchovies or pickled herrings), red chilies and spices. The product, after cooking, is strained through fine hair sieves. Leicester Sauce resembles Worcestershire in general characteristics but is less pungent."

Soy (p. 576): "A brown sauce, valuable to the commercial sauce market, made from the Soy Bean, a native of Southeastern Asia [sic] and widely grown in China and Japan. The beans are boiled, mixed with ground wheat or other grain, salt, etc., and allowed to ferment for a month or 6 months. The liquid is then strained off and clarified. Molasses is frequently added. In appearance it resembles Worcestershire Sauce, of which it is an important ingredient. It should not be too salt [salty] or too sweet, and although thick and syrupy, should be clear. When shaken in a bottle or glass it should, if it is genuine, leave a bright yellow film on the glass. Being a very desirable article, it is often counterfeited."

Soy bean (p. 577): "Commercial and government circles, both in Europe and this country are devoting increased attention to the cultivation of the Soy Bean as a food product, as it contains a large percentage of protein and a fair amount of fat, thus resembling meat in general nutritive value. The cell-walls of the raw bean are very tough, but thorough cooking makes it readily digestible. Boiled with bacon and other fatty broths until soft and then seasoned, the result is a vegetable dish very pleasing to the average palate. If the beans are dry, a preliminary soaking to remove the skins is necessary.

"The Soy Bean is largely consumed in Japan, China and other parts of Asia as an adjunct to rice and other foods, taking the place of meat in the popular dietary. It is most popular in these countries in fermented form, the best known types being *Shoyu* or Soy Sauce; *Tofu,* a kind of cheese; *Miso,* Soy Bean 'Milk' [sic]; *Yuba,* the evaporated product of 'Miso" [sic], and *Matto* [sic, *Natto],* a product obtained by simple fermentation of the boiled beans. The various degrees and styles of fermentation serve the double purpose of rendering the beans more easily digestible and producing new flavors, just as by the fermentation of milk and cream we produce the different flavors of cheese.

"The plant is an annual, growing chiefly in bush form..." The different varieties are classified principally by the color of the beans: "Black, Yellow, White and Brown,... Types of all these four classes are grown to some extent in Germany, Austria, and Switzerland, and the first three also in this country, in North Carolina and other Southern States. Under favorable conditions a single plant may bear a hundred or more pods.

"Because of the fact that the beans contain little if any starch, they have been recommended as a desirable food for diabetics, and Soy Bean Bread and Soy Bean Meal are prepared for that purpose in Paris. The dried beans are also used in Switzerland and elsewhere as a coffee substitute." An illustration shows the top of a soy bean plant, with leaves, pods, and flowers.

Note 1. This book is full of fascinating information about the food system in the USA in 1911, with entries such as cold storage (first attempted in 1860, it has grown to

extraordinary proportions), coloring matter (great improvements, no longer harmful), ice and refrigeration (ice manufacture dates from about 1870; today nearly 200 companies produce ice for general sale, mostly using the compressor and anhydrous ammonia). Dictionary of food names in five languages (English, French, German, Italian, and Swedish, p. 710-724) and a dictionary in English of "Culinary and bill-of-fare terms" (p. 741-45).

Note 2. The author, Artemas Ward, lived 1848-1925. His father was Henry Dana Ward (1797-1884), his grandfather was Thomas Walter Ward (1758-1835), and his great-grandfather was Artemas Ward (1727-1800), the first Commander-in-Chief of the colonial troops before the arrival of George Washington (a little-known Virginia planter) on 3 July 1775. Thereafter he served as second in command after Gen. Washington and was a Major General in the American Revolutionary War. Address: Formerly (from 1874) founder and editor of *The National Grocer,* 30 Union Square, New York.

346. Wicherley, William. 1911. The whole art of rubber-growing. Philadelphia, Pennsylvania: J.B. Lippincott Co.; or London: The West Strand Publishing Co., Ltd. 154 p. See p. 146-51.

• ***Summary:*** In Chapter 16, titled "The soya bean" (p. 146-51), the author is encouraging the cultivation of soya beans in Ceylon. "Early last year the authorities in the Malay States embarked upon a scheme of raising soya on a large scale, but the latest reports point to an all-round failure, first as to yield, and again as to the possible profitable exploitation of the plant. The same thing happened two years ago in Java, and also in the Philippines, where great things were prophesied for the soya by the already optimistic and enthusiastic American colonists. In each case–and generally the same may be said in every instance where, given the proper soil and climate, the soya bean fails to yield profitably–the fault was wholly due to a want of practical knowledge of its cultivation."

"Now, it is extremely doubtful whether there are more than half-a-dozen Europeans who have a practical acquaintance with the successful growing of the soya bean, since the Chinese, always jealous of the secrets of a craft in which they have no rivals throughout the universe, have carefully avoided every attempt by outsiders to become acquainted with the system under which they produce the bean in such enormous quantities, and in so perfect a condition for export to Europe and elsewhere."

"I present the secret, therefore, to the reader of these pages with the greatest confidence and pleasure." He then explains that the key is proper inoculation of the soil. To accomplish this, soybeans are planted in any light, sandy friable soil without inoculation, broadcasting 4-5 bu/acre of seed. Six weeks after the plants have emerged and begun to branch, the crop is plowed under. The ground is again leveled, and the crop proper at once drilled in, the rows being 6 inches apart with 4 inches between plants in each row. "Under this system the soil is thoroughly and effectively inoculated, and the crop, other things being equal, will mature in 8 or 9 weeks from the time of sowing."

"During the past year eminent millers both in England and on the Continent turned their attention to this residue material [defatted soy flour, produced at Hull {England} and Antwerp {Belgium}], and have discovered in it properties, hitherto unsuspected, of immense value to the milling industry. In short, they find that soya flour ranks nearly highest in the scale of high-class products of this nature, and Messrs. Ranks, Ltd., among others, are now putting on the market a soya flour of great nutritious value as human food. A most delicious biscuit is also being manufactured from the flour by Messrs. Carr, of Carlisle. There seems, in fact, no end to the commercial possibilities of this truly wonderful legume."

Note: The Malay States were the native states of the Malay Peninsula, especially those formerly under British protection, located in the central and north part of the peninsula. These semi-independent states were inbabited by Malays and governed by Malay rulers. Address: F.R.H.S.

347. Hooper, David. 1912. Soy bean in India: Glycine hispida. *Tropical Agriculturist (Ceylon)* 38(1):11-15. Jan. 15; 38(2):99-103. Feb. 15. [1 ref]

• ***Summary:*** This is a reprint of an article by the same author with the same title published in 1911 in *Agricultural Ledger* (Calcutta) No. 3. p. 17-33. Address: Australia.

348. Gibbs, H.D.; Agcaoili, F. 1912. Soja-bean curd, an important Oriental food product. *Philippine J. of Science* 7A(1):47-54. Feb. Section A. [13 ref]

• ***Summary:*** Discusses chemical analyses of soybeans, method of manufacture of the curd around Manila, and adulteration of the product in the locality. "One of the most important foods manufactured from the soy-bean is the curd which is sold in the form of small cakes. The Chinese have introduced and extended the use of this product throughout the East, and Bloch [1906] states that there is no Chinese settlement without one or two bean-cheese factories.

"This curd is known by a number of different designations. In English it is often spoken of as 'bean cake' or 'bean cheese,' although it is not entitled to the designation 'cheese,' since no ripening process takes place in its manufacture... Among the natives of the Philippine Islands surrounding Manila, it is called *toqua* [tokua], a name of Chinese origin. In China the substance is known as *teou-fou* and *tao-hu* and in Japan as *topu* [sic, tofu].

"In this district, as far as observation has extended, the manufacture is carried on entirely by Chinese practically in the manner described by Bloch and Geerligs, except that methods have been introduced which border on adulteration

[sic, with powdered gypsum, which coagulates the soymilk].

"The soja-bean, *Glycine hispida* Maxim, is imported into the Philippines from southern China in large quantities, principally from Amoy and Hongkong. In the markets of the latter place they are known as 'soy-beans' or *pak-tau"* ["white beans"].

The author conducted two analyses of baked cakes of *toqua* and found they contained: Moisture: 73.0% and 72.1%. Protein: 13.88% and 17.56%. Fat: 10.78% and 10.99%. Ash: 1.2% and 1.27%.

"The same food product, known locally under the name *tahuri* or *tahuli* [tofu pickled in brine] is imported from southern China in large stone jars. It is preserved by covering the cakes with a strong salt solution. During shipment, the cakes are somewhat broken, giving to the liquid portion the appearance and consistency of an emulsion. The two portions of the mixture were analysed separately." Table III shows that the solid and liquid portions of *tahuri / tahuli* contain: Water: 55.76% and 57.86%. Protein: 14.56% and 9.56%. Fat: 7.12% and 2.09%. Sodium chloride: 12.7% and 16.38%.

A photo shows the inside of a Chinese bean-curd factory in Manila, with four people working at a table.

Note 1. This is the earliest document seen (Feb. 2004) that uses the term "soja-bean curd" or the word *toqua,* or the word *teou fou* (or *teou-fou)* to refer to tofu.

Note 2. This is the earliest English-language document seen (Feb. 2007) that contains the word *tahuri* or the word *tahuli.* There is no suggestion that the product is fermented. However it is salted, and later documents explain that it is pickled / fermented in this salt solution.

Note 3. This is the earliest English-language document seen (Sept. 2006) with the word "Soja-bean" (or "Soja-beans") in the title. Address: 1. Assoc. Prof. of Chemistry, Univ. of the Philippines. From the Lab. of Organic Chemistry, Bureau of Science, Manila, P.I.

349. Waerden, Herman van der. 1912. De sojaboon [The soybean]. *Indische Mercuur (De) (Amsterdam)* 35(12):251-52. March 19. [6 ref. Dut]
• ***Summary:*** This article is reprinted from *Pharmaceutisch Weekblad,* 12 Aug. 1911. 48(32):889-96. Address: Scheikundig Ingenieur, Dir. Laboratorium Koloniaal Museum.

350. Li, Yu-ying; Grandvoinnet, L. 1912. Le soja [The soybean]. *Agriculture Pratique des Pays Chauds (Bulletin du Jardin Colonial)* 12(108):213-23. March. [7 ref. Fre]
• ***Summary:*** Contents (continued): Products and condiments based on fermented soybeans. 5. Condiments in paste form *(Condiments pâteux):* Miso (preparation, different varieties including white miso, Yeddo miso, Sandai [Sendai] miso or red miso, composition of miso {a table based on studies by Kellner and König}), Tao-Tjiung (Tou-chiang, doujiang) or Chinese-style miso (preparation, properties, composition {a table based on analyses by Prinsen-Geerligs}). Sauces: Shoyu (Schoyou, soyou, schoyu, or Phek-sze-You in Chinese; preparation, raw materials used and their proportions, formation of molds and koji, fermentation, perfection of the fermentation process in an aseptic environment using soymilk or soy bouillon inoculated with pure cultures), properties of shoyu, chemical composition of shoyu (tables show: (1) Composition based on analyses by Kellner, Stift, Belohoubeck, Tahara & Kitao. (2) Composition and forms of nitrogen according to Suzuki, Azo [sic, Aso], and Mitarai (3 tables)), aroma of shoyu (2 tables based on analyses by Tahara and Kitao; Belohoubeck found two types of microbes in shoyu; the Saccharomyces and the bacteria). *Chiang-yu (Tsiang-yeou;* Chinese soy sauce), Ketjap (soy sauce from Java). Address: 1. Counseiller de 1ere classe au Ministère de l'Agriculture de la Chine; 2. Ingénieur agricole (G.).

351. Li, Yu-ying; Grandvoinnet, L. 1912. Le soja [The soybean]. *Agriculture Pratique des Pays Chauds (Bulletin du Jardin Colonial)* 12(109):302-08. April. [2 ref. Fre]
• ***Summary:*** Contents (continued): Products and condiments based on fermented soybeans (continued): Tuong (an Annamese condiment that can replace nuoc mam or fish sauce; preparation with rice or corn/maize as described by Bui), Tao-yu (a condiment widely used in China and Japan, as described by Prinsen Geerligs; preparation, properties, chemical composition).

6. Confectionery products *(Produits de confiserie):* Sweet soya preserves made from whole soybeans *(Confiture de soja,* such as soy-based *crème de marron,* a chestnut cream), soya powder (two types are made at Li's plant: one by drying soy pâté and one from roasted soybeans), soy chocolate.

7. Soya used as coffee (a table shows the composition according to Kornauth). 8. Ferments or starter cultures for fermentation: Kiu-tsee (a special ferment from Canton described by M. Daby de Thiersant), lactic ferments (fermented soymilks).

Industrial uses of soybeans: Uses of the oil to make soap, wax candles *(bougie),* paint, or artificial rubber. Uses of the protein *(caséine de soja)* to give products resembling those made from milk proteins: sojalithe or soy stone resembling lactite, insulators for electrical apparatus, soy glues, etc. Illustrations (line drawings, p. 305) show cellular elements of different soya confections. Address: 1. Counseiller de 1ere classe au Ministère de l'Agriculture de la Chine; 2. Ingénieur agricole (G.).

352. Morse, W.J. 1912. The soy bean; a valuable leguminous crop for the North. *Tribune Farmer (New York)* 11(553):1-2. June 6. [2 ref]

• ***Summary:*** This is the earliest article about soybeans seen written by William Morse alone; his very first was with C.V. Piper in 1910. Contents: Introduction. Adaptation of varieties. Preparation of the soil. Feeding to stock.

"The soy bean is a native of Southeastern Asia... Although introduced into the United States a number of years ago, it has made practically no progress in the farming systems of the Northeastern states. No doubt the chief reason for this is that reliable concerning its adaptation, culture, and use has not been available in practical form. The soy bean is now generally grown in the Southern and Middle states, and is also grown successfully in Illinois, Michigan, Wisconsin, New York, New Jersey, Pennsylvania, Rhode Island and Massachusetts... The soy bean promises to become one of our important legumes in the North."

"The inoculation can be most practically done by taking soil from an old soy bean field, scattering from 300 to 500 pounds of it an acre on the field to be planted, and harrowing in at once. The inoculated soil may also be screened and a peck mixed with the seed in the drill box and fed out with the seed." Photos show: (1) A mature soy bean plant, at the proper stage for cutting for seed. (2) A comparatively cheap but efficient gas power sprayer on the farm of M.G. Keenan near Oneonta, New York. (3) A fine specimen of a soy bean plant at the Arlington, Virginia, experimental grounds. Address: United States Department of Agriculture, Washington, DC.

353. Fremery, F. de. 1912. Mededeelingen uit de practijk. No. 1. Soja en katoen als voorvrucht [Notes from practice No. 1. Soybeans and cotton as preparatory crops (for tobacco)]. *Mededeelingen van het Deli Proefstation te Medan (Sumatra)* 7(1):57-58. July. [Dut]

• ***Summary:*** This paper explores the results of experiments with soybeans and cotton as a preparatory crop for tobacco.

354. Li, Yu-ying; Grandvoinnet, L. 1912. Le soja: Sa culture. Ses usages alimentaires, thérapeutiques, agricoles et industriels [The soybean: Its culture. Its food, therapeutic, agricultural, and industrial uses]. Paris: Augustin Challamel (Rue Jacob 17). 150 p. Illust. Index. 25 cm. Translated into French and expanded from the Chinese edition, published by la Societé Biologique d'Extréme-Orient (1910). [151 ref. Fre]

• ***Summary:*** One of the earliest, most important, influential, creative, interesting, and carefully researched books ever written about soybeans and soyfoods. Its bibliography on soy was larger than any published prior to that time. It was first published as a series of eight articles in *Agriculture Pratique des Pays Chauds (Bulletin du Jardin Colonial)* from September 1911 to April 1912. Before being published as a book, it was revised slightly by adding a table of contents at the back, dividing the material into 5 parts with 19 chapters, and adding several photos (p. 16-17), a world map showing the distribution of soybean cultivation (p. 21), and an interesting 2-page table (p. 66-67).

Contents: The soybean: Origin and history. Part I: Soybean culture. 1. Species and varieties of soybeans: Botanical characteristics, species, varieties (Chinese, Japanese, Indian, Indochinese, Hawaiian, USA, European). 2. Needs of the soybean: Climatic, geographical area of the soybean by region worldwide, agrological/soil needs, fertilizers, soil preparation, the place of the soybean in crop rotations. 3. Soybean seeds: Study of seeds (by weight, by germination rate, selection of seeds), time of planting, plant spacing, depth of seeding, rate of seeding per hectare, method of seeding (broadcasting, in rows, in mounds). 4. The soybean during its vegetative stage: Germination, transplanting, types of care (e.g., second dressings), irrigation, flowering and fruiting, enemies of the soybean (e.g., insects). 5. Harvest of soybeans: Time for harvest (forage or grain), methods of harvesting (forage or grain; mechanical mower), threshing (use of machine), yields of soybeans (forage and grain in various countries, ratio of seeds harvested to straw is about 1 to 2, yield of nutrients). 6. Fixation of atmospheric nitrogen by soybeans, and improvement of the soil. 7. The soybean in mixed cultures and alternate rows: With corn, cowpeas, rice, sweet sorghum, or millet.

Part II: Chemical composition of the soybean. 1. Composition of the plant: Minerals in the leaves and total plant. 2. Study of the seed: Composition, chemical composition, microscopic comparisons, table of analyses by 28 previous researchers, albumins, sugars, starch, dextrin or dextrine, diastase, lipids, ash/minerals.

Part III: The soybean as human food and animal feed. 1. The soybean as feed for animals: Green forage and hay. 2. The soybean in human feeding: From the viewpoints of physiology, economy, and gastronomy. The role of soya in special diets: Vegetarianism, remineralization, diabetic, and lactose intolerant.

Part IV: Food products based on soya. 1. Soymilk and its derivatives: Soymilk (Methods of manufacture, Chinese and modern at l'Usine de la Caséo-Sojaïne, nature and properties [physical and chemical] and composition of the milk, action of ferments and diastases (enzymes) on the milk, uses of the milk, the residue from the soy dairy [okara], condensed soymilk, powdered soymilk, fermented soymilk (kefir, yogurt, etc.)), tofu (called Caséo-Sojaïne, or fromage de soya; methods of production, coagulants, yield of tofu, storing tofu, composition and comparison with various meats, digestibility, culinary preparations made from tofu (smoked tofu, tofu pâté, tofu sausages)), Soy casein (food and industrial uses). 2. Soy flour and its derivatives: Soy flour, soy bread, wholemeal bread, other products based on soy flour (as biscuits and cakes for diabetic diets). 3. Soy oil and its by-products: Soy oil, physical and chemical properties, usage, residue of the oil

mill: the cake, price, uses. 4. Use of the soybean as a legume: Whole soybeans (composition and digestibility), soy sprouts *(germes de soja),* green vegetable soybeans *(le soja frais).* 5. Fermented soy condiments: Solid condiments from Japan: Tokyo natto *(Le Tokio-Natto)* and Ping-Ming natto or tao-tche *(Le Ping-ming-Natto;* soy nuggets with salt, ginger, orange rind, etc. A similar product is made in China and called tao-tche). Paste condiments: Miso (four types and composition), tao-tjung (Chinese miso). Sauces: Shoyu (its production, varieties, properties, composition), chiang-yu *(tsiang-yeou),* ketjap [kechap, from Java], tuong (from Annam, with rice or corn), tao-yu (widely used in China and Japan, described by Prinsen Geerligs). 6. Confectionery products: Comparison with chestnuts, roasted soy flour to replace chocolate. 7. Soy coffee (with analysis by Kornauth). 8. Special fermented products: Kiu-tsee (a special commercial ferment from Canton described by Thiersant), fermented soymilks.

Part V: Industrial uses of soybeans. Oil based: soap, wax candles *(bougie),* and paint oils. Protein based: sojalithe or soy stone which corresponds to lactite, insulators for electrical apparatus, glue, etc. Conclusion. Addendum *(Complément)* to Part III, Chapter 1: Soybean straw and stems. Composition of various seeds, including soybeans. Soy flour. The cakes from oil mills. Soymilk and the cake from soy dairies *(tourteau de laiterie,* okara).

A very interesting table (p. 66-67, which does not appear in the original 8 articles) shows earlier nutritional analyses of the composition of soybeans by Steuf (from Hungary, Mongolia and China), Schroeder, Caplan, Pellet (from China, Hungary, Etampes), Muntz, Nikitin (black soybeans from Russia, 2 samples), Lipski [Lipskii] (yellow, from Russia), Giljaranski (yellow from Russia, China and Japan; black from China and Japan; green), Kònig *(Hispida platycarpa* black, Tumida yellow, brown and black), Prinsen (white from Java and China), Goessmann, Kellner, USDA, Chemiker Zeitung (white from Java and China, 29 Jan. 1896), Scuff (misomame; miso soybeans), Zulkovski (yellow from China, reddish brown from Mongolia), Institut Agr. de Vienne (Austria; yellow from Vienna, reddish brown from Tirol), Ecole Imp. et Roy d'Ag. Hong (yellow from Mongolia and China, reddish brown from China), Chez M. Olivier Lecq (from Moravia), Lechartier (Etampes and black), Joulie (yellow), Stingl and Morawski, Bloch (yellow, green, and black), Balland, Cavendish Evelyn Liardet (yellow, brown, green, black, and white), Jardin Colonial (Laos, Tonkin, China), Aufray (Tonkin, Yun-nan), Homes Laboratory (black from China, or white). Photos and illustrations are the same as those referenced in individual sections of the book, except for the following: A field of soybeans (p. 16). A soybean plant growing in Europe (p. 17). Color illustrations appear facing pages 12, 22, and 64. Address: Li is from Societe Biologique d'Extreme-Orient (Chine). Grandvoinnet is from Ingenieur Agricole (G.).

355. *Agriculture Pratique des Pays Chauds (Bulletin du Jardin Colonial).*1912. Communications diverses: Soja du Cambodge [Miscellaneous communications: Cambodian soybeans]. 12(116):411. Nov. [Fre]

• ***Summary:*** "The Colonial Garden *(Jardin Colonial* in Paris, France) has had the occasion recently to study a sample of Cambodian soybeans *(Soja du Cambodge).* This sample, analyzed in the laboratories of the Chemical Service, was found to contain: Moisture 7.00%, nitrogenous material *(Matière azotée)* 41.60%, and fatty material *(Matière grasse)* 18.26%.

"The fat content of this soya is therefore rather high, the average being only 17 to 18%. This soya, submitted to the expertise of brokers, has been judged to be of good quality and would now be easy to sell at a price of 17 to 20 francs per 100 kg f.o.b. at French ports.

"Cambodia seems capable of mass-producing this legume. According to indications furnished recently by Mr. Magen, director of the agricultural and commercial services at Pnom Penh, this plant is cultivated in Cambodia by the indigenous people in a large number of villages; but they undertake this cultivation for no other purpose than local consumption."

356. Kuijper, J. 1912. Soja [Soya]. *Departement van den Landbouw, Suriname, Bulletin* No. 29. p. 24-29. Nov. [Dut]

• ***Summary:*** In recent years, since 1908, soya has become a product of great importance on the world market. There are few products whose exports have risen so dramatically is just a few years. The reason for the great expansion of trade in soya can be found in the great demand by industry for oilseeds. For more than 30 years, experiments have been conducted on growing soybeans in Europe, but the results have not been very promising. Some people have suggested that soya might be able to be grown in Suriname. It is grown in many tropical countries, including Siam, British India, and Java. Requirements for cultivation and yields are discussed. Japan reports the highest yields, 2,500 kg/ha, compared with 1,000 to 1,400 kg/ha from the USA. Soybeans produce more protein and oil per unit area of land than any other farm crop. The seed is used mainly for human consumption but the plant also yields, fresh or dried, and excellent livestock feed, which is why so much research on it is now being conducted in Australia and America. It is important for Suriname that soya can be used as a green fodder, for example interplanted and fed with corn.

From soya one can make numerous products such as soymilk *(soyamelk),* soy cheese *(soyakaas,* whose food value is higher than that of meat), soy flour, soy bread *(soyabrood),* oil *(olie),* various sauces (soya sauce, Worcester sauce, etc.), and various substitutes for coffee and chocolate, etc. *(surrogaten voor koffie en chocolade enz.).*

In Suriname soya is cultivated on a small scale by the Javanese, for example in Lelydorp and in the settlements of Johan and Margaretha. Many experiments with Soya have already been conducted in the experimental garden *(Cultuurtuin).* Seeds imported from America did not give good results; the plants remained small, yielded few fruits, and died quickly thereafter. It is a common occurrence that plants from temperate or subtropical regions do not grow well in the warm tropics in the rainy season. Of the seeds cultivated in Suriname, two varieties give good results. Those cultivated by the Javanese give hardy plants and a lot of seed though exact yield figures are not available; the planted area is still quite small. But the yield is about 1,000 kg/ha. Apparently the necessary bacteria are present in the soil, for the roots show nodulation.

In the experimental garden two beds of soya were planted on May 24. The first seeds ripened after 3 months and within 4 months all was harvested. Thus the plants developed during the rainy season, and they probably got too much water. The results would probably be better if this season could be avoided. Soya is sold in Suriname for hfl 30 per bag, a considerably higher price than that paid in Europe. On the plantations Peperpot and Jaglust experiments with soya have also been conducted. The European seed that was used gave very limited results. The experiments will be conducted again using Suriname seeds.

With the market price at hfl 10 per bag, it seems very unlikely that the cultivation of soya in Suriname will ever be profitable, unless high yields can be obtained. As mentioned above, this seems unlikely. Small scale cultivation for sale in Suriname, however, seems advantageous at present, while in areas where cattle are raised the use of soya as a green feed to replace more expensive secondary feeds will likely give good results.

Note 1 This is the earliest document seen (May 2009) concerning soybeans in Suriname, or the cultivation of soybeans in Suriname.

Note 2. This is the earliest Dutch-language document seen (March 2001) that uses the term *surrogaten voor koffie* to refer to soy coffee.

Note 3. This is the earliest Dutch-language document seen (Oct. 2003) that uses the term *soyamelk* to refer to soymilk. Address: Surinam.

357. Gibbs, H.D.; Agcaoili, F. 1912. Some Filipino foods. *Philippine J. of Science* 7A(6):383-401. Dec. Section A. Plus 6 unnumbered pages of plates at end. See p. 398-99 + plates III, IV. [2 ref]

• ***Summary:*** "Toyo sauce–This condiment is made principally by Chinese from soja beans, *Glycine hispida* Maxim., imported from China. It is a Chinese sauce of the Worcestershire type." Boiled beans and salt are placed in earthenware jars and spontaneous fermentation is allowed to go on in the sun for 2-4 months (see plate V). "The fermented mass is again boiled for another 12 hours, and the clear liquid is bottled and sold under the name of the toyo sauce. Sometimes it is boiled two or three times producing different grades of strengths of sauce. Molasses or sugar are sometimes added, and this variety is called *si yao* (Chinese). A photo shows soja beans fermenting in earthenware jars, covered with conical woven bamboo lids, in the manufacture of toyo sauce.

"The Macao Chinese add a quantity of wheat flour to the boiled beans and dry the mixture in thin layers on trays several days before placing in jars for fermentation. This process hastens the fermentation." Note: Macao [Macau] is a Portuguese overseas territory, located about 40 miles west of Hong Kong.

Table XVIII gives "Analyses of toyo sauce," including regular toyo, toyo made with sugar, and crude molasses.

Note: This is the earliest document seen (May 2001) that uses the word "toyo" to refer to Filipino-style soy sauce. Address: 1. Assoc. Prof. of Chemistry, Univ. of the Philippines; 2. Food and Drug Inspector, Bureau of Health. Both: From the Lab. of Organic Chemistry, Bureau of Science, Manila.

358. Beltzer, Francis J.-G. 1912. Industries du lactose et de la caséine végétale du soja [Industries producing lactose and soy vegetable casein]. Paris: Librairie Bernard Tignol. 144 p. Undated. (Bibliotheque des Actualites Industrielles, No. 144). [17 ref. Fre]

• ***Summary:*** Contents: Preface. Part 1: The lactose industry (p. 9-95; 4 chapters). Part II: Vegetable milk, vegetable casein, and products from soybean seeds. Introduction. 1. Vegetable milk *(Le lait végétal;* soymilk), microscopic examination of vegetable milk. 2. Vegetable cheese *(Le fromage végétal;* tofu). 3. Industrial uses of vegetable casein, proximate analysis of soybean seeds, quantity and dosage determination, the price of soybeans, price of recovery of vegetable casein, industrial production of vegetable casein, cleaning the soybeans, extraction of soy oil, extraction of soy casein. 4. Plan and installation of a factory for processing (10 tons/day of) whole soybeans [to make industrial vegetable casein], estimate and specifications for special materials, general materials, the buildings, price of recovery of vegetable casein, industrial uses of vegetable casein. Illustrations (line drawings) show: (1) Microscopic view of soymilk globules. (2) Microscopic view of soya bean tegument (exterior). (3) Schematic drawings (cross section and overview) of a factory for making vegetable casein.

The Preface notes that in Indo-China, vegetable milk and vegetable cheese made from the soybean form the base of the people's nutrition. Cow's milk is largely unknown, and the people raise and nourish their children largely with soymilk. Tofu serves equally for the current nourishment of the poor (p. 6).

The Introduction (p. 101-07) notes that soy protein is a globulin, called *glycinine* or vegetable casein *(caséine végétale)*. Osborne & Clapp submitted this substance to acid hydrolysis and found its composition, which is very rich in glutamic acid (p. 102). Soy flour *(farine de Soja)* contains little starch but a large amount of nitrogenous materials, similar to gluten; it is widely used in making bread for diabetics. It can also be used as the basis of foods that are rich in protein and very nutritious, as for colonial or European troops (p. 103).

Soy sauce *(Soja fermenté)* is made in Japan from a mixture of soy and wheat *(koji)*. The number of brewers *(brasseurs)* of soy sauce exceeds 12,000 in the entire Japanese Empire, furnishing more than 2,500,000 hectoliters of this condiment (p. 103).

A Chinese factory has been founded on the outskirts of Paris (at Valées, near Colombes) for the production soy-based food products *(produits alimentaires à base de soja)*. This factory currently makes *Caséo-sojaïne* [tofu] and the following food products: Soy flour *(Farine de soja)*, soy bread *(Pain de soja)*, soy sauce *(Sauce de soja)*, soymilk *(Lait de soja)*, fermented soymilk *(Lait de soja fermenté)*, soy cheese [tofu] *(Fromage de soja)*, soy confections *(Confitures de soja)*, etc. The Journal, in its issue of 9 Jan. 1911, under the title *"Une usine chinoise fonctionee dans la banlieue parisienne* [A Chinese factory is operating on the outskirts of Paris]" gives some details (p. 106).

In our colonies in Indo-China, the indigenous people have long prepared soymilk, tofu, and several other foods. Soymilk is used like regular milk for feeding babies. Soy cheese, when cooked, is analogous to gruyere cheese; fresh soy cheese resembles our goat cheese. Many Europeans are now preoccupied with making the best of the abundant nutritive principles found in the soybean. One can eat green vegetable soybeans *(Les fruits verts)* like green peas *(pois verts)*. In Annam and Japan a sauce is also made from soybeans; its use has spread from East Asia just like that of tofu *(fromage végétal)* (p. 107).

The introduction into Europe and France of soyfoods *(aliments retirés du Soja)*, especially soymilk and tofu, will enable us to combat periods of scarcity of animal milk and periods when the prices of certain foods are high. Will the substitution of vegetable casein for milk casein enable us to likewise conserve milk for food use instead of delivering it to industry? (p. 107).

Chapter one, "Soymilk" (p. 108-13), discusses the work of the Japanese chemist T. Katayama (1906) with soymilk and notes that it can be homogenized and condensed. Illustrations show a microscopic view of the globules of soymilk and of okara. The absence of starch in soybeans is a very positive characteristic.

Chapter two, "Tofu" (p. 114-18), notes that in Cochin-China, calcium sulfate is called *Tchack-kao*, and there are three main varieties of tofu: (1) The fermented variety, which is gray or yellow in color, has a piquant taste and resembles Roquefort cheese. (2) The white salted variety resembles goat's cheese. (3) The baked *(cuite)* or smoked variety resembles gruyere cheese and keeps as well as the salted variety.

Chapter three, "Industrial uses of vegetable casein" (p. 119-32), observes that the oil in soybeans must first be removed by pressing or extraction. A table (p. 120) gives the chemical composition of soybeans from Laos and Cochin China, Tonkin, and China and Manchuria. They contain 17.64 to 18.28% oil. In Indochina a food which Beltzer calls *La caséine végétale en lames* ("vegetable casein in sheets" = yuba) has a rather high oil content–about 25-28%. There follows a section (p. 126-32) which contains details on industrial production of soy casein. Chapter four, "Design and installation of a factory for processing soybeans into industrial vegetable casein," describes each piece of equipment and its cost, itemizes the costs of general and special materials plus, buildings and working capital. Also includes a detailed schematic diagram (p. 136-37) with three production lines, and both top and side views. Finally, it lists expenses, income, and profit (p. 139). The last section, applications of industrial vegetable casein, includes paints, paper coatings, silk and artificial textiles, Galalith, and waterproofing of textiles and straw hats. The book contains no bibliography, few footnotes, and no mention of the work of Li Yu-ying–from whom the author appears to have borrowed much.

Note: Although this book is undated, all major sources (except a Seattle Public Library bibliography) give its date as 1912. Address: Ingenieur-Chemiste-Expert, Professeur de Chimie Industrielle.

359. Fairchild, David. 1912. Plant introduction for the plant breeder. *Yearbook of the U.S. Department of Agriculture.* p. 411-22. For the year 1911. See p. 416.

• ***Summary:*** The article begins: "It is now nearly two centuries since the first successful attempt to hybridize plants was made by an English gardener."

The section titled "Extent of the work of the Office of Foreign Seed and Plant Introduction" states: "To stimulate this research and make it possible for a growing number of enthusiasts to breed plants with intelligence, the Office of Foreign Seed and Plant Introduction has been importing from various parts of the world the wild relatives of our cultivated plants and such promising wild forms as seem to offer a chance for domestication.

"When one canvasses the whole world for the varieties of one of our cultivated plants it is surprising to find how many forms there are. In 1907, for example, when the systematic work of bringing in soybean varieties for the Office of Forage-Crop Investigations first began, there were known in this country only 23 varieties. In a recent bulletin of the Bureau of Plant Industry 300 are mentioned as having

been tested (Footnote: Piper & Morse. 1910. "The soy bean: history, varieties, and field studies." *USDA Bureau of Plant Industry, Bulletin* No. 197. See p. 24). These forms have been gathered since 1907 from the bazaars of oriental villages or bought from peasants in Japan, India, China, Siberia, Chosen (Korea), and the Dutch East Indies by trained explorers, American consuls, missionaries, or special correspondents." Address: Agricultural Explorer in Charge of Foreign Seed and Plant Introduction.

360. Giles, Herbert Allen. 1912. A Chinese-English dictionary. 2nd ed., revised & enlarged. 2 vols. Shanghai, China: Kelly & Walsh, Ltd.; London: Bernard Quaritch. 33 x 26 cm. Reprinted in 1964, 1978. [4 ref. Eng; chi]

• ***Summary:*** These two massive volumes, each weighing about 9½ lb, contain more than 1,800 pages and 13,848 Chinese characters. Contents of Vol. I: Part I. By the same author (25 books). Dedication. Preface. Extracts from preface to first edition. Dialects (The romanized pronunciation of each character is given in Cantonese, Hakka, Foochow, Wênchow, Ningpo, Peking, Mid-China, Yangchow, and Ssuch'uan {Szechwan} dialects, as well as in Korean, Japanese, and Annamese, each being distinguished by its initial letter). Tables: Insignia of official rank, the family names, the Chinese dynasties, topographical, the calendar, miscellaneous (the Chinese digits, the Chinese decimal system). The 214 radicals. Radical index. Part II. A Chinese-English dictionary (p. 1-1711, in two volumes). Examples of soy-related characters:

*Chiang* (p. 149, No. 1220). "A soy made by mixing salt with bean flour. Sauce." Fourteen compounds using this character are given, including: Bean sauce, soy. Pickled bean curd. Bean sauce. Soy is of two kinds, the clear and the thick. Dry relishes. Soy [sauce] colour–a dark reddish drab. He won't use money for vinegar to buy soy.

*Ch'ih* (p. 249, No. 1996). "Salted fruits, etc., dried and used as relishes." Four compounds incl.: Salted beans. Soy, sauce.

*Fu* (p. 458, No. 3686). "Rotten; putrid; worthless." Eleven compounds and sayings include: Bean curd, see No. 11,417. Bean curd officials–a term of contempt applied to certain of the poorer classes of official servants who are compelled to feed largely on this cheap food. Also explained as flabby or unenergetic officials. A Mongol name for cheese. A kind of milk made from beans (milk + fu) [Note: Probably fermented tofu].

*Huang* (p. 635, No. 5124). Yellow. Compounds: Yellow beans.

*Mao* (p. 955, No. 7,679). "Hair, down, feather." But the word *Maodou* ("Hairy beans") = edamame does not appear here.

*Ta* (p. 1,294-96, No. 10,470). "Great." But the word "Great bean" = soybean does not appear here.

*Tou* (p. 1,412, No. 11,417). "Beans; pulse." See also No. 11,412. Thirty compounds, incl.: Bean-sprouts. Bean-curd. A cheap restaurant (a bean-curd restaurant). Like making bean curd–very tedious. A tongue like a knife, but a bean-curd heart (soft). Bean-cake. Bean oil. Big bean, black bean, or yellow bean = the soja or soya bean *(Glycine hispida,* Max.), used for making bean-curd, soy, oil, etc. Ground-nuts.

*Yu* (p. 1,661, No. 13,409). "Oil, fat, grease." 45 compounds incl. Oil, salt, soy, and vinegar = condiments generally. Sesamum-seed oil. Linseed. Wood oil. An oil factory. Oil dregs. But "bean-oil" = soybean oil does not appear here.

Note 1 (see p. vii): Other earlier important Chinese dictionaries are: Morrison (1819, English). Medhurst (1843, English). Williams (1874, American). Giles (1892, English). Giles lived 1845-1935.

Note 2. Unfortunately, the pronunciation of the compounds is not given (as in Mandarin). Address: Prof. of Chinese, Univ. of Cambridge, Cambridge, England; and sometimes H.B.M. Consul at Ningpo.

361. Jong, A.W.K. de. 1912. Wetenschappelijke proefvelden. Verslag over het jaar 1911 [Scientific experiment fields. Report of the year 1911]. *Mededeelingen van het Agricultuur Chemisch Laboratorium (Departement van Landbouw, Nijverheid en Handel) (Batavia, Dutch East Indies)* No. 1. 40 p. See p. 36-40. [Dut]

• ***Summary:*** The last of the seven parts in this report (p. 36-40) is titled *Bemestingsproef met soja hispida* ("Fertilizer trials with soybeans"). On 11 Oct. 1911 a field was divided into 64 equal plots. Various fertilizers and combinations of fertilizers were applied to non-adjacent plots and the seed yield recorded as follows: 1. Potassium chloride *(Chloorkali)* (830 gm). 2. Potassium chloride and stable manure (1,300 gm). 3. Superphosphate (1,169 gm). 4. Superphosphate and stable manure (826 gm). 5. Potassium chloride and super phosphate (1,249 gm). 6. Potassium chloride, super phosphate, and stable manure (1,372 gm). (7) No fertilizer (992 gm). 8. Stable manure (1,297 gm). Ninety plants were sown on each plot; 5 rows of 18 plants in each row. On Nov. 18 the flowers were visible and on Nov. 27 the seeds. They were harvested on Dec. 25.

Conclusions: Combination no. 6, Potassium chloride, superphosphate, and stable manure, gave the best yields (1,372 gm). Combination no. 2 gives the second best results. Address: Dr.

362. Koorders, Sijfert Hendrik. 1912. Exkursionsflora von Java umfassend die Bluetenpflanzen mit besonderer Beruecksichtigung der im hochgebirge wildwachsenden Arten. Vol. II. [A flora of Java for excursions, including the flowering plants with special attention given to species living wild in high mountains. Vol. II.]. Jena, Germany:

Verlag von Gustav Fischer. 742 p. See p. 399-400. [1 ref. Ger]

• ***Summary:*** In this 4-volume work, volume II is dicotyledons (archichlamydeae). The author reports 2 species of Glycine *(G. javanica* Linn. and in *G. soja* Bth. [Bentham]) in Java. A botanical description of each is given. *G. Javanica* grows in bushes/shrubbery *(Im Gebuesch)* on the plains and in the mountains.

*G. soja* is an herbaceous plant that grows ½ meter tall, with 3 leaves and long hairs. The small flowers are white or violet and grow in clusters. The pods are 3-4½ by 8-10 cm, with long hairs. In Java, it is often cultivated on the plains. Its indigenous name (Einh. Name) is "Dekeman, Jav. Kr. D." [Note: We have been unable to decipher the meaning of this sentence. It is apparently NOT a citation.]

Note: The author lived 1863-1919. On pages 402-03 of this volume 2 he reports *Pueraria phaseoloides.* On 409-10 he reports five species of Dolichos: *D. lablab, D. biflorus, D. Junghuhnianus, D. truncatus,* and *D. falcatus.* Address: Dr., Niederlaendischen Kolonialministeriums (Dutch Colonial Ministry).

363. *Philippine Agriculturist and Forester.*1912. Current literature. 2(4-6):103-04. [2 ref. Eng]

• ***Summary:*** Contains a summary of two documents concerning soybeans grown in Mauritius. (1) Sornay, P. de. 1910. *"Étude sur les légumineuses* [Study on legumes"]. *Ile Maurice (Mauritius), Station Agronomique, Bulletin* No. 24. 122 p. See p. 44, 88. This summary states: "It is of interest to note that in spite of a number of failures the Director of the station remains of the opinion that the Soy bean is a plant of great promise for culture under the tropical conditions existing in Mauritius. The failures are ascribed most frequently to the absence of the proper bacteria in the soil, or in individual cases to attacks by various pests. Planting from December to March, a satisfactory crop of mature seed has been harvested in two and one-half to three months."

(2) Boname, P. 1912. *"Soja* [Soybeans"]. *Ile Maurice (Mauritius), Station Agronomique, Rapport Annuel* For the year 1911. p. 22-23. Also titled Bulletin No. 26. This summary states: "The annual report for 1911,... shows that the hopes entertained in the matter of Soy beans have not been realized. Responsibility for this failure is laid chiefly to typhoons. The work is being kept up, and it is hoped that by means of selection from a large number of varieties, one will be found which is sufficiently resistant and vigorous. Like many other legumes, native and introduced, the *Soja* is subject to destruction by the bean fly *(Agromyza).*" Address: Philippines.

364. *Daily Consular and Trade Reports (U.S. Bureau of Manufactures, Department of Commerce and Labor).*1913. Vegetable-oil industry and trade. 16(35):737-44. Feb. 11. See p. 740.

• ***Summary:*** The section titled "Ceylon" states: "The cultivation of the soya beans is not making very much headway in Ceylon, according to the Times of Ceylon, whereas in Java, Burma, Japan, and Manchuria cultivation is carried on on a very extensive scale. Some time ago the Ceylon Agricultural Society ordered beans from Java for a few members, the beans from that country being found more suitable to Ceylon. At first the beans were obtained on successfully in Jaffna, Kalutara, and Puttalam, and even in the Kandy district, and at present the beans are being used as a vegetable and for making green manure. It is claimed they are a good specific for diabetes, and the oil that is expressed from them is equal to olive oil. It has an agreeable flavor and is known as sweet oil. It is a formidable rival to coconut oil for the purpose of soap manufacture, but its cultivation in this island does not seem to have 'caught on.' It can be interplanted with coconuts and as it is a nitrogenous plant the larger trees would benefit."

365. Lemarié, Charles. 1913. Les plantes alimentaires du Tonkin [The food plants of Tonkin]. *Bulletin de la Societe d'Acclimatation* 60:367-76. March. See p. 371. [Fre]

• ***Summary:*** In the section on legumes, we read: *"Glycine hispida* Moench.–Soybeans *(Les Sojas)* are cultivated everywhere for the preparation of purées or of kinds of cheeses [probably tofu], or else for the production of sprouts, a food of which the indigenous people are fond. They are not used as a source of oil.

"Varieties from Japan, distributed by the Colonial Garden *(Jardin colonial)* in 1910, to Tonkin, as well as to the Sudan, have given nothing but poor results. These varieties were not adapted to the soil or the climate.

"But the improvement of local varieties and, if possible, the introduction of better varieties, continues to be studied."

Note: The term "Sudan" refers imprecisely to a region (not a political unit) that extends across the African continent from the west coast to the mountains of Ethiopia. Much of it was under French rule from 1898 as part of French West Africa, and included Dahomey *(Dahomey),* French Guinea *(Guinée),* French Sudan *(Soudan français),* Ivory Coast, Mauritania *(Mauritanie),* Niger, Togo *(Territoires Militaires du Niger et Togo),* Senegal *(Sénégal),* & Upper Volta *(Haute-Volta).* It is not clear to which part of the Sudan the soybeans were introduced, nor whether or not they were cultivated there, nor with what results. Address: Director of Agriculture, Tonkin [Vietnam].

366. *USDA Bureau of Plant Industry, Inventory.*1913. Seeds and plants imported during the period from January 1 to March 31, 1912. Nos. 32369 to 33278. No. 30. 99 p. June 12.

• ***Summary:*** Soy bean introductions: *Glycine hispida* (Moench) Maxim.

"32491-32655. Seeds secured by Mr. C.V. Piper, of the Bureau of Plant Industry. Received November, 1911. Numbered February 1, 1912. Quoted notes by Mr. W.J. Morse, of the Bureau of Plant Industry.

"32491-32598. From Calcutta, India. Received November 17, 1911, from the Economic Botanist.

"32491-32533. 'These are black with small seeds and appear identical as to seeds with S.P.I. Nos. 24678 to 24689 received from India in 1909.

"32491. 'Reg. No. 32045. From Purtabghur, United Provinces.'

"32492. 'Reg. No. 32046. From Sultanpur, United Provinces.'

"32493. 'Reg. No. 32047. From Lucknow, United Provinces.'

"32494. 'Reg. No. 31577. From Patna Division.'

"32495. 'Reg. No. 32175. From Nocha, Farukhabad, United Provinces.'

"32496. 'Reg. No. 32176. From Bahadurpur, Farukhabad, United Provinces.'

"32497. 'Reg. No. 32177. From Ismail Digon, Farukhabad, United Provinces.'

"32498. 'Reg. No. 32178. From Pasgawn, Kheri, Oudh, United Provinces.'

"32499. 'Reg. No. 32179. From Bijna, Kheri, United Provinces.'

"32500. 'Reg. No. 32180. From Sansarpur, Kheri, United Provinces.'

"32501. 'Reg. No. 32501. From Chandeswa, Sitapur, United Provinces.'

"32502. 'Reg. No. 32182. From Bhagantipur, Sitapur, United Provinces.'

"32503. 'Reg. No. 32183. From Nimkhar, Sitapur, United Provinces.'

"32504. 'Reg. No. 32184. From Kauta, Unao, United Provinces.'

"32505. 'Reg. No. 32185. From Lalopur, Unao, United Provinces.'

"32506. 'Reg. No. 32186. From Mahanadpur, Unao, United Provinces.'

"32507. 'Reg. No. 32187. From Sanksoha, Basantpur, Futteghur, United Provinces.'

"32508. Reg. No. 32188. From Bahndolpur, Futteghur, United Provinces.'

"32509. Reg. No. 32189. From Khera Khurd, Mainpuri, United Provinces.'

"32510. 'Reg. No. 32190. From Lakhoura, Mainpuri, United Provinces.'

"32511. 'Reg. No. 32191. From Mainpuri, United Provinces.'

"32512. Reg. No. 32192. From Jaimoi, Mainpuri, United Provinces.'

"32513. 'Reg. No. 32193. From Nasipur, Mainpuri, United Provinces.'

"32514. 'Reg. No. 32194. From Tiswahisor, Hurdoi, United Provinces.'

"32515. 'Reg. No. 32195. From Atwa Karsot, Hurdoi, United Provinces.'

"32516. 'Reg. No. 32196. From Sanwaria, Hurdoi, United Provinces.'

"32517. 'Reg. No. 32197. From Aslapur, Hurdoi, United Provinces.'

"32518. 'Reg. No. 32198. From Jaipura, Hurdoi, United Provinces.'

"32519. 'Reg. No. 32199. From Naira, Hurdoi, United Provinces.'

"32520. 'Reg. No. 32200. From Barch, Etawah, United Provinces.'

"32521. 'Reg. No. 32201. From Bhoiya, Etawah, United Provinces.'

"32522. 'Reg. No. 32202. From Karayee, Etawah, United Provinces.'

"32523. 'Reg. No. 32203. From Nangawan, Etawah, United Provinces.'

"32524. 'Reg. No. 32204. From Etawah, United Provinces.'

"32525. 'Reg. No. 32205. From Etawah, United Provinces.'

"32526. 'Reg. No. 32209. From Shikohabad, United Provinces.'

"32527. 'Reg. No. 32210. From Bewar, United Provinces.'

"32528. 'Reg. No. 32211. Lakhimpur, United Provinces.'

"32529. 'Reg. No. 32212. From Langawar, United Provinces.'

"32530. 'Reg. No. 32213. From Panhar, United Provinces.'

"32531. 'Reg. No. 32399. From Jaunpur, United Provinces.'

"32532. 'Reg. No. 32874. *Bhatmas.* From Darjiling' [Darjeeling].

"32533. 'Reg. No. 31565. From Kalimpong, Darjiling.'

"32534-32538. 'Black, speckled with brown. In size and shape the seed is identical with S.P.I. Nos. 32491 to 32533.'

"32534. 'Reg. No 31785. From Poona, Bombay. Black, very similar to *Nuttall,* S.P.I. No. 17253.'

"32535. 'Reg. No. 34013. From Gurwhal, United Provinces.'

"32536. 'Reg. No. 32206. From Chakrata, Dehra Dun, United Provinces.'

"32537. 'Reg. No. 30030. From Kashmir.'

"32538. 'Reg. No. 31704. From Simla, Punjab' [India].

"32539-32541. 'These are brown with medium-sized seed and very similar to S.P.I. No. 20011B.'

"32539. 'Reg. No. 32208. From Chakrata, Tahsil, Dehra Dun, United Provinces.'

"32540. 'Reg. No. 32372. From Kashmir.'

"32541. 'Reg. No. 31702. From Simla, Punjab.'

"32542. 'Reg. No. 31567. From Kalimpong, Darjiling. Brown, similar to S.P.I. No. 24673.'

"32543. 'Reg. No. 32873. From Darjiling; very similar to S.P.I. No. 32542.'

"32544. 'Reg. No. 32032. From Kalimpong, Darjiling. Brown, quite similar to S.P.I. No. 17258.'

"32545. 'Reg. No. 31701. From Kangra, Punjab [India]. Seed olive yellow, small, much flattened, with burnt-umber hilum.'

"32546. 'Reg. No. 32870. *Bhatmas.* From Darjiling. Olive yellow, medium small with burnt umber hilum.'

"32547. 'Reg. No. 32872. *Bhatmas.* From Darjiling. Straw yellow, medium small, much flattened, hilum russet colored.'

"32548. 'Reg. No. 32543. From Kilburn & Co., Calcutta. Olive yellow, identical with S.P.I. No. 26160.'

"32549. 'Reg. No. 31787. From Poona, Bombay. This sample contains olive-yellow seed, similar to S.P.I. No. 19186, a straw-yellow seed, very similar to S.P.I. No. 17273.'

"32550. 'Reg. No. 32265. From Kachin Hills, Burma. Straw colored with very small flattened seed, and hilum burnt umber.'

"32551. 'Reg. No. 31568. From Kalimpong. Olive yellow with dark-brown hilum; similar to S.P.I. No. 24704 in size and shape'

"32552. 'Reg. No. 31781. From Poona, Bombay. Olive yellow, with slate-colored hilum; similar in size and shape to S.P.I. No. 24704.'

"32553. 'Reg. No. 31790. From Poona, Bombay. Very similar to S.P.I. No. 26160.'

"32554. 'Reg. No. 31782. From Poona, Bombay. Very similar to S.P.I. No. 32552.'

"32555. 'Reg. No. 32406. From a Chinese dealer of Tiretti Bazaar, Calcutta. Very similar to S.P.I. No. 26160.'

"32556. 'Reg. No. 31703. From Simla, Punjab. Quite similar to S.P.I. No. 22901.'

"32557. 'Reg. No. 31617. From Shillong. Straw yellow and brown seed. Identical with S.P.I. No. 24672.'

"32558. *'Bhatmas* Reg. No. 32871. From Darjiling. Straw yellow with very dark-brown hilum; similar to S.P.I. No. 24697 in size and shape.'

"32559. 'Reg. No. 31615. From Bhamo, Burma. Straw yellow, very similar to S.P.I. No. 17269.'

"32560. 'Reg. No. 31779. From Poona, Bombay. Straw yellow, very similar to S.P.I. No. 32560.'

"32561. 'Reg. No. 31778. From Poona, Bombay. Straw yellow, identical with S.P.I. No. 32560.'

"32562. 'Reg. No. 31786. From Poona, Bombay. Straw yellow, seed identical with S.P.I. No. 24702.'

"32563. 'Reg. No. 32405. From Chinese dealer of Tiretti Bazaar, Calcutta. Straw yellow, seed quite similar to S.P.I. No. 17278.'

"32564. 'Reg. No. 31776. From Poona, Bombay. Straw yellow, very similar to S.P.I. No. 24696.'

"32565. 'Reg. No. 31777. From Poona, Bombay. Straw yellow, identical with S.P.I. No. 32564.'

"32566. 'Reg. No. 32583. From Madras Museum, Government farm, Trivandrum. Straw yellow, very similar to S.P.I. No. 24699.'

"32567. 'Reg. No. 31789. From Poona, Bombay. Straw yellow, identical with S.P.I. No. 24699.'

"32568. 'Reg. No. 31780. From Poona, Bombay. Straw yellow, very similar to S.P.I. No. 24699.'

"32569. 'Reg. No. 31783. From Poona, Bombay. Straw yellow, identical with S.P.I. No. 24702.'

"32570. 'Reg. No. 31788. From Poona, Bombay. Straw yellow, identical with S.P.I. No. 24702.'

"32571. 'Reg. No. 31619. From Lashio, Hsenvi State, Northern Shan States, Burma. Straw yellow, very similar to S.P.I. No. 3259.'

"32572. *'Sudawpa.* Reg. No. 31173. From Ruby Mines, Upper Burma. Straw yellow, nearly identical with S.P.I. No. 17269.'

"32573. 'Reg. No. 31784. From Poona, Bombay. Straw yellow. Very similar to S.P.I. No. 14954.'

"32574. *'Pe-nga-pi.* Reg. No. 32043. From Lashio, Northern Shan States, Burma. Straw yellow, with very small seed elliptical in shape and hilum russet colored.'

"32575. 'Reg. No. 32214. From Myitkyina, Burma. Straw yellow, identical with S.P.I. No. 30574.'

"32576. 'Reg. No. 31803. From Naga Hills, Assam. Straw yellow, very similar to S.P.I. No. 14954.'

"32577. 'Reg. No. 31803. From Naga Hills, Assam. Straw yellow, identical with S.P.I. No. 30576.'

"32578. 'Reg. No. 31626. From Tiddim, Chin Hills, Burma. Straw yellow, very similar to S.P.I. No. 24674.'

"32579. 'Reg. No. 31566. From Kalimpong. Straw yellow, identical with S.P.I. No. 24674.'

"32580. 'Reg. No. 31569. From Kalimpong. Straw yellow, very similar to S.P.I. No. 24674.'

"32581. 'Reg. No. 33216. From Myitkyina, Burma. Straw yellow, very similar to S.P.I. No. 32580.'

"32582. 'Reg. No. 31252. *Pyin.* From Maubin, Lower Burma. Straw yellow, with small seeds much flattened and brown hilum.'

"32583. 'Reg. No. 31251. From Katha, Burma. Straw yellow, identical with S.P.I. No. 32582.'

"32584. 'Reg. No. 32075. From Myitkyina, Burma. Straw yellow, with brown hilum, similar to S.P.I. No. 32574, in size and shape.'

"32585. 'Reg. No. 31426. From Nagpur, Central Provinces. Straw yellow, very similar to S.P.I. No. 32582.'

"32586. 'Reg. No. 32217. From Myitkyina, Burma. Straw yellow, very similar to S.P.I. No. 32584.'

"32587. 'Reg. No. 31249. From Thaton, Upper Burma. Straw yellow, very similar to S.P.I. No. 32584.'

"32588. 'Reg. No. 32215. From Myitkyina, Burma. Straw yellow, very similar to S.P.I. No. 32584.'

"32589. 'Reg. No. 31616. From Lower Chindwin, Burma. Straw yellow, similar to S.P.I. No. 32584.'

"32590. 'Reg. No. 32074. From Katha, Burma. Straw yellow, similar to S.P.I. No. 32580.'

"32591. 'Reg. No. 31614. From Mandalay, Burma. Straw yellow, similar to S.P.I. No. 32580.'

"32592. 'Reg. No. 32592. From Gurhwal, United Provinces. Straw yellow, similar to S.P.I. No. 32580.'

"32593. 'Reg. No. 31574. From Haka, Chin Hills, Burma. Straw yellow, identical with S.P.I. No. 24672.'

"32594. 'Reg. No. 32029. From Kashmir. Straw yellow, identical with S.P.I. No. 22901.'

"32595. 'Reg. No. 32373. From Kashmir. Straw yellow, identical with S.P.I. No. 32594.'

"32596. 'Reg. No. 32012. Yields 12.55 per cent of oil. From Gurwhal, United Provinces. Straw yellow (cloudy), in size and shape similar to S.P.I. No. 32594.'

"32597. 'Reg. No. 31250. *Pe-kyat* or *Pe-bok*. From Mandalay. Straw yellow, very similar to S.P.I. No. 32594.'

"32598. 'Reg. No. 32207. From Chakrata, Tahsib, Dehra Dun, United Provinces. Straw yellow, very similar to S.P.I. No. 32596.'

"32648-32649.

"32648. 'Dull black, identical with S.P.I. No. 16790B, a selection from *Cloud,* S.P.I. No. 16790.'

"32649. 'Straw yellow, very similar to S.P.I. No. 24695.'

"32890-32891. From Blacksburg, Va. [Virginia]. Grown by the Virginia Agricultural Experiment Station. Received February 27, 1912. Seeds of the following; quoted notes by Mr. W.J. Morse:

"32890. *'Duggar.* Grown under No. 17268C at the Virginia Experiment Station, Blacksburg, Va., 1911. A field mass selection at Arlington Experimental Farm in 1907 out of S.P.I. No. 17268, *Ito San.* An olive-yellow seeded variety of medium maturity found especially promising in Alabama and Virginia.'

"32891. *'Austin.* The progeny of S.P.I. No. 17263 grown under No. 17263 at Virginia Experiment Station, Blacksburg, Va., 1911; originally from S.P.I. No. 6397 from Pingyang [Pyongyang / P'yongyang], Korea. This variety was also distributed under Agrostology No. 1539. A late olive-yellow seeded variety found especially promising in Virginia, Tennessee, and southern Pennsylvania.'

"32906-32909. The following list represents some promising varieties of soy beans grown in quantity at the Arlington Experimental Farm, Virginia, in 1911. Numbered March 4, 1912, for convenience in recording distribution. Seeds of the following; quoted notes by Mr. W.J. Morse:

"32906. *'Virginia.* Grown under No. 19186D. A pure field selection at Arlington farm in 1907 out of S.P.I. No. 19186, from Newchwang, Manchuria, 1906. A medium-late brown-seeded variety of considerable promise.'

"32907. *'Peking* Grown under No. 17852B. A pure field selection at Arlington farm in 1907 out of S.P.I. No. 17852, *Meyer,* from Peking, China. A medium-late variety with small black seeds. Very prolific and especially promising as a hay variety.'

"32908. *'Chestnut.* Grown under No. 20405B. A field mass selection at Arlington Experimental Farm in 1907 out of S.P.I. No. 20405, *Habaro,* from Khabarovsk, Siberia, 1906. A medium-early brown-seeded variety of promise in the more northern States.'

"32909. *'Auburn.* Grown under No. 21079A. A field mass selection at Arlington Experimental Farm in 1907 out of S.P.I. No. 21079, *Shingto,* from Tieling, Manchuria, 1907. A black-seeded variety in Pennsylvania and New York.'" Address: Washington, DC.

367. Curtice, Raymond S. 1913. Dairen. *Daily Consular and Trade Reports (U.S. Bureau of Manufactures, Department of Commerce and Labor)* 16(177):597-608. July 31. See p. 604-05.

• ***Summary:*** This is part of a larger article on "Commerce and industries of southern Manchuria" (p. 593+). The section on Dairen begins: "The Dairen (Dalny) consular district compromises the southern end of the peninsula of Liaotung, the southernmost part of Manchuria, and embraces the whole of the Kwantung Leased Territory, which was originally leased to Russia by China in 1898. The unexpired term of the lease was ceded to Japan by Russia at the close of the Russo-Japanese War."

The section titled "Bean trade" (p. 604) notes that there has been a marked decrease in the trade of soybeans and products from Dalny. The reasons for this have already been given. A table shows exports for the calendar year 1912 of bean cake, [soy] beans, and bean oil (in tons of 2,000 lb) to various countries. Most of the bean cake (302,402 tons) is sent to Japan. Most of the [soy] beans are also exported to Japan (101,903), followed by Hong Kong (9,694), Great Britain (5,700), Dutch Indies [today's Indonesia] (2,829), and Netherlands (1,108). The largest amount of [soy] bean oil is sent to Belgium (13,550), followed by Japan (7,636), and Great Britain (1,116). Small amounts of beans and/or products are exported to: United States (oil only), Singapore / Straits, etc., Sweden, Germany, France, Russia (Pacific ports), and Chosen (Korea). For bean cake: Total to foreign countries 302,551. Total to Chinese ports 76,172. Grand total (1912) 378,723. For [soy] beans: Total to foreign countries 121,3241. Total to Chinese ports 61,304. Grand total (1912) 182,629. For [soy] bean oil: Total to foreign

countries 23,493. Total to Chinese ports 13,973. Grand total (1912) 37,467. Corresponding totals are given for 1910 and 1911. "The fact that share taken by the Chinese ports was so much greater proportionally in 1912, in all three items, was due to the lessening of the European demand." "It is expected that a new factor in the export trade of bean cake will be introduced when the new chemical process of extracting the oil is put into operation, for the residue, now in the form of bean cake, will be in a powder, and will be capable of shipment through the tropics without decaying. This should open up profitable markets in America and Europe for this article."

The section titled "Bean milling the chief industry" (p. 605) begins: "The industries of this consular district center around the [soy] bean trade and the South Manchuria Railway Co. Gives statistics by bean mills on production of bean cake and oil in 1910, 1911, and 1912. The Chinese have 40 [soy] bean mills in operation with a combined capital investment of $528,500, while the Japanese with their six mills of most modern construction total $1,687,000. Although most of the Chinese mills are operated by crude methods, still it is significant that their combined output during the season just past (October–April) was $8,308,098. The output of five modern Japanese mills (one having been destroyed by fire) during the same period was $2,360,170." Address: Vice consul.

368. Barrett, O.W. 1913. Current notes–July. *Philippine Agricultural Review* 6(7):348-55. July. See p. 350.
• ***Summary:*** The section titled "Soya oil" (p. 350) states: "According to the Daily Consular and Trade Reports the new process for the extraction of oil from soya beans is now a success. This process employs gasoline as a solvent, and in this way the cake or residue, known in Germany as 'schrot,' is free from the dangerous purgative substances which have hitherto practically prohibited its use as a cattle feed. With the old method of crushing and pressing, the proteid substances in the raw bean (which are the base of the bean 'cheeses' so commonly used as food throughout the Orient) caused much trouble through the sticking of the 'cake' to the press cloths."

The next section is about peanuts as a potential competitor to copra since the "world's oil hunger is so great and increasing so fast." Peanut production in India and Africa is growing rapidly. Includes a story about peanuts in the hinterland of the State of Quelimane on the north side of the Zambezi River in today's Mozambique.

Note: A new weed killer or "weedicide," arsenite of soda (made by boiling together white arsenic and washing soda or sal soda), is widely used in Hawaii (p. 569). Address: Chief, Div. of Horticulture, Philippines.

369. Heyne, K. 1913-1917. De nuttige planten van Nederlandsch-Indie, tevens synthetische catalogus der verzamelingen van het Museum voor Technische- en Handelsbotanie te Buitenzorg [The useful plants of the Netherlands Indies. 4 vols.]. Batavia [Jakarta]: Printed by Ruygrok & Co. Vol. 1, 250 + xxvii p. Vol. 2, 349 + xxxix p. Vol. 3, 402 + xlviii p. See vol. 2, p. 242-43, 316-22. See also 2nd ed. 1927 and 3rd ed. 1950. 24 cm. [12+ ref. Dut]
• ***Summary:*** Contains detailed on information soybeans in Indonesia, including various local names, soybean production in Indonesia by province from 1918-1925 (the top producers in 1925 were Madoera and Madioen; total production grew from 222,426 to 260,125), soybean culture, imports, exports, tempeh, tofu (tao hoe), tao koan, tao tjo (Indonesian miso), and soy sauce (ketjap). Also discusses ontjom and dagé made from peanuts.

Note 1. This is the earliest document seen (May 2010) that gives soybean production or area statistics for the Dutch East Indies (later Indonesia).

Note. This is the earliest document seen (April 2001) that contains the term *tao koan.* Address: Chef van het Museum voor economische botanie te Buitenzorg (Bogor).

370. Jong, A.W.K. de. 1913. Bemestingsproef met soja hispida [Fertilizer experiment with soybeans]. *Mededeelingen van het Agricultuur Chemisch Laboratorium (Dutch East Indies, Departement van Landbouw, Nijverheid en Handel)* No. 3. p. 22-25. [Dut]
Address: Wetenschappelijke Proefvelden.

371. Paerels, J.J. 1913. Tweede Gewassen [Second crops]. *Oost-Indische Cultures (Dr. K.W. van Gorkom's)* 3:276-88. [11 ref. Dut]
• ***Summary:*** See Prinsen Geerligs (1913, vol. 3, p. 276-88). Address: Indonesia or Netherlands.

372. Prinsen Geerligs, H.C. ed. 1913. Dr. K.W. van Gorkom's Oost-Indische Cultures, opnieuw uitgegeven onder redactie van H.C. Prinsen Geerligs. Compleet in drie deelen [Dr. K.W. van Gorkom's East-Indian crops. New edition. 3 vols.]. Amsterdam, Netherlands: J.H. de Bussy. See vol. 3, p. 276-88. Illust. Index. 27 cm. [7 ref. Dut]
• ***Summary:*** In vol. 3 is a section on "Second crops *(Tweede Gewassen)*" (p. 243-91). Chapter 4 *(Hoofdstuk IV)* of that section is titled "Soybeans *(Soja)*" (p. 276-88). Contents: Origin and native land. The soybean plant: Botanical description (flowers, seeds, fertilization, germination), types and varieties, geographical distribution. Cultivation of soybeans: General instructions for growing, planting, manuring, diseases and pests. Production, trade, and use of soybeans: Tofu *(Tao-Hoe),* Chinese soy sauce *(Tao-Yoe),* soybean paste *(Tao-Tjiong),* Tempeh, composition and value as a food *(samenstelling en voedingswaarde).*

Note: This is the earliest document seen (Feb. 2009) that contains the term Tao-Tjiong, a term, and perhaps a

product, that appears to be between *doujiang* (Chinese-style miso) and *tao-tjo* (Indonesian-style miso).

Photos show: (1) A soybean plant that bears black-seeded varieties (p. 277). A soybean plant that bears white-seeded varieties (p. 278).

Also discusses (in vol. 2): Peanuts (p. 227-41). Sesame seeds (p. 247-51).

Reprinted in Van Gorkom 1918, p. 839-51. Karel Wessel van Gorkom lived 1835-1919. Address: Amsterdam, Netherlands.

373. Grimme, Clemens. 1914. Die Sojabohne und ihre Verarbeitung zu Nahrungs- und Genussmitteln [The soybean and its processing for food and stimulants]. *Konserven-Zeitung* 15(1):1-3, 10-11. Jan. 2. [1 ref. Ger]

• ***Summary:*** The author discusses the many food uses of soybeans and how they are made and use, drawing heavily on *Le Soja* by Li & Grandvoinnet (1912). He notes that there is a steadily rising interest in soyfoods in almost all branches of the German food industry [perhaps in anticipation of World War I].

Foods made from natural [unfermented] soybeans include: Soymilk *(Sojamilch),* tofu *(Sojakäese),* frozen tofu *(Kori-Tofu),* soy flour *(Sojamehl),* soy bread *(Sojabrot),* soya confections *(Sojakonfekt),* soy chocolate *(Sojaschokolade),* soy coffee *(Sojakaffee),* and green vegetable soybeans *(Soja als Gemüse).* Foods and seasonings made from fermented soybeans include: (1) Solid seasonings: Natto, and tao-tche (Chinese natto [sic, soy nuggets]); (2) Seasonings in paste form: Miso (4 types), and Tao-tjiung (Doujiang, Chinese miso); (3) Liquid seasonings: Shoyu (Schoyou), Tsiang-Yeou (Chinese soy sauce), Ketjap (Javanese soy sauce), Tuong (Annamite soy sauce, made with rice or corn), Tao-Yu (soy sauce made with black soybeans in China and Japan).

Note 1. This is the earliest German-language document seen (June 2009) that mentions green vegetable soybeans, which it calls *Soja als Gemüse.*

Note 2. This is the earliest German-language document seen (Oct. 2003) that uses the term *Sojamilch* to refer to soymilk. As of Jan. 2009 *Sojamilch* is the modern German word for soymilk.

Note 3. This is the earliest German-language document seen (Jan. 2009) that uses the word *Sojaschokolade* to refer to soy chocolate. The German word for "chocolate" is *Schokolade.* Address: Dr.

374. Baker, C.F. 1914. The lower fungi of the Philippine Islands: A bibliographic list chronologically arranged, and with localities and hosts. *Leaflets of Philippine Botany* 6:2067-2190. Jan. 14. See Article 102, p. 2077. *

• ***Summary:*** Early work on an illustrated manual of Philippine fungi. *Uromyces sojae* Syd. was found on *Glycine hispida* in Los Baños.

Note: This is the earliest English-language document seen (Jan. 2007) that contains the word "sojae" in connection with the soybean. It is the species name of a fungus that grows on soybeans.

375. Barrett, O.W. 1914. Current notes–February: Soya bean. *Philippine Agricultural Review* 7(2):82-83. Feb. From the Daily Consular and Trade Reports of the U.S. Dep. of Commerce.

• ***Summary:*** "As was confidently expected, the soya bean has been greatly improved in the past few years, both in America and Europe. Whereas in its home country of Manchuria the oil content is only about 15 or 16 per cent, some of the new varieties which have been bred up in America and Europe run as high as 20 and even 22 per cent. South Africa is now taking up this crop and it is found that altitude somewhat affects the yield of oil in any given variety; for instance, at an altitude of 1,000 meters the [oil] yield of a certain variety is about 20 per cent. while at sea level it is about 22 per cent. Germany, ranking with France as the heaviest importer of oil seeds, has been trying for years to find a suitable oil crop which could be put under intensive cultivation; this desire seems about to be realized in the shape of soya, many varieties of which can now most likely be grown in Germany with excellent success. In 1912 Germany imported 1,443,447 metric tons of oil seeds valued at 217 million pesos." Address: Chief, Div. of Horticulture.

376. Bois, D. 1914. Germes de soja et germes de haricot mungo: Un produit alimentaire faussement dénommé [Soy sprouts and mung bean sprouts: A food product falsely named]. *Bulletin de la Societe d'Acclimatation* 61:334-36. Feb. [Fre]

• ***Summary:*** In November 1911, the *Journal des Halles et Marchés* reported the appearance in Paris of a vegetable designated under the name *Yamado* and considered new. The author identified it as mung bean sprouts *(germes du Haricot Mungo),* a green seed well known to the Society and described by Paillieux in the 3rd edition of his book *Le Potager d'un curieux* on p. 222. The mung bean/mung bean sprouts are known as *Lou teou/Ghia* in China and *Yaye nari/ Moyashi* in Japan. The sprouts are called Taugé in Java.

"We see them appear now every winter, sold in Paris by a certain number of food merchants, who also sell the ungerminated mung beans.

"But, perhaps to facilitate the sale of these products, the shopkeepers have seen fit to offer them to the buyers under the names 'soy sprouts' and 'soybeans' *(germes et de graines de Soja),* a confusion that would not be appropriate to perpetuate."

Footnote: "A circular has been printed and is distributed to the buyers, titled *Le Soja, alimentation économique et hygiénique. Une légume nouveau importé de Chine: Le Soja*

*frais en germes* ['The soybean, an economic and hygienic food. A new vegetable imported from China: Fresh soya sprouts']. It contains some recipes using the sprouts, also falsely named."

"The soybean *(Le Soja)*, whose products are coming to be used more and more in Europe, has seeds which are completely different from those of the mung bean, not only in their form and volume, but also in their special chemical composition, which requires that they be used quite differently. I must add that all the sprouts I have seen in Paris under the name of soy sprouts *(germes de Soja)* actually came from the mung bean."

"Since I have introduced the subject of soybeans, I will say that the seed of this precious legume is presently imported into Europe in considerable quantities. The Information Leaflet of the Ministry of Agriculture announced recently, according to the *Molkerei Zeitung*, that an organization named "Soyama-Werke" has been established at Bockenheim (Germany) for the production of milk, cream, butter, and cheese from this seed.

One can see from the accompanying illustration the great difference that exists between the seeds of the mung bean and those of the soybean, and between their respective sprouts.

An illustration (line drawing, p. 336) shows the seeds and sprouts of the Mung bean and soybean. Mung beans, which are smaller than soybeans, give ready-to-use sprouts in 4 days, compared with 8 days from the larger soybeans. "Because of this difference, the soybean seems to me absolutely unsuited to the production of etiolated sprouts."

Messrs. Li and Grandvoinnet have published in the *Journal d'Agriculture pratique des pays chauds*, 1911-1912, a series of articles about the soybean, and they mention the sprouts among the products obtained from this plant. But the sprout in the illustration (fig. 21, p. 130, of 1912) is that of the mung bean. Address: France.

377. *Tropical Agriculturist (Ceylon)*.1914. Soya bean. 42:275. April.
• ***Summary:*** This is a reprint of the section on "Soya Bean" in an article titled "Current notes–February: Soya bean," by O.W. Barrett, published in the *Philippine Agricultural Review* 7:82-83 (Feb. 1914).

378. *Independent (The)*.1914. Milk and cheese from the soya bean. 78:487. June 15.
• ***Summary:*** "A large concern known as the 'Synthetic Milk Syndicate, Ltd.' is about to establish a factory in Liverpool, at which soya milk will be made according to the process of Dr. Fritz Goessel, of Essen, Germany." A detailed description of the process follows. "It is expected that this milk will be retailed in England at 4 cents a quart. It is claimed to have the same nutritive value as natural milk, and will be free of the characteristic oily flavor which makes other soya bean products unpalatable to most people who have not acquired the tastes of the Orient... Treated with a mineral salt or an acid, which acts the part of rennet, vegetable milk can be converted into cheese of several varieties. In Indo-China, where the soya milk industry has assumed large proportions, three principal kinds of cheese are made: a fermented variety with a taste suggesting Roquefort; a white salted variety, resembling goat's milk cheese; and a cooked or smoked variety, like Gruyère."

Note: This is also the earliest English-language document seen (Feb. 2004) that uses the word "smoked" (not including "smok'd") in connection with tofu. Address: England.

379. Dietz, P.A. 1914. Het katjang-vlindertje (het vermeende toa-toh-motje) [The little katjang butterfly; the so-called little toa-toh moth]. *Mededeelingen van het Deli Proefstation te Medan (Sumatra)* 8(8):273-76. [Dut]

380. Jumelle, Henri L. 1914. Les cultures coloniales: Plantes oléagineuses–cocotier et palmiste, arachide, sésame et ricin, cotonnier et soja [Crops of the colonies: Oil-producing plants. Vol. 5. 2nd ed.]. Paris: Librairie J.-B. Baillière et Fils. 112 p. See p. 108-12. 18 cm. [15 ref. Fre]
• ***Summary:*** The soybean is discussed under the heading "Glycine hispida Max." Information is given on the nutritional composition of the seeds, the oil and its composition and properties, soybean cake, and soybean flour.

An illustration (non-original line drawing by Thiebault; p. 111) shows a soya bean plant with pods. Note: Soy is not mentioned in either volume of the 1st edition, 1901. The third ed. was 1925-27, 8 vols. The author lived 1866-1935. This volume also discusses: Coconut palm and oil palm, peanuts, sesame and castor oil plant. Address: Prof., Faculte des Sciences de Marseille [Marseilles], France.

381. Thompstone, E.; Sawyer, A.M. 1914. The peas and beans of Burma. *Burma Department of Agriculture, Bulletin* No. 12. 107 p. See p. 22-26. [Eng]
• ***Summary:*** Contents: Names and description of the plant: Leaves, pods, seeds (yellow or black). Varieties (based on seed color, size, and shape): Yellow (3 races), greenish-yellow to yellow, dull brownish gray to olive brown shading to black around the hilum. Notes.

Tables shows that each of the soybean varieties and races has one or more local names in different parts of Burma: Local names of the yellow soybean are: Hto-khyan-pè, pè-ngapi, san-to-tep, be-hrum, pe-hlum, beir-kan, pè-bôk-san, hsan-to-nouk, to-nouk, pè-bi-zat (probably a misnomer generally applied to Dolichos biflorus), lazi-shaprè-tum, lasi n'loi, lasi n'hti, hto-laung, pè-ngapi. Local names of the greenish yellow variety are pè-ngapi, pè-kyât-pin, pè-bouk-si, and pè-bouk. The local name of the dull

brownish gray to olive variety (which grows only in Maungoli/Kachin Hills) is ngasee.

"The Soy Bean is not extensively grown in Burma though its distribution is wide. It is more frequently sown as a subordinate crop than alone. A little is often scattered along with other peas and beans, chiefly along the banks of rivers and streams or on islands after the floods subside. In Sagaing District it is frequently grown on paddy nurseries after the young plants have been removed. In Myingyan, Minbu, Pakôkku, Lower Chindwin and Bhamo districts, it is also sown away from the rivers on high sandy soils. Sowing generally takes place about October and the crop is ripe by about February. In Kônmahut (Bhamo District) two crops are sometimes grown–a rainy season crop sown about August and reaped about November and a cold weather crop sown in November and reaped in February... Very little care is bestowed upon its cultivation; the seed is scattered at the rate of 1/8 to ¼ basket per acre after which very little attention is given to the crop. The yield is poor and varies from 4 to 12 baskets per acre.

"Pè-ngapi is issued for a variety of purposes. After being steeped in water, fermented and cured it is used under the name of 'Kyányo,' 'pè-bouk-yè,' or 'pè-ngan-byá-yè' as a sauce for flavouring food and takes the place of 'ngapi' (Burmese rotted fish) where the latter cannot be easily obtained. For this purpose, considerable quantities of the bean are utilized in the plains and the product carried to other parts, particularly to the Northern Shan States. A similar product is made by Chinamen in parts of Mandalay, but for this purpose the Manchurian Bean is frequently imported."

A detailed description is given of the process used by Chinese for making soy sauce in Burma. Wheat flour is mixed with the beans before the mixture is spread on bamboo matting to dry and become koji. The fermentation takes place in earthenware vessels outdoors, often for as long as one year. "When fermentation has proceeded far enough, which is ascertained by tasting, the dark reddish-brown liquid is decanted off, bottled and sold. The residue is made into small flat cakes called 'pé-bôk' which are used for flavouring curries and soups. The whole beans are also said to be made into similar cakes, also called 'pébôk,' by the Shans of the Northern Shan States for sale to caravans, and it is further stated that one small cake is sufficient for a meal.

"Attempts have been made to introduce foreign Soy beans into Burma but with no success. Although they will grow, a profitable yield cannot be obtained and the oil-content rapidly decreases. The Chinese who import the bean from China state that the climate of Burma is not suitable for the production of Soy beans of good quality; hence they are forced to import them at a cost of somewhere about Rs. 20 per bag of three baskets (Burmese)." Address: 1. B.Sc., Deputy Director of Agriculture, Burma; 2. Asst. Agricultural Botanist, Burma.

382. *Bulletin Economique de l'Indochine (Hanoi).*1915. Surface cultivée et production du Soja au Japon de 1904 à 1913 [Area cultivated and production of soybeans in Japan from 1904 to 1913 (and in Korea from 1909 to 1912)]. 18(112):260. March/April. [Fre]

• ***Summary:*** This table for the years 1904 to 1913 inclusive in Japan gives for each year: Area cultivated (in *cho;* 1 *cho* = 2.451 acres). Soybean production (in *koku;* 1 *koku* = 180 liters = 47.6 gallons). Average yield (in *koku* per *tan;* 1 *tan* = 0.245 acre). The cultivated area rose from 446,843 *cho* in 1904 to a peak of 495,802 *cho* in 1908, then fell to 475,284 *cho* in 1913. Production rose from 3,710,459 *koku* in 1904 to a peak of 3,892,934 *koku* in 1908, then fell to a low of 2,993,095 *koku* in 1913. Yield fell from a peak of 0.830 in 1904 to a low of 0.629 in 1913.

A second table gives statistics for soybean production in Korea from 1909 to 1912. The area cultivated rose dramatically from 280,090 *cho* in 1909 to a peak of 375,340 *cho* in 1912. Production also rose sharply from 1,533,027 *koku* in 1909 to 2,452,203 *koku* in 1912. Address: Hanoi.

383. Brewer, Lucile; Canon, Helen. 1915. Beans and similar vegetables as food. *Cornell Reading Courses (New York State College of Agriculture) Food Series* 4(89):181-200. Food Series No. 16. June 1. [20 ref]

• ***Summary:*** The section titled "Long and extensive use of legumes as food" states (p. 182): "The cowpea and the soy bean have only within recent years come into common use in this country." "The first reference to the soy bean in American literature was in 1829; it had been grown in the botanical garden at Cambridge, Massachusetts and was referred to as 'a luxury, affording the well-known sauce, soy, which at this time is only prepared in China and Japan.' About twenty-five years later [1854], seed of the soy bean, or Japan pea as it then was called, was brought from Japan to California, and thence to Illinois and Ohio. Within the last twenty-five years, it has come to be a crop of great economic importance in the United States."

"The peanut, properly classed with the nuts, is thought to be a native of tropical America. It has long been grown in Africa, the East Indies, China, and Japan. It is said that in the seventeenth century it had become so important an article of food in Africa that the slave dealers loaded their vessels with it as food for their captives. Since the Civil War, the peanut has become important in the Southern States as a human food, a forage crop, and a fertilizer."

The section titled "Digestibility" (p. 184) states: "In Japan the soy bean is grown almost entirely for human food. According to Mr. Oshima, next to rice in the Japanese diet are the legumes, which are universally used.

In the section on "The cooking of legumes" we read (p. 188) that the use of a small amount of baking soda (sodium bicarbonate; ¼ teaspoon to 1 quart of water) serves to loosen the skins of legumes, "to render their protein more digestible, and to soften water of average hardness..." "Soft water, either distilled or rain water, is the best in which to soak and cook the legumes. Hard water interferes with their becoming soft and also with their digestibility. Hardness of water caused by the carbonate of lime or magnesium, may be remedied for use in the cooking of legumes by boiling the water, pouring it from the sediment, and adding a small amount of soda; when the hardness is caused by the sulfate of lime of magnesium, boiling has no effect, but soda may improve it for this purpose.

This publication contains many recipes for "beans" but without any specific reference to soy beans in a recipe.

384. *Bulletin Economique de l'Indochine (Hanoi).*1915. Les exportations du Soja en Mandchourie [The exports of soya from Manchuria]. 18(115):773. Sept/Oct. Extract from Echo de Chine. [1 ref. Fre]

• ***Summary:*** "The quantities of soybeans forwarded from Dairen to the South China Sea by ships / vessels which offer regular service between Dairen, Shanghai, and Hongkong, to be expedited again to other destinations, increase significantly each year. The quantities in 1913 attained 3,061,336 kg; in 1914 they were only 2,976,049 kg, and for the year 1915, the quantities already exported rose to 6,667,000 kg."

A table shows the imports of soybeans (in million kg) at the following ports in 1914 and 1915: Singapore (1.460 / 1.426), Hongkong (4.760 / 0.923), southern Chinese ports (36.946 / 13.580), Dairen (2.976 / 6.667), and Japanese ports (1.503 / 1.060). Note 1. In 1914 southern Chinese ports imported 77.5% of the total imports of 47.645. In 1915 the total imports dropped to 23,656, and southern Chinese ports imported 57.4% of that total.

"The Indies *(Les Indes)* had exported 49,705 kg to these different places in 1913, but since then, no new exportation has been done, the Indies sending all available soybeans into the city *(dans la Métropole)."*

"In the South China Sea, mainly in Malaysia and Oceania *(les Iles Océanique),* soybeans are used to prepare Chinese food sauces from certain special farms, and the residue is used as fertilizer on sugarcane plantations." Address: Hanoi.

385. Gimlette, John Desmond. 1915. Malay poisons and charm cures. London: J. & A. Churchill. viii + 127 p. Index. 20 cm.

• ***Summary:*** The hairs on the pods of the soybean seem to be capable of causing a certain amount of irritation within the digestive tract. In the section titled "Kachang Bulu Rimau" (p. 41-42), the author reports that in June 1913 a Kelantan police exhibit consisted of some rice cooked with a particular salted green vegetable, and "a quantity of fine woolly hairs scraped from the pod of an edible bean, *kachang bulu rimau* (Glycine hispida Maxim., Leguminosae). A attempt seemed to have been made to poison or incapacitate for the time being (pending a law suit) a cousin of His Highness the Sultan of Kelantan. Three of her women who partook of the meal were attacked with vomiting, diarrhoea, and general prostration, with violent itching of the skin in one case; they all recovered quickly with treatment by castor oil and a bismuth mixture."

The light yellow hairs of the soybean do not present any peculiar features under the microscope. The author suggests that they may be used as a substitute for bamboo hairs in such circumstances. Address: Residency Surgeon of Kelantan, one of the Protected Malay States.

386. Martindale, William Harrison; Westcott, W. Wynn. 1915. The extra pharmacopoeia of Martindale and Westcott. 16th ed. 2 vols. London: H.K. Lewis & Co., Ltd. See vol. I, p. 563, 849. Index. 17 cm. [14 ref]

• ***Summary:*** In Vol. I, the section titled "Oleum papaveris" (p. 562-63) is about "Suggested use of other oils to replace cod liver oil in malnutrition, phthisis and other forms of wasting disease." "Several nutritive oils... which rank almost as high as Cod Liver Oil in Iodine values, suggest themselves as suitable for therapeutic use. These oils are used both medicinally and as foods..." A table shows each oil with its iodine value. Cod liver oil 126-66. Poppy seed oil 138.1. Maize oil 111. Sunflower seed oil 136.1. Soya bean oil 122. Of these, poppy seed oil seems to be suited for use as an alternative to cod liver oil. Arachis oil, sesame oil, and henbane oil are also discussed briefly.

In the chapter titled "Supplementary list of drugs" is a long section (p. 805) on "Soya Bean.–*Glycine Hispida (Leguminosae).* This bean is extensively cultivated in China and Japan for human consumption and laterally in America and Europe, chiefly as a forage crop, is eaten as a vegetable, in soups, sometimes picked green, boiled and served cold with a sprinkling of Soy Sauce, and sometimes as a salad. A favourite method of preparing in the East is to boil until soft and place the resulting mass in a warm cellar until it ferments,–the resulting 'cheese' being known as 'Natto.'

"Analysis of the bean calculated on water free basis, indicated 38.5% Protein and 20% fat. It is probably due to this large amount of easily assimilable Nitrogenous matter that the Chinese and other rice eating people require so little meat. It contains practically no Starch–the latter fact is said to be due to presence of a diastase in the bean capable of converting Starch formed, two-thirds into Sugar, one-third into Dextrin. Has been used as an addition to ordinary diabetic dietary,–the beans may easily replace the Gluten of bread,–causes reduction in percentage of sugar *(Lancet* 1910, p. 1844). Soy Flour is even more serviceable,

containing almost 1/3 more Protein than the bean, this being due to the removal of the fibrous hulls, which contain but little Protein *(British Medical Journal Epitome* 1911, p. 80).

"The protein of the Bean is being extensively used in connection with the treatment of diabetes and malnutrition. Soya Bean Meal from which it is made must be carefully examined for the toxic *Java Bean*.–F.W. Crossley Holland *(Pharmaceutical Journal and Pharmacist* (London) 1912, p. 154). Soya Beans average 8 m.m. in length and 7 m.m. in breadth and 6 m.m. in thickness. They are roundly ovoid in shape and about 99% are pale yellow in colour–there being a few darker coloured, smaller and more elongated. Structure of the bean. Soya Bean Cake and Meal is enormously adulterated.–T.E. Wallis *(Chemist and Druggist* (London) 1913, p. 278; *Pharmaceutical Journal and Pharmacist 1913,* p. 120).

"E.S. Peck states *Glycine Hispida* has been used in clinical experiments for the splitting up of Urea into Ammonium Carbonate.

"* Sarton is a preparation of the bean for use as a diabetic food.

"Soya Oil has Iodine value 121 to 123. Cowie found 131 (Chemist and Druggist 1910, p. 66). For further characters see *(Pharmaceutical Journal and Pharmacist* (London) 1911, p. 407)." See also p. 563.

In Vol. II, the section titled "Lecithin" (p. 76) states that it is a "Mono-amino Phosphatide" and contains a table listing the percentage of lecithin contained in 17 substances, including: Brain 160. Spinal cord 11.0. Nerve tissue (dry) 17.0. Kidneys 8.5. Egg yolk 12.0. Lupin seeds 2.0. Yeast (dry) 2.0. The soybean is not mentioned. A test of purity of lecithin made from fresh egg yolk, and the determination of lecithin in preparations are described.

William Martindale lived 1840-1902. Volume I also discusses Gluten (p. 546–Synonym: Vegetable Albumin), Diabetic foods (p. 546-47, incl. starchless bread; soy is not mentioned), *Oleum sesami* Sesame Oil (p. 571; also called Benné oil, gingelli oil, teel oil), *Arachis Hypogæa* (p. 805; also called Pea Nut, Ground Nut, Goober Nut, Manilla grain [Manila grain], Chinese Almond).

Volume II also discusses "glutin" (p. 86-89), proprietary medicines (incl. Ovaltine, and Pinkham's (Mrs. Lydia E.) Vegetable Compound, p. 162-63). Address: 1. Ph.D., F.C.S.; 2. M.B.Lond., D.P.H.

387. Brill, Harvey C. 1916. The salicylic acid reaction of beans. *Philippine J. of Science* 11(2):81-89. March. [14 ref]
• ***Summary:*** "The bean is especially important since it not only furnishes food for man and beast, but enriches the soil in which it grows by taking nitrogen from the air and converting it into compounds available for plant growth. The Chinese and Japanese have recognized this fact from time immemorial, and their culture of the soy bean *(Glycine hispida)* has assumed large proportions." In 1914, the Philippines Islands imported 2,798,215 kg various species of dry beans [probably including some soy]; 63% by weight came from China, 17.9% from Japan, 14.9% of the United States, and 4.1% from Spain.

Some varieties of soy beans, particularly those grown in Japan, contain a substance which is soluble in alcohol and ether, volatile in steam, crystallizable, and yields a violet coloration with ferric chloride in acid solution. The substance, which is probably Brand's maltol, does not give a reaction with Jorissen's test for salicylic acid (a red coloration when the solution is heated with potassium nitrite, acetic acid, and a trace of copper sulfate). It appears to be formed by enzymic action in the beans. Address: Lab. of Organic Chemistry, Bureau of Science, Manila, Philippine Islands.

388. Nemzek, L.P. 1916. The soya bean and soya oil. *Paint Manufacturers' Association of the U.S., Educational Bureau, Scientific Section, Circular* No. 37. 8 p. June 10. [1 ref]
• ***Summary:*** This address was presented on May 18, 1916 (during World War I) at the meeting of the Mississippi Cotton Seed Crushers' Association, New Orleans, Louisiana. Accompanied by three exhibits, it states: "As early as 1907 the Bureau interested itself in a campaign to promote the increased production of flaxseed in the United States. The rapidly increasing demand for linseed oil, by the industries in this country, indicated that we should soon face a shortage of his commodity. It remained for the 1910 flaxseed crop failure to demonstrate what a menace to the pain trade such a shortage meant. Due almost entirely to the resultant scarcity of linseed oil, the price commenced to soar during the latter part of 1910. Linseed oil reached the high price of $1.00 per gallon during 1911 and high prices prevailed throughout most of the year 1912. This condition forcibly showed the necessity for a more profound investigation of oils which might find application as substitutes for linseed in the different industries which use the oil in large quantities. In view of the fact that the work which was done toward promoting an increased production of flaxseed had been so marvelously effective, it was decided to do work of similar magnitude with miscellaneous oils."

"A series of practical paint exposure tests were begun on test fences located at Washington, D.C., in connection with the Institute of Industrial Research. The paints were exposed in May, 1911. The repainting tests were made during the latter part of 1914. This series of tests is referred to in Circular No. 30, 'Repainting Tests on Paint Oils,' issued by the Educational Bureau during December, 1914.

"Soya oil was one of the oils decided upon for the experiments largely because it was already available in quantities and could readily be imported. After looking into the matter it was found that the production of it might be

developed on a satisfactory basis in this country. Soya beans were already being grown in considerable quantities, but up to that time domestic oil on a commercial scale had not been produced.

"Soya oil is crushed from the bean bearing that name. The bean is commonly referred to by the agriculturists in this country as 'Soy,' but the oil, ever since it was first imported, has been known as 'Soya Bean Oil' or 'Soya Oil.' Largely for the sake of convenience the title 'Soya Oil' has been adopted and is coming into general use. The title 'Soya' was, very likely, introduced from Manchuria, where the bean is grown in enormous quantities, and is a derivation from the Japanese 'Shoyu' or 'Soja.' 'Soya' is replacing 'Soy' when used in reference to the bean as such, even in the language of the agriculturist, and it is only a question of time when the word 'Soya' will be adopted generally."

"The first step in connection with the Bureau's endeavor consisted of the importation of soya beans from Manchuria for oil-extraction tests and the distribution of this seed, together with seed from a number of varieties already grown in this country, and the soliciting of the assistance of the State Agricultural Experiment Stations and other interested persons to urge the farmer to grow more soya beans for seed. While soya beans had been grown in this country for a good many years, this was done as a forage crop and for fertilization purposes. Only enough seed was being harvested to take care of the succeeding year's planting. The far-reaching propaganda, through the active co-operation of the State Agricultural Experiment Stations and the different Bureaus of the U.S. Department of Agriculture, was solely for the purpose of inducing the farmer to increase his population."

The Bureau reached farmers through the State Agricultural Experiment Stations. "While growing tests during 1911 and 1912 were limited to North Dakota, Minnesota, Missouri, New Jersey and Kentucky, they were extended in 1913 to every State, with the exception of a few where conditions are unfavorable from an agricultural standpoint.

"The tests were also extended to the Philippine Islands and to several places in Canada. It is noteworthy in this connection that there are at least two varieties which can be successfully matured as far north as the southern portions of Quebec.

"During 1912, forty-eight varieties were experimented with, including four imported from Manchuria. This number was greatly increased in 1913, so that all available types would be included."

By 1916 the number of varieties had been reduced to about fifteen (see Exhibit No. 1), which were already popular: "Mammoth, Medium Yellow, Ito San, Holly Brooks [Hollybrook], Haberlandt, Peking, Wilson, Auburn, Black Eye Brow [Black Eyebrow]. Arlington, Tokio, Mikado, Virginia, Chiquita, Sable and the Yellow Manchurian bean...

"No sooner were the farmers interested in the larger growth of soya beans than they began to ask for information as to how and where the beans could be disposed of to be converted into oil.

"It was soon evident that the cotton seed mills in the South were best situated for crushing the beans. The location of the hundreds of these mills is fortunate, inasmuch as the South is naturally adapted to become the great soya bean-producing section of the country. Definite plans have not been evolved in sections where the cotton seed mills are not located, but in the northern section of the country the linseed oil mills will, very likely, crush the beans as soon as the production is large enough to warrant their going into the matter. In some sections, notably Tennessee, it was suggested that the farmers in a certain locality club together and conduct their own mill, disposing of the oil in the regular manner, and each farmer to use the cake from his crop for feeding purposes. In this way there would be returned to the land the full fertilizing values of the crop. The promoters of successful agriculture see in this a means to increase the production of soya beans, mainly because of the value which the farmer obtains by the improvement of his soil.

"During August and September, 1913, I made a trip of nearly twenty-four thousand miles, visiting most of the Agricultural Experiment Stations, to discuss matters relating to the increased production of beans for oil-crushing purposes and to determine whether or not the cotton seed mills were in a position to handle the crop without materially altering the machinery they use for the crushing of cotton seed or going to the expense of installing new equipment. Most of my time was spent in the States growing cotton and where cotton seed mills were already established."

Also discusses the oil-bearing properties of different varieties of soya beans (the oil content averages 19% and ranges from 16 to 25%), and the drying properties (see Exhibit No. 2). "During the past six or seven months there has been produced in this country in the neighborhood of one hundred thousand gallons of soya oil. The largest part of this quantity has been produced by the Elizabeth City Oil & Fertilizer Co., Winterville Cotton Oil Co. and the New Bern Cotton Oil & Fertilizer Mills."

Discusses prices at which soybeans should be purchased for profit in the oil industry, and opportunities for disposing of the oil and meal. The author points out the limited uses of soy bean oil in paints; in 1916 some 98,171,275 lb of soy bean oil were imported into the United States. The five samples of soybeans analyzed had an average iodine number of 125.8. But iodine value and drying power do not necessarily go hand in hand, although such is often the case.

"In those sections of the South where the cotton fields are infested by the boil weevil, the growers may find it to their advantage to produce soya beans on a large scale. The Alabama Cotton Seed Crushers' Association has the matter under careful consideration at the present time. The cotton crop of certain sections of that State has been seriously affected by the disastrous results which accompany the boil weevil.

"It is at once apparent that it is to the advantage of the cotton seed mills to take up the crushing of soya beans. In the first place it will help to give the mills a longer season and thereby shorten the period of idleness. This period generally varies from four to six months every year with different mills.

"The crushing of soya oil has advantages over cotton seed; it is a cleaner and easier material to handle preparatory to crushing, and the bean releases its oil as freely, at least, as cotton seed.

"Soya oil can be disposed of just as readily, at least, as cotton seed. The A.M. Parks Company, Philadelphia, commencing with the May issue of 'The Oil Miller,' advertise for domestic soya oil. This is the first ad to appear, and opens up what is likely to prove the most satisfactory outlet for the product of so many mills... In some cases the consumers who could handle it in tank cars would be able to deal direct with the crushers. The A.M. Parks Company was one of the first to import soya oil, and still imports it in large quantities. Two or three years ago the Company distributed an interesting pamphlet entitled 'Soya,' in which the commercial possibilities of the oil are referred to in some detail."

"While practical tests started in 1911 have not yet been completed, and the Bureau, in line with its adopted policy, does not intend to make a definite report until the investigation has been finished, the writer feels safe in stating that large quantities of soya oil will eventually be consumed in the manufacture of paint and varnish. Because of the inferior drying properties of soya oil as compared with linseed oil it cannot entirely displace linseed, and its use in connection with linseed oil will be limited to from 25 to 50 per cent., depending on the product in which it is used."

Note 1. This is the earliest English-language document seen (Nov. 1999) with the term "soya oil" in the title.

Note 2. This is the earliest document seen (Aug. 2004) that mentions the soybean variety Chiquita. Address: Special Technical Representative, Educational Bureau, Paint Manufacturers' Assoc. of the United States, Philadelphia, Pennsylvania.

389. Gagnepain, François; Lecomte, Henri. ed. 1916. Flore générale de l'Indo-Chine. Tome deuxième, fascicile 4–Légumineuses : Papilionées [General flora of Indo-China. Vol. 2:4–Legumes: Papilionoidae]. Paris: Masson et Cie, Éditeurs. See p. 398-99. [7 ref. Fre]

• ***Summary:*** The entry for *Glycine* L. begins with a botanical description of the genus, which contains two species: *Glycine Soja* and *Glycine laotica.*

For *Glycine Soja* (an annual), after the botanical description we read: More than 30 varieties are known. May derive from *G. ussuriensis,* which grows wild in China, Manchuria, etc.

Cultivated in: Tonkin, Laos, Cochin China–China, Japan, Philippines, Java, etc. etc.

Vernacular names: *Dâu nanh, Mak toua kon* or *ta tone.*

Uses: The seeds are consumed like those of the Haricot bean, or can be used to make a cheese [tofu], a condiment, or as a source of oil. The black variety is used for animal feed; the stem and leaves as forage.

Note: This nine-volume series was published under the direction of Henri Lecomte (lived 1856-1934). Address: Museum of Natural History, Paris, France.

390. Williams, Adolph A.; Dickover, Erle R. 1916. China: Dairen. *Supplement to Commerce Reports [USA] (Daily Consular and Trade Reports, Bureau of Foreign and Domestic Commerce, Department of Commerce)* No. 52c. p. 13-32. Aug. 16.

• ***Summary:*** Of the 77,153 inhabitants of Dairen, 55.0% are Chinese and 44.8% are Japanese. The remaining 0.2% are foreigners. Trading and shipping are now largely in the hands of Japanese and Chinese. "Dairen is a free port, and therefore the Japanese authorities keep no accurate record of imports and exports. But as it is also the principal seaport of southern Manchuria as well as of the Japanese Leased Territory, and is the southern terminus of the South Manchuria Railway, it is the entrance port and distributing center for a large share of the commodities going into and coming out from those parts of Manchuria lying outside the Leased Territory. Therefore the Chinese Maritime Customs maintain an office in Dairen, and it is from their returns that the accompanying tables of statistics were compiled."

"The decrease in exports to the United States [in 1914 and 1915], which was never large, was due to a depression in the bean and bean-oil trade during the early part of 1915." However, this trade has increased again (p. 15).

Although economic changes were brought about by the European War, the principal exports–"soya beans, bean oil, bean cake, corn, and coal"–still moved out steadily. A table (p. 20-21) shows the quantity and value of these commodities exported to foreign countries and to Chinese ports in both 1914 and 1915.

One section, titled "Soya-bean industry–The storage problem" (p. 27-28) begins: "The soya bean, which has been responsible for much of the prosperity of the port, sustained its reputation in 1915. In spite of loss of some European markets and the difficulties attending shipping to

others, the volume of business was large and more beans were handled at this port than ever before." "At Dairen the storage capacity of the wharves was taxed to its uttermost, and could not contain the produce arriving in a ceaseless stream.

"While beans may be stored in the open, piled up in bags and covered with tarpaulins, or in temporary ozier [osier] bins, bean cake can not be stored, as its value depends largely upon its weight, which would be affected by snow or rain; hence bean cake must be stored under cover. The railway authorities warned the bean mill union that their output should be decreased or the cake would have to be stored in the open while awaiting shipment" (p. 28).

The next section, titled "Condition of bean market" (p. 28) begins: "The large crop of rice in Japan brought down the prices of beans so that the purchasing power of the farmer and the broker was severely weakened. The large supply of beans, the rise of freight rates to more than double the usage charge, the loss of certain markets in Europe, and difficulties connected with guaranteeing delivery into the hands of neutrals, all worked against beans, as did the low price of silver and the scarcity of containers, both for beans and for oil. Beans were shipped in larger quantities than heretofore to Java, which appears as almost a new market."

The next section, titled "Mixed storage of bean cake" (p. 29) begins: "During 1915 several plans for assisting the bean trade were brought up. The mixed storage of bean cake is now an accomplished fact, while the mixed storage of beans (not in bulk, but in bags) is accepted in principle. Produce exchanges were nearly arranged for at Kaiyuan and at Changchun by the end of the year and will be opened early in 1916. The South Manchurian Railway changed its standard carload of cake to 1,000 pieces, or about 30½ tons per car for a 30-ton car.

"There are three kinds of cake on the market–mixed storage cake, rejected cake, and train cake. The first named is the best, being standard at 46 kin (61 pounds) each, while the others may be several pounds or ounces over or under the standard. In 1915 so much cake was stored that the cakes came out considerably lighter than they went in. This loss was due to the evaporation of water absorbed in the process of manufacture... Mixed storage works to the advantage of owner, buyer, and railway by facilitating the financing of owners and the making of shipments, as well as the securing of sellers and buyers. The cake put out at Dairen is the best on the market." Address: 1. Consul; 2. Vice consul. Both: Dairen, Manchuria.

391. Wolk, P.C. van der. 1916. Onderzoekingen over een onverwachte bacterieziekte in de Soja-plant, in annsluiting met een onderzoek naar het wezen der wortelknolletjes van Glycine Soja en Arachis hypogaea [Investigations on an unexpected bacterial disease in the soybean plant, in conjunction with an investigation on the nature of root nodules of Glycine Soja (soybeans) and *Arachis hypogaea* (peanuts)]. ***Cultura, Oficieel Orgaan van het Nederlandsch Genootschap voor Landbouwwetenschap (Wageningen)*** 28(336):268-85. Aug.; 28(377):300-319. Sept. [2 ref. Dut]
• ***Summary:*** The disease first appears as an etiolated condition and may result in the death of the plant. It was considered to be caused by the activities of the bacterium, *Rhizobium beijerinckii,* associated with root nodules, which are here compared with plant galls. Address: Laboratorium der Selectie- en Zaadtuinen te Buitenzorg (Bogor), Java.

392. Klinkert, Hillebrandus C. 1916. Nieuw Maleisch-Nederlandsch woordenboek met arabisch karakter. Derde verbeterde en vermeerde druk [New Malay-Dutch dictionary with Arabic characters. 3rd improved and expanded ed.]. Leiden, Netherlands: E.J. Brill. viii + 1047 p. 23 cm. [Dut; Ara]
• ***Summary:*** The soybean is mentioned under *katjang* (p. 744) and is written *k. kedelai.* It also appears under *kedelai* (p. 769). Indonesian-style miso [tauco] appears under *taötjo* (p. 247).

Also discusses: *bidjam* (sesamum indicum, p. 224). *ragi* (yeast, p. 484).

Note: This book is hard to use since the order of words follows the Malay alphabet. H.C. Klinkert lived 1829-1913. Address: Leiden [Netherlands].

393. Mann, Harold H. 1916. Fodder crops of Western India. *Bombay Department of Agriculture, Bulletin (Poona, India)* No. 77. 142 p. See p. 128-30. [4 ref]
• ***Summary:*** Section XVI titled "Soy beans" (p. 128-30) states that this plant *(Glycine soja)* has been much utilized and recommended as a fodder crop during the last few years in many parts of the world. It "is also cultivated to a very considerable extent in the hills of North-East India." It "demands a moist temperate to sub-tropical climate such as is found in the Naga hills... Hence in introducing the crop it must be remembered that it is not adapted to a very hot climate, but is rather suited to a lower temperature and less tropical conditions.

"This may account for its practical failure when grown in the rainy season in Western India It was first tried at Poona [Footnote: See Poona Experiment Farm Report, 1905-06] in 1905-06 and grown in the rains when it seemed to be unhealthy throughout its growth and only gave 331 pounds of green fodder per acre. It has been grown in small plots every year since that time, but the results have always been similar.

"In 1911-12 and succeeding years, a number of American varieties and also a Java type have been tried in various centres. At Dhulia in 1911-12 in the rains, the Java soybeans grew well, gave a large quantity of leaf, and came to maturity in three months, giving 400 pounds of grain and

2,240 pounds of stalk per acre. The American varieties (Haberlandt, Hollybrook and Medium Green) grew much shorter not higher than nine to twelve inches high, and only yielded from 280 to 415 pounds of grain and from 120 to 400 pounds of stalk per acre... At Dharwar the same varieties as at Dhulia did poorly in 1911-12."

"On alluvial soil the results at the same season were no better. At Nadiad on the light *goradu* soils of Northern Gujarat, the crop was a complete failure in the monsoon in two successive years. At Gokak, on sandy soil in the Deccan, Java soybeans went to leaf, but even then only gave a very small yield.

"So that in all our centres the crop has not been a success in the rains. On the other hand few experiments have been made with soybeans as an autumn *(rabi)* or cold weather fodder, though this is the season to which it would seem naturally adapted. In 1915, however, it has been grown on a small scale on the Kirkee Military Dairy Farm as an autumn crop, and the results, unlike those quoted above seem to show considerable promise. It was suggested as a crop to put into the land after the monsoon to improve the soil and give leguminous fodder for the cattle at that season, and has created a very favourable impression."

Page 119 states: The "conclusion was states as follows in 1914 as regards Sind: 'The ideal pulse would give repeated cuttings of good fodder in the hot weather and give a final cut for seed before being ploughed in for *rabi* crops. *Val (Dolichos lablab)* and *chavli* (or cowpea; *Vigna catjang)* followed by soybean and velvet bean seem to be the most promising up to date'" (Footnote: *"See* Reports, Larkhana and Landhi Agricultural Stations, 1913-14"). Address: D.Sc., Principal, Poona Agricultural College [India].

394. Roepke, W. 1916. Verslag over het jaar 1915/1916, betreffende de technische werkzaamheden van het Proefstation Midden-Java, uitgebracht door den Directeur [Report about the year 1915/1916, concerning the technical activities of the Central Java Experiment Station, by the Director]. *Mededeelingen van het Proefstation Midden-Java* No. 23. p. 13-29. See p. 24-25. [Dut]
• ***Summary:*** Discusses *Araecerus fasciulatus* which feeds on kedele (Soja hispida). Address: Java.

395. *Chemisch Weekblad.*1917. Algemeene vergadering de Nederlandsche Chemische Vereeniging te 's-Gravenhage op 28 December 1916 [General assembly of the Dutch Chemical Union at the Hague on 28 Dec. 1916]. 14(1):4-15. Jan. 6. [Dut]
• ***Summary:*** Includes the paper *"Ueber die Anwendung von Enzymwirkungen in der Ostasiatischen Hausindustrie* [On the application of enzymes in East Asian cottage industries"], by H.C. Prinsen Geerligs, followed by a long discussion.

396. Brenier, H. 1917. Les ressources de l'Indochine en plantes oléagineuses [Indochinese resources of oleaginous plants]. *Academie d'Agriculture de France, Comptes Rendus* 3(7):185-95. See p. 188-89. Session of 21 Feb. 1917. Index. [Fre]
• ***Summary:*** Indo-China is a colony of France. Starting in 1912, Germany imported 1,425,000 tonnes (metric tons) of oil-yielding seeds, whereas France, the chief importing country up to that time, imported only 1,219,000 tonnes in 1913, and England about 1 million tonnes. As the English oil-mills increased their capacity by about 25%, imports into England rose to 1,700,000 tonnes in 1915, but fell in 1916 to 1,400,000 tonnes–yet still exceeding French imports. Because Indo-China is a French colony, France has the greatest interest in finding in her colonies the raw materials needed by her industries. From this viewpoint, Indo-China offers France resources of the greatest importance.

I must now say a word about soya. You know what a surprise occurred around 1909 when we learned that a new oilseed was suddenly being presented in the European markets in considerable quantities, since, from the first year, Manchuria had exported 410,000 tons of soya.

At that moment, the industry in Marseilles *(Marseille),* keeping an eye on all the changes with respect to oilseeds, had attempted to procure soya; we had difficulty with customs: we did not know if it should be classified as a legume, for soya can be viewed as either a haricot-type bean or as an oilseed. While the matter was being discussed, all the available beans had been purchased by Hull, England, and Hamburg, Germany. The market was lost for us.

The analysis of soybean seeds from Cambodia proved that their oil content is superior to that of soybeans from Manchuria, although it does not exceed 18%. Since it is simultaneously a legume capable of playing a role as a soil-improving crop, it was essential to demonstrate it.

Concerning sesame (p. 190-91): It is cultivated in Tonkin and Annam, and might well be grown in Cambodge (Cambodia) and Cochin China. It gives a very high oil yield, sometimes up to 50%. Enormous quantities of sesame are cultivated in and exported from British India.

Concerning peanuts (p. 191-92): In good years, as much as 420,000 tonnes of pea-nuts are imported into Marseilles; this represents about one-third of French imports of oils and fats. Although Senegal supplies 200,000 tonnes, this amount does not nearly meet the commercial demands and its further cultivation in other French colonies is, therefore, most desirable. Light soil, indispensable to peanut cultivation, is found in Tonkin, Central Annam, Cochin China, and Cambodge. In Africa the yield is from 20 to 29 cwt. [1 cwt = hundredweight = 112 pounds], whereas in Indo-China it is as high as 39, or, in good soil, even 49 cwt. Address: Directeur général de la Chambre de Commerce de Marseille.

397. Prinsen Geerligs, H.C. 1917. Ueber die Anwendung von Enzymwirkungen in der Ostasiatischen Hausindustrie [On the application of enzymes in East Asian cottage industries]. *Zeitschrift fuer Angewandte Chemie, Wirtschaftlicher Teil* 30(3):256-57. May 8. [Ger]
• ***Summary:*** Paper read before the *Niederlaendische Chemische Vereinigung* (Dutch Chemical Union), General session in Hague, December 28, 1916.

This paper is on the domestic application of enzyme actions in Eastern countries, and describes, among other things, the making of fermented and non-fermented soybean food products. "To make soymilk *(Milchersatz),* only white soybeans are used, softened in water for 3 hours until they have swollen to 3 times their original size. Then, while water is added continuously, they are milled between two hard stones and fall through a hole in the bottom stone into a pail. A very small amount of the thin soybean slurry is set aside; through the proliferation of lactic acid bacteria it quickly becomes so sour that after several hours that lactic acid content has risen to 1.5%. The above mass is cooked in a large pan. The now pasteurized liquid is filtered through a large sieve to remove the hulls and hard pieces. The filtered milk-white liquid has, in appearance and chemical composition, the greatest similarity with animal milk. A sample contains 6.9% solids, 3.13% protein, and 1.89% fat. It gives an alkaline reaction and contains a solution of legumin bound to potassium phosphate, while the fat is emulsified in the thick protein solution. Unfortunately this soymilk *(Bohnenmilch)* tastes very much like raw French-beans *(Schneidebohnen),* so that people who are accustomed to cow's milk do not enjoy it much. But infants should be very content with it.

"If cheese is to be made from this milk, a small amount of the slurry soured with lactic acid is added to it. Thereby, the legumin (protein) is dissolved from the potassium phosphate and coagulated, then settles out with the fat with which it is emulsified. When the milk, through several hours mixing with the coagulation liquid, has become fully firm, it is packed in cloths and pressed between boards, in order to remove any excess water. Then the cakes are cut into square pieces; if they are to be eaten raw, it must be done quickly, lest they continuing souring and spoil. In order to impart a pleasant color to the cakes, they may be placed for several moments in a Curcuma [turmeric] decoction. Mostly the cakes of cheese *(Kaesekuchen)* are dried in the sun or fried *(gebraten).* They then keep better and acquire a pleasant flavor."

"Of much greater significance is the preparation of the most popular and prevalent soybean preparation, soy sauce *(der Soja),* which in East Asia is an indispensable seasoning for a variety of dishes, and is produced and used in unbelievably large quantities. There are various types, some of which contain wheat flour. But here we will consider only the type that is made [in the Dutch East Indies] with soybeans plus some added ingredients to improve the flavor. For the preparation of soy sauce, brown or black soybeans are cooked for several hours. After pouring off the cooking water, the beans are placed in flat pens / trays *(Hürden)* of woven bamboo and dried for half a day in the sun, then cooled in the shade. When they are cooled, the beans are covered with leaves of *Hibiscus tiliaceus,* a species of mallow, and they are soon covered with a layer of Aspergillus mold, which is usually found on the tiny hairs or cilia on the underside of the hibiscus leaves and so is transferred to the beans. The mold filaments or hyphae penetrate between the tough and thick cell walls, dissolve these through hydrolysis, and thus make the cell contents accessible to the influence of the molds. The mold is allowed to work until it forms spores *(Fruchtstaende).* The beans then appear to be covered with a brownish green felt. The beans are then dried in the sun and placed in a strong, cold salt solution. The mixture is placed in the sun for several days and then cooked. The brine solution, which contains the soybean extract, is poured off and the beans are cooked several more times until they have lost their salty taste. The various cooking extracts are mixed, filtered through a fine sieve, then mixed with palm sugar, aniseed *[Pimpinella anisum],* and an herb extract, which one can buy at a druggist's shop, and finally cooked until salt crystals appear. The soy sauce *(Soja),* which is now ready to use, is a dark brown, thick, very salty liquid, in which a viscous sediment forms. By thinning with water, it becomes turbid. But the solution again becomes clear with the addition of salt. This thorough investigation has shown that the mold hyphae branch out into the cell walls, hydrolyze and dissolve the pectin substances, and likewise break down the protein content of the cells to leucine, tyrosine, asparagine, and other decomposition products of legumes.

"But this action and result is of secondary importance. The main point is the dissolution of the cell walls, whereby the protein becomes free and can be dissolved in the concentrated salt solution. The composition of soy sauce, except for the salt content, is very similar to that of meat extract, so that it can completely replace meat in the largely vegetarian diets of the people of the East.

"In a similar way, various other foods are obtained, whereby a mold dissolves the cell wall and so fulfills the function otherwise accomplished by cooking. We mention here only the bean paste *(Bohnenbrei) [tao-tjo],* for the preparation of which, dehulled white soybeans are cooked and then mixed with rice flour and glutinous rice flour *(Kleereismehl).* The mixture is placed in a small basket that is lined with the same hibiscus leaves mentioned above, and the Aspergillus molds growing on the leaves are allowed to develop. This saccharifies the rice starch flour and dissolves the bean cell walls. Thereby, the mixture becomes sticky and glutinous, and tastes sweet. It is dried and placed in a pot with saltwater. There it remains until each bean is

permeated with salt and a sample tastes salty. Palm sugar is added to taste and it is ready for use without further cooking. Microscopic analysis showed that the cell walls were completely dissolved and the contents lay free, so that the mold growth had greatly improved the digestibility of the beans.

"In Java, soybeans are also cooked and made into flat cakes on a flat bamboo lattice. A small piece of an old cake is added and the mass is covered with banana leaves. One soon observes a rise in temperature and the development of moisture. The mass is penetrated by hyphae of *Rhizopus Oryzae,* which again dissolves the cell walls and frees their contents. The cake [tempeh, though the term is not mentioned] with its covering of mold, is consumed without further processing, raw or fried *(gebraten).*

Also discusses the preparation of onchom from peanut press-cake. Address: PhD, Netherlands.

398. Brill, Harvey C.; Alincastre, Cecilio. 1917. The possible maximum vitamine content of some Philippine vegetables. *Philippine J. of Science* 12A(3):127-32. May. [19 ref]
• ***Summary:*** Gives data on the nitrogen and vitamine [vitamin] content of dry soybeans (yellow or green) imported into the Philippines.

Note: This is the earliest document seen that uses the word "vitamine" (or "vitamin") in connection with soybeans, or that gives the vitamine content of soybeans or soyfoods. Address: Lab. of Organic Chemistry, Bureau of Science, Manila.

399. *Bulletin Economiqae de l'Indochine (Hanoi).*1917. L'huile de soja utilisée comme base pour la fabrication du savon [Soy oil used as a basis for the manufacturing of soap]. 20(124):268. May/June. [Fre]
• ***Sammary:*** The members of the Cottonseed Crushers Association of Louisiana, at a recent meeting in New Orleans, voted unanimously in favor of developing a soy oil industry in that state and of the scientific cooperation of the authorities of the Ministry of Agriculture. The consumption of soybean oil in America has increased considerably as a direct result of the increased demand for cottonseed oil and the resulting price rises. Cottonseed oil sells for about 11½ cents a pound, whereas the price of soy oil is about 5 cents per pound less expensive. The consumption of glycerine during the war and use of cottonseed oil as a basis for making this glycerine, have been factors in the rise of the price of cottonseeds. Address: Hanoi.

400. Bussy, L.P. de. 1917. *Lasioderma* in Deli en zijn bestrijding *[Lasioderma* in Deli and methods for controlling it]. *Mededeelingen van het Deli Proefstation te Medan (Sumatra)* 10(6):129-60. July. See p. 134, 137. [Dut]
• ***Summary:*** Discusses *Lasioderma serricorne,* its life cycle, life history and habits, environmental factors, and fumigation. This insect attacks soybeans (kedelé, soja. *Glycine soja).* Address: Medan, Sumatra.

401. Stoddard, William Leavitt. 1917. Soy: The coming bean. *Good Hoasekeeping* 65:77, 126-28. Sept. [4 ref]
• ***Summary:*** *"Good Housekeeping* asked the Department of Agriculture to tell its readers the truth about the soy bean. This article is the department's answer. In the [Good Housekeeping] Institute Kitchen new recipes and methods of using the soy bean were evolved and tested. These recipes will be found at the end of this article. A list of dealers in various sections of the country who carry a supply of soy beans will be mailed upon request accompanied by a stamped addressed envelope.

"'The soy bean, also called the soja bean, is a native of southeastern Asia, and has been extensively cultivated in Japan, China, and India since ancient times... The beans are there grown almost entirely for human food, being prepared for consumption in many different ways. Their flavor, however, does not commend them to Caucasian appetites and thus far they have found but small favor as human food in either Europe or America.' Thus declared a bulletin of the Department of Agriculture [Piper and Nielsen. 1909. Farmers' Bulletin 372] before the war. Less than three months after our entrance into the war–and the entrance of the United States as a nation for the first time into a food moderation and conservation campaign–this same authority stated that 'the soy bean has already reached a place of high economic importance in America and Europe as a foodstuff... During the past season the demand for seed by food manufacturers has resulted in greatly increased prices.' The soy is a coming bean if not *the* coming bean."

Sold in some American markets under the name Togo bean, the soy bean "now flourishes in an increasingly large acreage in Tennessee, North Carolina, Virginia, Maryland, Kentucky, and the southern parts of Illinois and Indiana. The earlier varieties even mature in Ontario [Canada] and our Northern states."

The American housewife probably does not care "that there is a factory in New York is making a 'vegetable milk' of soy beans; the "flour or meal [okara] which remains after the milk is manufactured is valuable both as a stock for feed and for human consumption; that soap manufacturers and paint manufacturers are using the oil of soy beans to replace more expensive oils; and that the substitute butter makers are using the fat of the soy bean in products which thousands of consumers are using all unwitting of its true nature.

"The thing that the American housewife wants to know today is where soy beans can be bought and what are the simplest uses of them... Probably the easiest and commonest

method of cooking soy beans is to use them either for soup or to bake them."

Eight recipes are given; all but two call for "soy beans." Soy-bean bread (containing 20% of the flour in the form of "soy-bean meal" [a full-fat soy flour]), Soy beans and rice (with "1 tablespoonful Worcestershire sauce"), Soy-bean loaf with tomato sauce, Vegetable roast (baked), Savory baked soy beans, Soy-bean soup, Soy-bean muffins (with "1 cupful cold baked soy-bean pulp"), and Salted soy beans (deep fried).

Photos show: (1) Muffins made with soy-bean meal. (2) Soy-bean meal ground at the Good Housekeeping Institute; the hand-turned mill and two small piles of soy beans are shown. (3) A dish of soy beans and rice. (4) A soy bean plant. (5) A vegetable roast with soy beans as an ingredient.

Note 1. Theodore Hymowitz writes (12 Feb. 1990): "I have no idea if William Leavitt Stoddard was related to Illinois soybean pioneer William Hoyt Stoddard. William Hoyt had one brother named Charles Lumas Stoddard."

Note 2. This is the 2nd earliest document seen concerning soybeans in connection with (but not yet in) Togo.

Note 3. This is the earliest English-language document seen that uses the term "Salted soy beans" to refer to soynuts. It is also the earliest document seen in any language describing the frying or deep-frying of whole soybeans to make soynuts. Previously soynuts had always been dry roasted.

Note 4. This is the earliest article on soy seen (Aug. 2002) in *Good Housekeeping* magazine.

402. *USDA Bureau of Plant Industry, Inventory.*1917. Seeds and plants imported by the Office of Foreign Seed and Plant Introduction during the period from July 1 to September 30, 1914. Nos. 38666 to 39308. No. 40. 110 p. Oct. 30.
• ***Summary:*** Soy bean introductions: *Soja max* (L.) Piper. Fabaceæ. *(Glycine hispida* Maxim.)

38986-38990. "From the Philippine Islands. Presented by Mr. H.R. Reed, acting superintendent, Singalong Experiment Station. Received August 7, 1914. Quoted notes by Mr. Reed.

"38990. *Soja max* (L.) Piper. Fabaceæ. Soy bean. *(Glycine hispida* Maxim.) 'A variety introduced from China. This variety was very productive of seed at the Singalong Experiment Station.'" Address: Washington, DC.

403. Scidmore, Geo. H. 1917. Japan. *Supplement to Commerce Reports [USA] (Daily Consular and Trade Reports, Bureau of Foreign and Domestic Commerce, Department of Commerce)* No. 55c. 40 p. Dec. 31.
• ***Summary:*** One "important item of import is bean-oil cake, which comes practically all from Kwangtung Province and China. These imports were valued at $17, 234,382 for 1916 and the quantity amounted to 1,727,079,733 pounds." In the table of articles imported, bean-oil cake is listed under fertilizers, and is by far the largest value. Cottonseed and rapeseed oil-cake were also imported for use as fertilizer in 1916, but the value of each was only about 4% that of bean-oil cake. Small amounts of manures and bone dust were also imported as fertilizers. Of the $2,263,504 worth of soya bean imported, 74% came from China [including Manchuria], 19% came from Kwangtung Province [controlled by Japan], and 7% came from Asiatic Russia. But of the $17,234,382 worth of bean-oil cake, 57% came from Kwangtung Province, 25% came from China, and 2% came from Asiatic Russia.

Exports of "soy" (soy sauce) from Japan were worth $491,596 in 1915 and $533,545 in 1916. Of the 1916 amount, 34% went to the United States, 26% went to Hawaii, and 13% went to Kwangtung Province. A small amount was exported to the Philippine Islands. The volume exported is not given; "soy and vinegar" are grouped together.

Within the report from Japan is a report from Kobe by Consul Robert Frazer Jr.

Note: This is the earliest document seen (Feb. 2001) concerning soybeans in the former USSR after it was established in Nov. 1917. This document contains the earliest date seen for soybeans in the USSR (1917). Address: Consul General, Yokohama.

404. Grageda, Gregorio F. 1917. Culture, selection and acclimatization of soy beans. Los Banos, Philippines, College of Agriculture. Unpublished manuscript. *
• ***Summary:*** In 1917 the author, a thesis student at the College of Agriculture, started a rigid selection of pure cultures. Out of the several varieties which he tested, two proved to be of possible future value because of their superior yields of both soybeans and forage, and also in adaptability to cropping more than once a year. Grageda made considerable initial selection and began to multiply some of the superior individual plants, thereby producing enough materials for continuing the work he started.

405. Crevost, Charles; Lemarié, Charles. 1917. Catalogue des produits de l'Indochine. 5 vols [Catalog of the products of Indochina. 5 vols.]. Hanoi: Imprimerie d'Extrême-Orient. 175 p. 29 cm. Formerly published in Bulletin Economique de l'Indochine, Vols. 25 and 26. [Fre]
• ***Summary:*** Volume 1 (published in 1917), titled *Produits Alimentaires et Plantes Fourragères (Nutritious Products and Forage Plants),* describes plants grown in Indochina and the nutritive value of each. Pages 106-09 describe "Soja–Glycine Soja," the soybean. Local names are given in Annam and Tonkin, Cambodia, China, and Japan. "The plant is widely cultivated in Indochina for its seeds, which are consumed in various forms. Soybean seeds in Indochina are typically yellowish white... It is well known that the

Japanese use the soybean to prepare a sauce named *shoyu (teou yeou* in China), as well as a *fromage de pâte* or vegetable cheese named *to fu* [tofu], or *teou fou* in Chinese. The Annamites also prepare an analogous sauce named *tuong* and a *fromage de pâte* named *dau phu* and *dau phu-ao.* Cambodia and the Indochinese province of Châu-dôc produce significant quantities of soybeans, of which a part is sent down to Saigon to be consumed or exported. There are good varieties on the high plateaus of Tonkin, especially in the province of Lang-son, whence large amounts can be obtained for export.

"The dead leaves are ordinarily burned. However some indigenous people partially burn the stems of the soybean plants, stripped of their leaves, to obtain a very fine charcoal dust or ash, which they mix with the resinous balm of *Canarium commune,* to use in making joss sticks. These are slender incense sticks burned as offerings in the pagodas and at the altars of their ancestors in their family homes." [Note: A joss house is a Chinese temple or shrine.] A large, excellent, and very detailed illustration (p. 108) shows a soybean plant, with leaves, pods, seeds, and flowers. Nutritional analyses of soybeans from Laos, Tonkin, and Manchuria are given (from other sources).

Volume 3, titled *Matières Grasses Végétales (Fats and Vegetable Matter),* includes analyses of Indochinese plants and their fat and oil contents. The contents of Vol. 3. was first published in the *Bulletin Économique de l'Indochine* 1922-1924. Pages 75-78 discuss "Soja–Soja Max (Lin.) Piper," the soybean. "Mr. Li Yu-ying, a member of the Biological Society of the Far East, has greatly contributed, following several attempts made for more than a century by naturalists and those who acclimatize plants, to popularize in France this plant of many uses. He introduced cultivation of the plant in the area around Paris and, in Paris itself, in 1908 he established a laboratory for the study of the soybean, since completed by a soyfoods factory *(l'usine de la caséo-sojaïne),* where all the products derived from this plant are manufactured: Soymilk (regular, concentrated, powdered, or fermented), tofu *(fromage de soja),* soya patés, soya casein, soy flour and bread, etc." The rest of the article is concerned mostly with characteristics, uses, and trade of soybean oil.

Crevost was born in 1858. Note: The meaning of soya casein is not clear. Address: 1. Inspecteur des Services agricoles et commerciaux; Conservateur du Musée [Maurice Long] agricole et commercial de Hanoi; 2. Ingénieur-Agronome, Directeur des Services agricoles et commerciaux du Tonkin, Lauréat de la Société nationale d'acclimatation.

406. Goot, P. van der. 1917. Het *Tephrosia* kevertje [The small *Tephrosia* beetle]. *Mededeelingen van het Proefstation Midden-Java* No. 26. 36 p. 2 plates. [4* ref. Dut]

• ***Summary:*** Pages 11-12 state that the soybean (locally named *Kedelé)* is attacked by the Tephrosia beetle *[Araecerus fasciulatus].* Address: Salatiga.

407. Merrill, Elmer Drew. 1917. An interpretation of Rumphius's Herbarium Amboinense. Manila, Philippines: Bureau of Printing. 595 p. See p. 274-75. Maps. Index. 25 cm. Also listed as Philippine Islands, Bureau of Science, Publications No. 9. [8 ref]

• ***Summary:*** Glycine Linnaeus

Glycine max (Linn.) comb nov.

*Phaseolus max* Linn. Sp. Pl. (1753) p. 725.

*Dolichos soja* Linn. Sp. Pl. (1753) p. 725.

*Soja hispida* Moench. Meth. (1794) p. 153.

*Glycine hispida* Maxim. in Bull. Acad. Pétersb. 18 (1873) p. 398.

*Glycine soja* S. & Z. in Abh. Akad. Muench. 4 (1843) p. 119.

*Glycine ussuriensis* Regel & Maack Tent. Fl. Ussur. (1861) p. 50.

*Soja max* Piper in Journ. Am. Soc. Agron. 6 (1914) p. 84.

Cadelium Rumph. Herb. Amb. 5: p. 388, *t. 140.*

"This species is not represented in our Amboina collections, but the Rumphian figure is an excellent representation of the widely cultivated and well-known soy bean. It was originally reduced by Linnaeus to *Phaseolus max,* in Stickman Herb. Amb. (1754) p. 23, Amoen. Acad. 4 (1759) p. 132, Syst. ed. 10 (1759) p. 1162, Sp. Pl. ed. 2 (1763) p. 1018, in which he was followed by Burman f., Willdenow, Persoon, Poiret, Don, and other authors. Loureiro, Fl. Cochinch. (1790) p. 441, correctly referred it to *Dolichos soja* Linn., which is a synonym of *Phaseolus max* Linn. = *Glycine max* (Linn.) Merr. By Henschel and by Pritzel it has been also correctly referred to *Soja hispida* Moench., another synonym of *Glycine max* Merr. Miguel, Fl. Ind. Bat. 1 (1855) p. 197, erroneously referred it to *Phaseolus radiatus* Linn.

*"Phaseolus max* Linn. has been considered a true *Phaseolus* and a synonym of *P. radiatus* Linn. by nearly all recent authors. It is clearly the soy bean, identical with *Glycine hispida* Maxim., and the specific name *max* should be maintained for the soy bean, whether *Glycine* or *Soja* be recognized as its generic name. Piper has declared in favor of the genus *Soja,* chiefly for the reason that of the eight species originally described by Linnaeus in *Glycine,* but a single one, *G. javanica* Linn., now remains in the genus, the other seven having been removed by subsequent authors to *Apios, Kraunhia, Abrus, Rhynchosia, Amphicarpaea,* and *Fagelia,* respectively. However, I am content to determine the type of the genus *Glycine* by elimination, which well [sic, will?] maintain *Glycine* in its generally accepted sense with *G javanica* Linn. as its type.

"Prof. C.V. Piper has cleared up the synonymy of this commonly cultivated species; and with the aid of extensive data, supplied by Sir David Prain, he has clearly shown that *Phaseolus max* Linn. is identical with the commonly cultivated and well-known soy bean."

The section titled "Rumphius and his work" (p. 15-21) gives a brief biography of this pioneering naturalist. "George Everhard Rumphius, as the family name Rumpf or Rumph is Latinized, well named 'the Pliny of the Indies,' was born in 1627, apparently in Hanau, Hesse Cassel, Germany, and died in Amboina, June 15, 1702, at the age of 75 years. Detailed accounts of his life and work are available in the writings of numerous authors so that it is unnecessary to enumerate here more tban the most important facts in connection with the preparation and publication of his most renowned work, the Herbarium Amboinense.

"Rumphius entered the service of the Dutch East India Company as a young man, proceeded to Batavia, Java, in 1653, and in the latter part of the same year to Amboina, where he resided for the remainder of his life... It is evident that he commenced the preparation of the Herbarium Amboinense shortly after his arrival in Ambonia, his active work being continued practically until his death, in spite of the great handicap of blindness after the year 1670... His published works are manifestly based largely on observations made by him between 1653 and 1670. The handicap of blindness was somewhat lessened by aid given him by his wife and by assistants assigned to him by the Dutch East India Company... In the following year, however, his wife and eldest child were killed in the great earthquake of that year, and subsequent to that date he had less other assistance, some of it of little real value. The original illustrations for the Herbarium Amboinense were apparently made by Rumphius himself, but on January 11, 1687, Amboina was visited by a disastrous fire, in which Rumphius's house was destroyed, including his library, many of his manuscripts, and the plates of the Herbarium Amboinense. Undaunted by this last catastrophe, he replaced the destroyed illustrations by new drawings, some made by his son, P.A. Rumphius, others made by various assistants supplied by the East India Company. Thus in attempting to interpret Rumphian species the fact must be constantly kept in mind that the illustrations were not made from the actual specimens on which the corresponding descriptions were based."

"In 1690 the manuscript of the first six books was delivered to the Dutch East India company, the remaining parts being delivered in 1695. The manuscript of the first six books was forwarded to Holland from Batavia, Java, in 1692 on the *Waterland.* This ship was destroyed by the French in transit, and the manuscript was lost with the ship. Fortunately a copy had been retained, and thus the fruit of Rumphius's many years of labor was not lost. A copy of these six books was finally sent to Holland in 1696, the manuscript of the remaining six books was sent the following year. The manuscript of the 'Auctuarium,' completed by Rumphius in 1701, a few months before his death was copied at Batavia and sent to Holland in 1704. This important manuscript remained in the archives of the Dutch East India Company until 1736, when the company granted permission to Professor J. Burman to prepare it for printing, the six volumes appearing between 1741 and 1750 and volume seven, the 'Auctuarium,' in 1755."

The section titled *"Psophocarpus*–Necker" (p. 286) discusses *"Psophocarpus tetragonolobus* (Linn.) DC Prodr. [De Candolle, Prodromus] 2 (1825) p. 403. *Dolichos tetragonolobus* Linn. in Stickman Herb. Amb. (1754) 23, Amoen. Acad. 4 (1759) 132, Syst. ed. 10 (1759) 1162, Sp. Pl. ed. 2 (1763) 1020 (type!).

*"Botor tetragonoloba* O. Kuntze Rev. Gen. Pl. 1 (1891) 162.

*"Lobus quadrangularis* Rumph. Herb. Amb. 5: 374, t. 133. This well-known species [the winged bean] is not represented in our Amboina collections, but is doubtless still cultivated there as it is in most parts of the Indo-Malayan region. Tbe Rumphian figure and description are the whole basis of *Dolichos tetragonolobus* Linn., and it has been consistently cited by all authors under that name or its modern equivalent. *Psophocarpus tetragonolobus* DC."

Note 1. This work first gave the soybean its present scientific name, *Glycine max* (L.) Merrill. Merrill was an American who was Dean of the University of California College of Agriculture, Berkeley, during the late 1920s.

Note 2. This is the earliest document seen (Aug. 2003) in which the winged bean has the species name *tetragonoloba,* or the scientific name *Botor tetragonoloba.*

408. Roepke, W. 1917. Verslag over het jaar 1916/17, betreffende de technische werkzaamheden van het Proefstation Midden-Java, uitgebracht door den Directeur [Report about the year 1916/17, concerning the technical activities of the Central Java Experiment Station, by the Director]. *Mededeelingen van het Proefstation Midden-Java (Batavia)* No. 28. p. 10-33. See p. 30. [Dut]
• ***Summary:*** Discusses *Pachymerus chinensis* (now named *Callosobruchus chinensis),* which is known to feed on soybeans (kedelé or *Glycine soja).* Address: Java.

409. Saccardo, Pier Andrea. 1917. Notae mycologieae. Series XXIII. Fungi Philippinenses a cl. Prof. C.F. Baker collecti et communicati [Notes on mycology. Series 23. Fungi of the Philippines collected and communicated by Prof. C.F. Baker]. *Atti della Accademia Scientifica Veneto-Trentino-Istriana* 10:57-94. 3rd Series. [Ita]
• ***Summary:*** Includes a technical description of *Trotteria venturioides* n. sp. found on "Glycines (Soja) hispidae" at Los Baños, Philippines, in Sept. 1915.

Note: The title pages states that volume 10, for the years 1917, 1918, and 1919, was published in 1919. Address: Baker: Prof. of Agronomy at the School of Agriculture at Los Baños, Philippines. Also director of the Singapore botanical garden (Malacca).

410. Hall, C.J.J. van. 1918. Ziekten en plagen der cultuurgewasen in Nederlandsch-Indië in 1917 [Diseases and pests of cultivated plants in the Dutch East Indies in 1917]. *Mededelingen van het Laboratorium voor Plantenziekten (Indonesia)* No. 33. 42 p. Jan. See p. 15. [Dut]

• ***Summary:*** The section titled "Soybeans" *(Kedelee)* contains three entries: (1) Residency of Yogyakarta and Surakarta *(Residentie Djoejakarta en Soerakarta):* In the residency of Yogyakarta [Pron: Jogjakarta], the soybean was injured by the bean-borer *(Agromyza)* and by caterpillars. (2) Residency of Rembang: The soybean plant was injured by lots of rain, just like the tobacco plant. (3) Residency of Kediri: The soybean suffered much injury from the rains and was injured by the bean-borer *(Agromyza)*

Also mentions *Ophiomyia.* The introduction states that owing to the wet east monsoon [dry season] of 1916 and the prolonged rains during the west monsoon of 1917, insect injury was less than in previous years.

Note: As of 2003, the first two residencies are in the Indonesian province of Central Java, and the last is in East Java. Address: Dr., Institut voor Plantenziekten en Cultures, Departement van Landbouw, Nijverheid en Handel [Dutch East Indies].

411. Howell, E.V. 1918. Soy beans and soy bean oil. *J. of the American Pharmaceutical Association* 7(2):159-63. Feb. [14 ref]

• ***Summary:*** "This bean is a native of southeastern Asia. It is at present the most important legume grown in China and Japan, where it is grown almost exclusively for human food. It has been cultivated from a remote period, each district having its own distinct variety, some two hundred kinds in all... The bean was introduced into England in 1790. Apparently the first mention of soy beans in American literature was in the *New England Farmer,* October 23, 1829, in an article by Thomas Nuttall." There follows a summary of this article and several other early U.S. documents that mention the soy bean.

"Importance: I think the soy bean is the most important plant introduced into the South within a hundred years. This opinion is based on the range of the plant, the value as a soil improver, and the numerous uses of the seed and oil, together with the fact that the present cottonseed oil mills can produce the oil with practically no change in machinery and thus double their mill season. The beans can be stored, as they are practically immune to insects. Especial emphasis is placed on this statement in the present demand for food on account of the war. In Japan the bean forms one of the most important articles of food, by nature a meat, to go with the starch of rice. The Chinese make from the beans a cheese resembling our own cheese, while the Japanese make the well-known sauce for rice or fish, soy or suey sauce. It is one of the principal ingredients in 'Tofu' (bean curd), natto (steamed beans), and white and brown miso, which is like our molasses brown bread."

"A factory for the production of this [soy] milk has recently been established in America. This can be used in cooking, by bakers, confectioners, and chocolate manufacturers. I have before me the following food articles in which soy bean meal is the principal ingredient: Egg substitute No. 1, egg substitute No. 2, colored cocoanuts, coffee substitute, cocoa substitute, roasted malted nuts, coloring curry powder, cutlet powder, soy and navy beans with pork, the equal of any pork and beans.

"The use of the soy meal for soups, for proportional use in muffins, cookies, fritters, croquettes, biscuit, and loaf bread is unlimited. Its use is checked only by our prejudice for certain customary flavors, just as northern people and Europeans do not use corn meal. In other words, North Carolina, if forced to by war conditions, could largely exist on the soy beans crushed in the State this year, including the imported and native beans crushed, the oil from which I estimate to yield this year 400,000 gallons. This oil can be used for frying, and for a salad oil in French dressing or in mayonnaise. I fried a partridge in the crude unrefined oil, and found it delicious.

"While the chief use, so far, of the oil has been for soaps and paints, the particular object of this paper has been to call attention to the use of soy oil in pharmaceutical preparations."

Tables show: (1) The specific gravity, saponification value, and iodine for three samples of Manchurian soy oil purchased in New York. (2) The chemical composition of soy bean meal (8.77% fat), compared with the meal of five other seeds (including cottonseed, linseed {old and new process}, decorticated peanut, and sunflower seed). (3) Four chemical constants of seven samples of domestic and imported soy oils (from L.P. Nemzek). (4) The food values (nutritional composition) of soy beans and six other foods, including lean beef, milk, and eggs.

Because of World War I: "During the past six or seven months there has been produced in this country in the neighborhood of one hundred thousand gallons of soy oil. The largest part of this quantity has been produced in North Carolina by the Elizabeth City Oil & Fertilizer Co., Winterville Cotton Oil Co., and the New Bern Cotton Oil & Fertilizer Mills. Samples from the different crushings have been examined in comparison with the imported oil."

"Medicinal use: In England a diabetic biscuit is manufactured. In this country an infant's food from the soy

bean is on the market. The enzyme in the bean is also attracting attention and opening a field for investigation."

Note 1. This paper was presented at the Scientific Section, American Pharmaceutical Assoc., Indianapolis meeting, 1917.

Note 2. This is the earliest English-language document seen (Oct. 2008) that contains the word "crushings."

412. Layosa y Makalindong, Pedro. 1918. Field tests of soy beans. *Philippine Agriculturist* 6(10):276-91. June. Based on his thesis, College of Agriculture, No. 92. [8 ref]

• ***Summary:*** "Of the leguminous crops in the Philippines the soy bean is the only one of which the finished products are used. These finished products, the most important of which are the [salt pickled] soy bean curd *(tahuri)* and soy bean sauce *(toyo)* have been long known all over the islands. In spite of this evidence of its economic importance, the crop has been given but very little attention by Filipino farmers."

The field tests were carried out in the Philippines. The author mentions that soy beans are used in China, Japan, and other countries as a substitute for meat.

The author has carried on the breeding work with soybeans begun by Maceda in the Philippines to determine their commercial value and to find the varieties best suited for the rainy and the dry seasons, respectively. It was found that the selections from the variety Kedilcie Wit grown during the rainy season and strains from Ami's bean grown during the dry season produced the highest yields. Address: Philippines.

413. *Gardens' Bulletin, Straits Settlements (The) [Singapore].*1918. Soy bean. 2(1):12. July 4.

• ***Summary:*** "The Soy bean is of enormous importance in Japan, Manchuria and China; and thence a great feature in world commerce. It is now being extensively planted in the United States. It has been said that it could not be grown in the Tropics, and some first trials of it in the Philippines a few years ago led to statements that it could not be successfully grown there. However this was merely a case of the wrong variety for the season in which the planting was done; for there are many distinct varieties of Soy of quite different possibilities; and more comprehensive trials in the Philippine islands developed the fact that certain varieties were suited only to the wet season, others only to a drier period, and some were heavier yielders of hay, others of grain, and so on, it now being recognized that soy is a practicable crop for the country.

"Three varieties were brought to Singapore from the Philippines. Two did not germinate. The third gave but few plants, but these grew well and are now setting pods. Great care should be taken to continue and develop this culture* since out of it may arise a real asset to the country. Comprehensive trials of all the plant in furnishing direct food for man and beast is but a part of its value, since its secondary products are used the world over. Vast quantities of the famous soy sauce** are consumed yearly in all parts of the world, while bean curds [probably tofu] and oil from this source are well known.

Footnotes: "* The second crop of Soy bean was for some unknown reason a complete failure. E.H.M. ** Basis also for one of the best known English [British] table sauces" [Worcestershire sauce].

Note 1. This is the earliest document seen (May 2010) concerning cultivation of soybeans in Singapore. This document contains the earliest date seen for the cultivation of soybeans in Singapore (1918). Address: Singapore.

414. Morse, W.J. 1918. The soy bean: Its culture and uses. *USDA Farmers' Bulletin* No. 973. 32 p. July. Superseded by Farmers' Bulletin 1520. [27 ref]

• ***Summary:*** Contents: Summary. Commercial importance. Climatic adaptations. Soil requirements. Preparation of the seed bed. Fertilizers. Inoculation. Time of planting. Depth of planting. Rate of seeding. Method of seeding. Cultivation. Varieties: Barchet, Biloxi, Black Eyebrow, Chiquita, Early Brown, Elton, Guelph ("also known as Medium Green, Early Green, Medium Early Green, and Large Medium"), Haberlandt, Hahto, Hollybrook, Ito San ("has been known under the names of Japan Pea, Yellow, Medium Yellow, Dwarf Yellow, Early Yellow, Early White, and Coffee Berry"), Lexington, Mammoth, Manchu, Medium Yellow ("has been grown under the names Early Yellow, Mongol, Banner, and Roosevelt"), Mikado, Peking ("In variety tests the Peking, Sable, and Royal varieties appear to be identical, and it is quite evident that the latter two are selections from the Peking."), Shanghai ("has been grown in North Carolina under the name of Tarheel Black"), Tokyo, Virginia, Wilson-Five [black seeded], Yokotenn [Yokoten].

Soy beans in rotations. Soy beans in mixtures: With cowpeas, corn, sorghums, or Sudan grass. Soy beans for seed: Yields of seed, feeding value, for human food, for oil and meal, viability of soy-bean seed, cost of production, soy-bean straw. Soy beans for hay: Time of cutting, curing soy-bean hay, feeding value of soy-bean hay, yields of soy-bean hay. Soy beans for soiling. Soy beans for pasture. Soy beans for ensilage. Soy beans for soil improvement. Enemies of the soy bean: Rabbits, root-knot caused by a nematode, cowpea wilt due to a Fusarium, caterpillars, and black blister beetles.

"Commercial importance: The soy bean, also called the soya bean, the soja bean, and in North Carolina the stock pea, is an annual leguminous plant, a native of southeastern Asia. It has been cultivated in China, India, and Japan for more than 5,000 years and in extent of use and value is the most important legume now grown in these countries."

"The soy bean was introduced into the United States as early as 1804, but it is only during the last decade that it has

become a crop of much importance. At the present time it is most largely grown for forage. In many sections, especially southward and in some parts of the corn belt, a very profitable industry has developed from that growing of seed. During the past few years the acreage has increased to a very considerable extent. The large yield of seed, the excellent quality of forage, the ease of growing and harvesting the crop, its freedom from insect enemies and plant diseases, and the possibilities of the seed for the production of oil and meal and as a food all tend to give this crop a high potential importance and assure its greater agricultural development in America" (p. 3).

Concerning the variety Hahto (p. 14): "This variety recently introduced from Japan is a large producer of seed and forage, and the seeds when from three-fourths to full grown make an excellent green vegetable, similar to the Lima or butter bean. Plants stout, erect, maturing in about 135 days; pubescence tawny; flowers purple; seeds olive yellow, with a black seed scar, much flattened, very large, about 75,000 to the bushel; oil, 14.8%; protein, 40.6%." Note 1. This is the earliest English-language document seen (May 2003) that uses the term "butter bean" to refer to the lima bean.

Uses for human food (p. 22-23): "Until 1916 the soy bean had been used but little in the United States for food and only as a special diet for persons [diabetics] requiring foods of a low starch content. Much interest has been shown during the last two years in the possibilities of the soy bean for food. The United States Department of Agriculture and many schools of cookery and domestic science have conducted successful experiments in utilizing the dried beans in the manner of the navy bean and the green beans when three-fourths grown to full grown as a green-vegetable bean. The variety and palatability of the forms in which the bean can be served make it a very desirable article of food, and undoubtedly it will grow in favor as it becomes better known. Soy-bean meal or flour may be used as a constituent of bread and muffins and in pastry."

Photos show: (1) A man standing in a field of soy beans (front cover). (2) A typical mature soy-bean plant (p. 4). (3) Roots of a soy-bean plant with abundant development of nodules (p. 7). (4) A field of the Black Eyebrow variety of soy beans in South Dakota (p. 14). (5) Plats of the Mammoth and Virginia varieties of soy beans at Arlington Farm, Virginia (p. 15). (6) A man standing in a field of the Peking variety of soy beans grown in 24-inch rows (p. 16). (7) A field of soy beans and corn grown for ensilage (p. 17). (8) A field of soy bean and Sudan grass grown in mixture for hay (p. 22). (9) Opened pods of Hahto variety soy beans on a plate, showing the large seeds (p. 23). (10) Soy-bean hay on frames (p. 25).

A diagram (p. 5) shows 67 different ways in which soy bean plants and seeds are utilized. The plants are used for green manure, forage (hay, ensilage, soiling), and pasture. The seeds are used to make oil, meal, and food products. The oil is used to make various non-food industrial products (glycerin, explosives, enamels, varnish, waterproof goods, linoleum, paints, soap stock {for hard or soft soaps}, celluloid, rubber substitute, printing inks, lighting oil {illuminants}, and lubricating oil), and four food products (butter substitute, lard substitutes, edible oils, and salad oils). Food products include dried beans and green beans. From dried beans are made soy sauce, boiled beans, baked beans, soups, coffee substitute, roasted beans, breakfast foods, and vegetable milk (from which is made soy cheese {fresh, dried, smoked, or fermented}, condensed milk, fresh milk, confections, and casein). The green beans are used as green vegetables, canned, or in salads.

An outline map of the United States (p. 6) shows the areas to which the soy bean is especially adapted, as to varieties and purpose. The eastern half of the country is divided horizontally into 3 zones: Southern, for later and larger varieties for seed production; Central, for medium and medium-late varieties for seed and the same varieties and later varieties for forage; Northern (the line runs through central Ohio, Indiana, and Illinois, and southern Iowa) for very early varieties for grain production and the medium and medium-late varieties for forage and ensilage.

Note 2. This is the earliest document seen (Aug. 2004) that mentions the soybean varieties Hahto, Yokoten, or Wilson-Five.

Note 3. This is the earliest document seen (June 2009) that describes a vegetable-type soybean variety (Hahto), or says that a specific variety makes an excellent "green vegetable."

Note 4. This is the earliest English-language document seen (June 2009) that contains the term "green-vegetable bean." Address: Scientific Asst., Forage-Crop Investigations, USDA Bureau of Plant Industry, Washington, DC.

415. Reinking, Otto A. 1918. Philippine economic-plant diseases. *Philippine J. of Science* 13A(4):165-274. July. See p. 204-08.

• ***Summary:*** Discusses the following diseases on soy bean (also called Soja; *Glycine max* (Linn.) Merr. *(Glycine hispida* Maxim.)), giving symptoms, description of the causal organism, and control of each: Black mildew caused by *Trotteria venturioides.* Blight caused by *Rhizoctonia;* also observed on African peanuts *(Voandzeia subterranea).* Downy mildew caused by *Peronospora trifoliorum.* Rust caused by *Uromyces sojae* Sydow. Illustrations show each of the microorganisms.

Concerning rust: "Symptoms.–Frequently soy beans may be severely attacked by this rust fungus. Characteristic brown rust sori are scattered thickly on the under surface of the leaves. Spots are at first circular, raised brown blisters, but later burst open, exposing the spores. The upper surface

of diseased leaves is yellowed above the sori on the lower surface. Causal organism.–Irregular, short, spiny brown uredospores are produced in the rust sori." Fig. 19 (magnified 315 times) shows six of these uredospores. "Control.–Crop rotation should be practiced."

Note: This is the earliest document seen (April 2005) which states clearly that soybean rust (later named *Phakopsora pachyrhizi)* was found on the cultivated soybean *(Glycine max).* Address: College of Agriculture, Los Baños, Philippines.

416. Otanes y Quesales, Faustino. 1918. The bean fly. *Philippine Agriculturist* 7(1):2-31. Aug. Plus 5 plates on unnumbered pages at end. Based on his thesis for graduation from the College of Agriculture, No. 93. [6 ref]
• ***Summary:*** This insect belongs to the order Diptera, family Agromyzidae. Some other species have been reported to cause great economic damage. An entomologist in Java has reported that *Agromyza sojae* Zehnt. occasionally causes considerable damage to *Soja, Vigna,* and *Phaseolus* by boring into the stem.

The bean fly in the Philippines is a new species, *Agromyza destructor* Malloch. It was named and described by J.R. Malloch in 1916 from specimens sent to him from the Philippines. Tables (pages 7 and 9) indicate that more than 900 soy bean plants grown in 1916 seemed to be immune from the attacks of this insect, which is most destructive to kidney beans and cowpeas. *Psophocarpus tetragonolobus (calamismis)* is also immune. Discusses *Agromyza, Eurytoma, Melanagromyza sojae, Ophiomyia phaseoli,* in the Philippines and Java. Tables summarize experimental data on beans and infestation by bean flies. Three plates of illustrations show the anatomy and stages in the life of the bean fly. Two photos show its damage to plants. Address: College of Agriculture, Los Baños, Laguna, Philippines.

417. *Christian Science Monitor.*1918. Welcoming the soy bean. Sept. 13. p. 10.
• ***Summary:*** In the section titled "Fashions and the household" we read: "The soy bean is a native of Asia; it is found in Japan, China, the Molucca Islands, and in India. It is said that the products of the bean, rather than the bean itself, are generally eaten in these countries. In China, a popular sauce [soy sauce], usually served with rice, is made from it. Here are some recipes for the use of this bean, given out by the Food Administration of the United States, with the suggestion that it may be used largely in the place of meat:" Recipes are given for: Black soy bean soup (with "1 pint black soy beans"). Cream soy bean soup (with "1 cup of green or yellow soy beans... Soak the beans 12 hours, cook in water 4 hours or until tender, then rub through sieve"). Yellow soy bean soufflé (with "1 cup of yellow soy beans"). Baked soy beans. Soy bean cup cakes (with "3/4 cup of soy bean meal").

418. *Bulletin Economique de l'Indochine (Hanoi).*1918. L'emploi de l'huile de soja dans la fabrication des couleurs [Use of soy oil in the manufacture of paints (Abstract)]. 20(132):992-93. Sept/Oct. [Fre]
• ***Summary:*** A French-language summary of the following French-language article: *L'Exportateur francais* (Paris). 1918. "L'emploi de l'huile de soya dans la fabrication des couleurs" [Use of soy oil in the manufacture of paints]. No. 87. p. 39. March 28. Address: Hanoi.

419. Winkler, Gustav. 1918. Die Sojabohne: Aus einem Vortrage... gehalten in der Hauptversammlung der Gartenbau-Gesellschaft Frankfurt a.M. am 17. April 1914. Zweite Auflage [The soybean: From a lecture... presented at the main meeting of the Gardening Society of Frankfurt am Main, on 17 April 1914. 2nd ed.]. Mainkur bei Frankfurt am Main, Germany: Published by the author. ii + 28 p. Illust. 22 cm. [4 ref. Ger]
• ***Summary:*** On the cover: "Die Sojabohne der Mandschurei [The soybean of Manchuria]. Much of this lecture (as stated on the title page) was based the following English-language article, translated into German by Werner Winkler (Gustav's son) in 1913: Shaw, Norman. 1911. "The soya bean of Manchuria." *Shanghai, Statistical Department, Inspectorate General of Customs. China Imperial Maritime Customs. II. Special Series* No. 31. 32 p.

Contents: A 2-page insert at the front. Photos show: (1) The author (with a large white beard and moustache) with a many-branched soybean plant, stripped of its leaves, mounted on a 2 x 3 foot wooden board, from his beanfield *(Winklers Bohnenfeld)* at Mainkur. This one plant grew from May 10 to Oct. 15, 6 months, producing 242 pods containing 503 completely mature soybeans. This line was acclimatized for 6 years and cultivated in the soil for 5 years. (2) The author standing and holding (with the roots facing upward) one soybean plant in each hand. In his right hand is an acclimatized soybean which produced 58 beans in 100 days. In his left hand is a plant grown from Chinese seeds of 1912-13 which produced 224 flowers and no seeds in 100 days. (3) A many-branched soybean plant, stripped of its leaves, from Winkler's beanfield, affixed to a board. Grown from Chinese seeds harvested in 1911/12. It grew from 15 May 1917 until Oct. 1, five months. 105 pods produced about 250 completely mature soybeans. From seeds that were not yet acclimatized grown on cultivated soil. (4) A similar looking plant from Winkler's beanfield. Grown from Chinese seeds harvested in 1911/12. It grew from 15 May 1918 until Oct. 15, five months. 160 pods produced about 350 soybeans. The seeds were not yet completely ripe because of bad, raw weather in 1918.

Foreword to the 2nd edition. Introduction. Diagram in the shape of a rhombus / diamond, showing how the various colored soybeans change from one color into another (adapted from Shaw 1911, p. 2). Description of the diagram: Discusses: (1) Ball, Carleton R. 1907. "Soy bean varieties." *USDA Bureau of Plant Industry, Bulletin* No. 98. 30 p. + 5 plates. May 27. (2) Hosie, Alexander. 1910. *Manchuria: Its People, Resources, and Recent History.* London: Methuen & Co. xii + 293 p. Hosie describes 3 types of soybeans: Yellow, with 3 subvarieites. Green, with 2 subvarieites. Black, with 3 subvarieites.

The rest of the contents is fairly similar to that of the 1st edition (1914), but the details within many sections are greatly expanded. On the rear cover is a photo of two soybean plants attached to a board, one month after planting the seed, Summer 1917; 15 May to 15 June. In the Supplement (p. 26-28), the author summarizes the results of his 8 years of soybean cultivation in Frankfurt; he concludes that it can be grown with good results in southern Germany. Frankfurt am Main is about midway between the northern and southern tips of Germany. Address: Mainkur bei Frankfurt am Main, Germany.

420. *International Institute of Agriculture, Bureau of Statistics (Rome), Review.* 1918. International trade in concentrated cattle foods. No. 4. 72 p. Nov. [1 ref]

• ***Summary:*** This is the IIA's fourth review on concentrated cattle foods. "The first three reviews were published in the *International Review of the Science and Practice of Agriculture,* in the numbers of April 1915, 1916, and 1917." This publication is divided into six chapters. In Chapter 4, titled "Oil seeds and oilcake" the section on "Soya beans and soya cake" contains statistics on three subjects: Production, trade, and prices. Tables show: (1) "Produce in soya cake in the importing countries (estimated on the basis of the quantities of soya beans available) (p. 51). Figures are given in quintals for the years 1913-1917 for the following countries: Denmark, Great Britain and Ireland, Netherlands, Russia (including Asiatic provinces), China, Formosa, Japan, Dutch India (Java and Madura), and New Zealand. The top 3 countries in 1917 are: Japan 727,418. Denmark 284,000, and Great Britain and Ireland 223,969. However in 1915 Great Britain and Ireland produced 1,513,059. Note: 1 quintal = 100 kg.

(2) "Foreign trade in soya cake" (p. 51). Statistics are given in quintals for the years 1913-1917. Import figures are given for Denmark, Canada (incl. soya beans), Formosa, and Japan. Japan was by far the biggest importer, with 9,912,850 quintals in 1917. Export figures are given for Denmark, Great Britain, and China. China was by far the biggest exporter with 7,034,459 quintals in 1916.

Canadian imports of soya cake (including soya beans) was as follows (in quintals) for each financial year (p. 51): 2.345 in 1913. 2.412 in 1914. 1.121 in 1915. 1.358 in 1916. 4.730 in 1917. Note: This is the earliest document seen (Jan. 2010) that gives Canadian trade statistics for soybeans or soy products. This document contains the earliest date seen (1913) for trade of such products to or from Canada.

(3) "Foreign trade in soya beans" (p. 51). Statistics are given in quintals for the years 1913-1917. Import figures are given for Denmark, Great Britain and Ireland, Netherlands, Russia (incl. Asiatic provinces), Sweden, Formosa, Japan, and Dutch India (both Java and Madura, and Other possessions). The biggest importers in 1917 were: Japan 841,942, and Great Britain and Ireland 254,510. Export figures are given for Netherlands, China, Formosa, and Japan. China was by far the biggest exporter with 5,315,324 quintals in 1916.

(4) Foreign trade in sundry and unspecified oilcakes (p. 62). Gives imports statistics for soya cake by Roumania [Romania]: 79,378 quintals in 1913, 36,650 quintals in 1914, 5,554 quintals in 1915. Gives export statistics for soya cake by Russia: 54 quintals in 1913.

(5) "Prices of sundry oilcakes at the close of each week" (p. 55-56). For soya cake, the prices are given at Copenhagen, Denmark, for 1917 and 1918 in gold francs. The price rose by about 41% between Jan. 1917 and Jan. 1918 from 46.47 to 62.16 gold francs.

(6) "Other vegetable products" (p. 71). In 1913 Denmark exported 1,390 quintals of soya meal.

This document also contains extensive information on groundnuts and groundnut cake, sesamum and sesamum cake, etc.

Note 1. This is the earliest English-language document seen (Aug. 2000) that contains the word "oilcakes." Note 2. This is the earliest English-language document seen (Jan. 2001) that uses the word "quintals" (or "quintal") in connection with soybeans. Address: Rome, Italy.

421. *Commerce Reports [USA] (Daily Consular and Trade Reports, Bureau of Foreign and Domestic Commerce, Department of Commerce).* 1918. The Dutch East Indies as a market for American goods. 21(282):838-42. Dec. 2.

• ***Summary:*** The section titled "Industrial development offers machinery market" states (p. 841): "The vegetable oil industry has developed into one of the most important industries in the [Dutch] colonies in the past 10 years. Started in an almost primitive way in 1907, the two oil mills of the Van Heel Co. imported modern hydraulic presses from Europe in 1910 with such success that the industry experienced a quick expansion. There are now 20 oil mills with hydraulic machinery in the archipelago, with a joint crush of 135,000 tons of copra, besides a great number of native hand presses. Up to the present time the oil has been marketed almost exclusively in the islands, but both the oil and the cake are now being exported. Besides copra, peanuts, kapok seeds, castor seeds, sesamum seeds, and soya beans are being crushed."

"Besides copra, Java produces 10,000 tons of peanuts a year,... 68,730 tons of soya beans, practically none of which are crushed at present; and about 2,500 tons of sesamum seeds, all but a few tons of which are consumed or exported without crushing."

422. Streefland, B. 1918. De oleinindustrie (Plantaardige) in Nederlandsch-Indie [The vegetable oil industry in the Netherlands Indies]. *Mededeelingen van de Commissie van Fabricksnijverheid in Nederlandse-Indie (Buitenzorg/ Bogor)* No. 4. p. 54. [Dut]*

423. Congrès d'Agriculture Coloniale, 21-25 Mai 1918. Compte rendu des travaux. 4 vols. [Congress of colonial agriculture, 21-25 May 1918. Conference proceedings. 4 vols.]. 1918. Paris: Augustin Challamel (Libraire Maritime et Coloniale). [Fre]

• ***Summary:*** The four volumes (published under the direction of Mr. J. Chailley, president of the congress) are: (1) General Report *(Rapport Géneral),* 574 p. (2) Section on oil-bearing materials *(Section de Oléagineux),* 639 p. Contents of Vol. 2. Africa: A. French West Africa. Senegal, Upper-Niger-Senegal, French Guinea, Ivory Coast, Dahomey. B. French Equatorial Africa: Gabon, Middle Congo *(Moyen-Congo),* Oubangi-Chari, Chad, Cameroon, Belgian Congo. C. Madagascar and dependencies (Mayotte, Comoros). Asia: D. India and French establishments in India (Pondicherry). E. Indochina: Cochin China, Tonkin. Oceania: F. Oceania and the New Hebrides. Mediterranean Region: Morocco, North Africa, Tunisia. United States (cotton). Various papers were presented concerning each country or region.

(3) Coffee, cacao, sugar cane, rice, tea, tobacco, rubber, cotton, silks *(Café, cacao, canne à sucre, riz, thé, tabac, caoutchouc, coton, soies),* 568 p. (4) Indigenous agriculture *(Agriculture indigène),* 726 p.

Many of the papers in these volumes, especially those about peanuts in Africa, are each cited separately. There are several references to the soybean (See Roux 1918).

424. Crevost, Charles. 1918. Matières alimentaires du Tonkin [Food of Tonkin]. Hanoi-Haiphong: Imprimerie d'Extrême-Orient. 17 p. 27 cm. Série Hanoi No. 2. Gouvernement Général de l'Indochine. [ soy ref. Fre]

• ***Summary:*** In these notes, which form a complement to the *Catalogue des produits de l'Indochine,* Vol. 1, *Produits Alimentaires...,* the author reports on the food peculiar to Tonkin which are suitable for consumption in France.

In section I, titled "Vegetable Foods," one of these foods is "Soya" *(Soja).* We read: The annual production of soybeans in Tonkin can be estimated at about 1,000 tonnes (metric tons). This figure does not indicate the amount that is sold off the farm, for the population consumes a great deal of it. On the other hand, the demand from Chinese merchants is always rather active and that which is not consumed is sent to Hongkong.

Our best types *(sortes)* of soybeans come from Cambodia and, in Tonkin, from the region of Lang-son. The price in Tonkin is from 8 to 9 piastres per 100 kg.

The next subsection, titled "Cereal crops of Yunnan" (p. 3) mentions *Soja,* which is harvested in about September or October.

Another food is Kondzu [Kudzu] whose "tubers are made into starch." Also discusses peanut oil, sesame oil, and coconut oil (p. 12-13).

Note 1. Charles Crevost was born in 1858.

Note 2. This is the earliest document seen (May 2010) that gives soybean production or area statistics for today's Vietnam, or for any country in Southeast Asia other than Indonesia.

Note 3. The publisher is also cited as: In: Congrès d'Agriculture Coloniale, Gouvernement Générale de l'Indochine. Series No. 2. Hanoi-Haiphong. Address: Inspector of the Agricultural and Commercial Services; Curator of the Agricultural and Commercial Museum (Inspecteur des Services Agricoles et Commerciaux; Conservateur du Musée [Maurice Long] Agricole et Commercial de Hanoi).

425. Crevost, Charles. 1918. Plantes oléifères de l'Indochine [Oil-bearing plants of Indochina]. In: Congrès d'Agriculture Coloniale, Gouvernement Générale de l'Indochine. Hanoi-Haiphong: Impr. d'Extrême-Orient. 57 p. Series: Hanoi No. 6. See p. 26-27. [100* ref. Fre]

• ***Summary:*** Following an overview, the various oil-bearing plants are described in detail, organized by family. The section on Soja (p. 26-27) states: Indigenous names in Cochin China, Annam and Tonkin: Dau nanh, Dau tuong. Cambodia: Sandek sieng. China: Teou [dou]. Japan: Daizu mame. The plant is widely cultivated in Indochina for its seeds which, although not consumed directly as food, are used nevertheless to make various other foods: cheeses (dau phu and dau oc [tofu]), and a condiment sauce [soy sauce] (tuong).

In Indochina there is only one variety of soybean, which has oblong yellowish-white seeds, slightly flattened, more or less large according to its place of origin, whereas in China and Japan soybeans come in various colors and colorations.

The best seed in the colony come from Cambodia and the province of Lang-son in Tonkin.

It is well known that soy protein *(graine de soja à base de caséo-sojaïne)* serves as the basis for numerous food preparations; but the seeds are now most widely used in the manufacture of an oil, used for illumination [in lamps] or food; it tends to replace cotton oil in the soap industry, whereas soybean cakes *(les tourteaux de soja)* are

considered excellent for use as a fertilizer or for fattening cattle.

A table shows nutritional analyses of soybeans from three locations, conducted at the colonial garden of Nogent-sur-Marne: Laos, Tonkin, and Manchuria. For each the moisture, protein, oil, carbohydrate, and mineral content are given.

Also discusses: Peanuts (p. 25-26, with illustration facing p. 25, and 9 references), sesame (p. 29-30, with illustration facing p. 29), perilla (p. 30).

Note the interesting phrase *graine de soja à base de caséo-sojaïne,* based on the work of Li Yu-ying near Paris, France. Address: Inspecteur des Services agricoles et commerciaux; Conservateur du Musée [Maurice Long] agricole et commercial de Hanoi.

426. Eynard, L. 1918. Note au sujet du tourteau de soja employé à Swatow comme engrais [Note on the subject of soybean cake employed at Swatow as fertilizer]. *Bulletin Economique de l'Indochine (Hanoi)* 20(130):475-76. [Fre]

• ***Summary:*** Swatow (Pinyin: Shantou; W.-G.: Shan-t'ou) is a coastal city in eastern Kwangtung province, in southeastern China, opposite Taiwan, at the mouth of the Han Sui River (on the south side), about 170 miles northwest of Hong Kong. The region around Swatow is very favorable for agriculture; the mildness of its climate, the fertility of its soil and the industriousness of its inhabitants have made it one of the most productive areas of China.

Since ancient times, the peasants have used night soil (human manure) to fertilize their fields. But they also use other fertilizers to make their fields more productive. The fertilizer which, for many years, has been the most widely used in Swatow is unquestionably "beancake." It is imported from Dairen bay, Newchwang, and surrounding regions where the soybean is widely cultivated. A table shows that the amount of beancake brought in through the port of Swatow [Shantou] has increased from 184,890 tonnes (metric tons) in 1913 to 206,607 tonnes in 1915, falling slightly to 200,141 tonnes in 1916.

Note: 1 picul = 40.45 kg. The average price of beancake is 3 taels 30 per picul, which is quite low, and lower than phosphate or nitrate fertilizers. Yet the author believes that chemical fertilizers are better and he does not understand why Chinese peasants have not come to realize this.

Note 2. This is the earliest document seen (May 2010) with "Swatow" in the title in connection with soybeans. Address: French vice-consul at Swatow, China.

427. Paerels, J.J. 1918. Soja [Soya]. In: Dr. K.W. Van Gorkom's Oost-Indische Cultures. 1918. Amsterdam: J.H. de Bussy. 2nd ed. Vol. 2. Edited by Dr. H.C. Prinsen Geerligs. See p. 839-51. Figs. 285-86. [8 ref. Dut]

• ***Summary:*** This is a reprint of Paerels 1913. Contents: Origin and native land. The soybean plant: Botanical description (flowers, seeds, fertilization, germination), types and varieties, geographical distribution. Cultivation of soybeans: General instructions for growing, planting, manuring, diseases and pests. Production, trade, and use: Tofu *(Tao-Hoe),* Chinese soy sauce *(Tao-Yoe),* soybean paste *(Tao-Tjiong* [a term, and perhaps a product, between *doujiang* and *tao-tjo,* Indonesian-style miso]), composition of the seeds and value as a food *(samenstelling en voedingswaarde).* Photos show: Plants of a black variety (p. 840), and a white variety of soybeans (p. 841). Address: Netherlands.

428. Roux, François de. 1918. Rapport général de la section de oléagineux [General report of the section on oil-bearing materials]. In: Congrès d'Agriculture Coloniale, 21-25 Mai 1918. Compte Rendu des Travaux (Congress of colonial agriculture, 21-25 May 1918. Conference proceedings). Paris: Augustin Challamel (Libraire Maritime et Coloniale). 639 p. See Vol. 2, "Section de Oléagineux." p. 7-11. [Fre]

• ***Summary:*** In the section titled "Colonies which must intensify the cultivation of oil-bearing materials" (p. 10-11) includes: Peanuts: Senegal, Upper-Senegal-Niger, and Guinea. Sesame: Indochina, Senegal, Guinea, Upper-Senegal-Niger. Soybeans *(Soja):* Cambodia. Olives: Tunisia, Algeria, Morocco.

The section titled "Other seeds" (p. 73-75) contains a long discussion of the soybean. The soybean represents an element of trade of the first importance and England, up until the present, has been its main destination in Europe. This movement, which reached 510,000 tonnes (metric tons) in 1910, declined in the following years for three reasons: Freight difficulties to Europe, more importation in the form of soy oil, and, above all, the detour / routing of more and more of the soybeans and soy products to the United States because it was closer to the major producer, Manchuria.

France did not participate very much in this movement, with imports varying as follows between 1911 and 1916: Soybean seeds 12 to 6,227 tonnes, and soybean oil 200 to 2,000 tonnes. But Cambodia and Lower Laos *(Bas-Laos)* can supply a variety of soybean having a higher oil content than that of Manchurian soybeans: 12.280% vs. 17.640%.

A greater utilization of the soybean in France would be a happy result in adding value to the vast territories in France's protectorate.

We need to look into using this product in a form that is different from the one admitted to date. (i.e., New uses might be found in addition to oil and meal).

Indeed, from the view point of oil mills, the [soybean] seed is of relative interest because of its fairly low oil content and because of the difficulty of finding an outlet for the large amount of cake that it generates.

The fine tuning / development of process for extraction of the casein (protein) or the flour (the indigenous peoples draw from it kind cheese [tofu] and also alimentary pastes [pastas]) allow us to consider the oil as a by-product and would also give some more financially rewarding end products to industry.

429. Hall, C.J.J. van. 1919. Ziekten en plagen der cultuurgewasen in Nederlandsch-Indie in 1918 [Diseases and pests of cultivated plants in the Dutch East Indies in 1918]. *Mededelingen van het Laboratorium voor Plantenziekten (Indonesia)* No. 36. 49 p. Feb. See p. 21. [Dut]*

• ***Summary:*** On the whole, insect injury was not considerable in 1918. On one estate in West Java, Kedelé *[Glycine soja]* was attacked by Agromyzid borers *[Agromyza]*, 70% of the crop being lost in one case, and by *Epilachna* sp., which has not been recorded hitherto from this plant. Address: Dr.

430. Reinking, Otto A. 1919. Philippine plant diseases. *Phytopathology* 9(3):114-40. See p. 125-26.

• ***Summary:*** The section titled *"Soja max*–Soy bean, Soja" (p. 125-26) discusses three diseases: (1) "Black mildew. Frequently entire patches of soy beans appear yellowish and sickly. This may be due to the attacks of a fungus which produces numerous black pycnidia on the under surface of the leaves. As yet the fungus is unidentified. Note 1. It was later identified as *Trotteria venturioides.*

(2) "Blight. During the rainy season entire fields of soy beans may be destroyed by a species of Sclerotinia... Besides different varieties of beans, the disease has been observed on African peanuts, *Voandzeia subterranea,* and on weeds growing among the infected plants... The sclerotia produce mycelium directly infecting injured or uninjured tissue and within one week the entire plant is blighted and falls over in a soft mass... Spores have not yet been observed on diseased plants of in cultures of the fungus and attempts to produce spore bearing bodies and spores, from sclerotial bodies have thus far failed." Note 2: This blight was later found to be caused by *Rhizoctonia* species.

(3) "Rust. Frequently soy beans are severely attacked by *Uromyces sojae* (Henn.) Syd. [later named *Phakopsora pachyrhizi].* Characteristic brown rust sori are scattered thickly over the under surface of the leaves. The spots are first rounded, raised, brown blisters, but later they burst open exposing the spores. On the upper surface of the diseased leaves the tissue is yellowed opposite the sori."

Also discusses: Peanuts, sesame, cowpeas. Address: College of Agriculture, Univ. of Philippines.

431. Chick, Harriette; Delf, Ellen Marion. 1919. The anti-scorbutic value of dry and germinated seeds. *Biochemical Journal* 13(1):199-218. May. [16 ref]

• ***Summary:*** The authors are looking for ways to prevent scurvy among Indian soldiers. In 1912 Fuerst showed that anti-scorbutic stuff was developed in substantial quantity during the first days of germination of various seeds. His experiments were based on a series of classical enquiries into experimental scurvy initiated by Holst at the University of Christiania [Oslo, Norway]. Fuerst fed sprouted barley, oats, peas, and lentils to guinea pigs. Fuerst also made the interesting observation that if germinated barley was dried at 37ºC, the anti-scorbutic properties gained during germination were lost.

In this experiment the authors fed sprouted green peas *(Pisum sativum)* and ordinary brown lentils *(Lens esculenta, masoor dhal)* to guinea pigs. The sprouted seeds were found to have anti-scorbutic properties, thus confirming Fuerst's observations. In addition, the sprouts were found to be slightly more effective than lemon juice in treating human scurvy patients. "A considerable portion of the anti-scurvy power generated in these germinated seeds is destroyed by boiling: cooking of these germinated seeds should therefore be as short as possible."

"It is, however, as a *preventive* of scurvy that the inclusion of germinated pulses in a human diet deficient in fresh fruit and vegetables, is principally to be recommended, and so far no definite trials of this type have been reported. In many parts of the world there exists the practice of eating certain seeds in the germinated condition, although there is no suggestion that the anti-scorbutic value of such foods has been appreciated. In the Dutch Indies and Federated Malay States germinated beans or "tow-gay" [taugé, soy sprouts] are eaten raw as a common article of the diet [Grijns, 1901; Private communication, Birg.-Gen. Anderson]. In certain districts of China it is the custom to take part of the rice in the germinated condition and, especially in the north, beans are artificially sprouted for food in the winter [Report, 1885]" (p. 216). Tables and graphs (line curves) show experimental results. Note: The word "soy" is not specifically mentioned. Address: Dep. of Experimental Pathology, Lister Inst. [England].

432. *San Francisco Chronicle.*1919. Motor-ship with oil cargo ablaze. July 3. p. 4.

• ***Summary:*** "Singapore, July 2–The American motor schooner Esperanza, loaded with [soy] bean oil, caught fire here today and had to be flooded to extinguish the flames. From the main mast aft the deck was destroyed."

433. Groff, Elizabeth H. 1919. Soy-sauce manufacturing in Kwangtung, China. *Philippine J. of Science* 15(3):307-16. Sept. [1 ref]

• ***Summary:*** Contents: Introduction. The equipment of a soy sauce manufacturing plant: Grounds and buildings, boiling shed, jars, racks, trays, baskets, covers, raw materials, method of mixing, boiling of beans, mixing of beans and

[wheat] flour, mold, method of sunning beans and flour, first drawing, second drawing, third drawing, fourth drawing, boiling method, mixing of soy, prices of raw materials, Sainam soy, making soy from rice, soy samples and prices gathered on the Canton market (8 grades are described). 8 plates with 13 photos.

"Soy sauce, known among the Chinese as *Ch'au yau* "drawing oil," or *pak yau,* "white oil," is without question the best liked and most widely used [of the many sauces in China]. Kwangtung Province [in southeast China; Guangdong in pinyin] is famous all over China for the soy sauce which it produces. Canton as its capital is the naturally the center of all this trade... Each neighborhood has its peddler who goes from door to door selling soy and other sauces. In Canton, jars of soy can always been seen in the making, as much of it is placed on the roofs to sun.

"Sainam, a city of about 30,000 inhabitants, 50 miles southwest of Canton on the Samshui ("Three Waters") Railway, is famous for the excellent quality of soy that it produces. The first-class shops in Canton all have signs advertising Sainam *Ch'au yau."* The establishments is Sainam are much larger than those in Canton and they have more space for sunning jars. There are 8 factories, all of about the same capacity, doing a business of over 100,000 dollars a year.

The manager of a large sauce-manufacturing plant named On Shing Lung showed the author in detail how his soy sauce was made. The buildings surrounded the 4 sides of the plot with a large court in the center for sunning the soy sauce. A "mold room" was usually placed to the north so that the doors which control the light and ventilation, very essential to good mold growth, can be opened to the south and plenty of sunlight allowed to enter. The koji is placed in trays (typically circular bamboo trays 3 feet in diameter and 1.5 inches deep) on racks in the mold room. The brown earthenware cylindrical jars in which the soy sauce is fermented are about 18.5 inches deep, 19.5 inches in diameter, and have a capacity of 180 catties (240 lb). About 1,000 of these jars are kept in the sunning yard at one time, although at times only about two-thirds of them are in use. "The Chinese believe that the [soy sauce in the] jars are greatly improved by long sunning, and when space permits the jars are allowed to sun in the court yard for months at a time." For the jars, "Nothing is more important than a good cover with which to protect the sauce at night and when it rains. A standard conical bamboo cover, 21 inches in diameter and 12 inches high, is used.

The raw materials used in making soy sauce are yellow soy beans (grown in Ngau Chong, Manchuria), local wheat flour, raw salt (from Tientsin), and water. Beans are measured in catties (1 catty = 1 and one-third pounds). The best soy beans have a thick and tough seed coat that does not break apart easily after the beans are boiled. "The Chinese consider this characteristic to be very important, for they wish to keep the bean as much intact as possible for the molding process." After mid-November the soy sauce plants stop boiling soybeans and do not begin again until February.

After the beans are boiled for 3-4 hours, they are drained in bamboo baskets until they are almost cold. Then 2 baskets at a time are poured onto a mixing board and two men mix the beans and flour with their hands until each bean is covered with flour. The mixture is then placed on the circular bamboo trays to a thickness of about 1½ inches and the hand is used to furrow them so they get proper ventilation. They trays are placed in the mold room for 1-2 weeks. Inoculation takes place naturally, probably by a yellow mold of the species *Aspergillus.* The undesirable black mold is *Mucor.* "The mold [koji] from 1,400 catties of beans and 1,200 catties of [wheat] flour is divided into 36 jars. [Note: The ratio of soybeans to wheat flour by weight is 1.17 to 1]. A salt solution, 150 catties of water to 40 catties of salt, is then poured into the jars until they are full." The jars are then sunned for 2 to 6 months–the longer the better. Most of the shops, however, make the first drawing after 3-4 months. The sunning process results in evaporation "and three days before the drawing of the soy, salt solution is used again to fill the jars. The first drawing is made by siphon. About 60 catties of the liquid are drawn off. This liquid is allowed to settle and is again drawn off, reducing the quantity to about 50 catties. It is then placed again in clean jars and allowed to sun again for from one to six months. Some of this soy is at times allowed to sun for three years, but this is too expensive and is rarely done commercially." The soy from the first drawing is called *teng ch'au* ("first drawing"). The material that remains in the jar is called *teng shi* ("original soy nuggets") and is sold as a separate sauce, used as the base of a number of different sauces or as the base for a "second drawing" *i ch'au.* For the second drawing, a salt solution of 150 catties of water and 30 catties of salt in now poured on the *teng shi,* or the beans which remain in the jar from the first drawing. The jars are again placed in the sun for 1-2 months, etc. Third and fourth drawings can also be made. "The sunning methods takes so much time that many of the manufacturers boil the second, third, and fourth drawings instead of sunning them. This makes a decidedly inferior quality of soy, but it can be sold very cheaply.

"After the soy is drawn from the beans, it is placed in an iron pan and boiled from two to four hours. The longer the better, but it must be boiled at the least two hours or it will not keep... The manufacturers never boil the first drawing. They always sun this and sell it for their finest grade.

"Mixing of soy. It is interesting to note that of the four drawings of soy, the only drawing that is sold as it is drawn is the 'first drawing.' The others are all mixed together and sold under the names of the price they cost per catty.

Candied molasses *(kat shui)* is added to the very cheapest soy as a coloring and to sweeten it.

"Many of the village people make their own soy from the rice that has stuck to the bottom of the vessel in which it is boiled." No soybeans are used and the result is an inferior grade of sauce.

The best quality soy [sauce], called *T'in teng ch'au yau* ("best selected drawn oil"), made of the first drawing and sunned for 4 months after drawing off, retails on the Canton market for "40 cents local silver per catty." The same soy, sunned for only 2 months after drawing off, retails for 14 cents per catty. Soy made of equal parts "first drawing" and "second drawing" retails for 11 cents. Soy made of equal parts "first drawing" and "second drawing," but after it has been drawn off the beans it is not boiled or sunned, retails for 8 cents. This "raw drawing" is used for soups and does not keep longer than about a week. Soy made of a mixture of 25% each of "first drawing," "second drawing," "third drawing," and "fourth drawing" retails for 8 cents per catty. Soy made of 50% salt solution, and 50% "third drawing" and "fourth drawing," and colored with candied molasses retails for 6 cents per catty. Soy made of 50% salt solution, and 50% "fourth drawing," and colored with candied molasses retails for 4 cents per catty.

Photos on unnumbered pages show: (1) The soybeans being boiled in an iron pan above a brick oven; a man is holding a strainer over the pan. (2) The dark mold fermentation room with its racks and trays. (3) Soy [sauce] being drawn by means of a siphon. (4) A man standing in a courtyard filled with earthenware jars, about to begin "the first drawing of soy." (5) A light frame used to hold the koji trays. (6) Bamboo baskets in which the boiled beans are cooled and drained. (8) A courtyard filled with earthenware jars topped with conical woven bamboo covers. (9) A court yard full of uncovered soy sauce jars. (10) Whole, dry soy beans (natural size). (11) Soy beans and flour after 5 days in the mold room. (12) Circular bamboo trays. (13) Soy sauce ready for shipment to northern China. It is placed in many sealed earthenware jars, which are incased in bamboo holders. Address: Canton, China.

434. Reinking, Otto A. 1919. Host index of diseases of economic plants in the Philippines. *Philippine Agriculturist* 8(2):38-54. Sept. [2 ref]

• ***Summary:*** The introduction begins: "No phase of scientific endeavor has yielded more direct or more valuable applications to practical agriculture than has the study of plant pathology. In connection with a general appeal to foreign scientists regarding the value of cooperation with a tropical biological station, it is important that the science of plant pathology be given the degree of emphasis which it justly deserves."

In the "Host Index" under *"Glycine max* (Linn.) Merr. *(G. hispida* Maxim). Soy bean, soja" are listed (p. 46-47):

*Peronospora trifoliorum* de Bary. Downy mildew. *Rhizoctonia.* Blight. *Sclerotium.* Blight and stem rot. *Troterria venturioides* Sacc. Black mildew. And *Uromyces sojae* Syd. [=Phakopsora pachyrhizi]. Rust. Address: Dep. of Plant Pathology.

435. Noroña Maceda, Felix. 1919. Selection in soy beans. *Philippine Agriculturist* 8(3):92-98. Oct. Based on his thesis, College of Agriculture (Los Banos), No. 103. [7 ref]

• ***Summary:*** "When and by whom the soy bean was introduced into the Philippines is not known. It has long been in cultivation in the Islands, but has never been considered as a crop worthy of attention. In the future it should be a crop of importance throughout the Archipelago." The author conducted various experiments: (1) The multiplication strains selected by Layosa and the running of "plant to row" tests of the most productive individuals or elites of each strain; (2) the isolation of strains that can be recommended for the rainy or dry season under local conditions; and (3) the comparison of the yield of selected strains with that of unselected plants. Each of the strains selected by Layosa gave higher yields in beans than their respective parents. The best variety was named Amis. With two exceptions all selected strains gave higher yields than the common stock. The gain in percentages of the yield of the selected strains over the common sort ranged in multiplication plantings from 18% to 79%. The highest yield of Amis beans during the dry season was 1,278 kg/ha, and during the dry season was 511.2 kg/ha. Address: Philippines.

436. Chevalier, Aug. 1919. Culture et valeur alimentaire des principales légumineuses tropicales [Cultivation and food value of the principal tropical legumes]. *Bulletin Agricole de l'Institut Scientifique de Saigon* 1(11):330-42. Nov. See p. 331. [2 ref. Fre]

• ***Summary:*** The section titled "Soja" (p. 331) states that this plant is first among all legumes in terms of nutritional value. In Indochina, the soybean is cultivated mainly in Tonkin [later named North Vietnam] and Cambodia. None of these soybeans are exported. The Chinese in Cholon (located just southwest of Saigon) use them to make sauces, cheeses, and a sort of vegetable casein which is sold at all of the Annamite [later South Vietnamese] grocery stores. During World War I, soy flour was mixed with wheat flour in a 1:3 ratio for making bread.

"The soybean contains 40% protein and 20% oil, whereas our European beans contain only 20% protein and 2% oils. Products based on soya can therefore contribute to a good diet." A table titled "Composition of the principal leguminous seeds of Indochina with their humidity" (p. 338) gives analyses for three soybean samples, from Yunnan, Langston (Tonkin), and the Delta (Tonkin).

Also discusses Bambara Peas *(Pois Bambara)* (p. 332), peanuts (p. 332-35), azuki beans *(Phaseolus angularis;* p. 334, 339).

437. Reinking, Otto A. 1919. Diseases of economic plants in southern China. *Philippine Agriculturist* 8(4):109-35. Nov. See p. 129.

• ***Summary:*** The section titled "Soy Bean. Wang Tan. *"Glycine max* (Linn.) Merr. *(G. hispida* Maxim.)" (p. 129) discusses: (1) Downy mildew *(Peronospora trifoliorum* de Bary).

(2) Rust *(Uromyces sojae* Syd.) [later named *Phakopsora pachyrhizi].* "The rust of soy beans commonly causes serious losses. In severe cases of attack, defoliation takes place. Brown rust sori are scattered thickly on the under surface of leaves. The upper surface is slightly yellowed in spots above the sori on the lower surface. The disease can be controlled by crop rotation." Address: Dep. of Plant Pathology, USDA.

438. Wester, D.H. 1919. Onderzoek naar het ureasegehalte van verschillende soorten soyaboonen [Investigations on the urease content of different varieties of soybeans]. *Chemisch Weekblad* 16(51):1552-56. Dec. 20. [3 ref. Dut]

• ***Summary:*** One table (p. 1553) shows the results of urease tests on 31 different varieties of soybeans. For each variety is given: Variety name, number of seeds tested, average weight per bean in milligrams, urea generated after 2, 4, and 24 hours. The author found that all of the beans, whether old or fresh, possessed strong enzyme action. The varieties are: Cheribon, Siam, Butterball, Guelph, Nuttall, Ogeman [sic, Ogema], Buckshot, Haberlandt, Yosho, Soya boonen, Shanghai, Hollybrook, Baird, Ebony, Samarow, Kedoe, Tokyo, Riceland, Amherst, Barchet, Mammoth, Ito San, Cloud, Brindle, Manhattan, Brownie, Meyer, Flat King, Eda, Kingston.

A second table (p. 1555) shows similar tests on 19 more soybean varieties. Only a few of these have English-language varietal names: Swan, Haberlandt, Cloud, and Pingsu. These four were obtained from the Cameroon agricultural experiment station in 1914. Most of the other varieties have German or Chinese varietal names.

Note: This is the earliest document seen (Aug. 2009) concerning soybeans in the Cameroon. This document contains the earliest date seen for soybeans in the Cameroon (1914) (one of two documents). The source of these soybeans is unknown. Address: Scheikundig Laboratorium der Hoogere Krijgsschool.

439. Dammerman, Karel Willem. 1919. Landbouwdierkunde van Oost-Indië: De schadelijke en nuttige dieren voor land, tuin- en boschbouw in Oost-Indië [Agricultural zoology of the Dutch East Indies]. Amsterdam, Netherlands: J.H. de Bussy. x + 368 p. See p. 81, 340, 346. Illust. Index. 27 cm. [1 soy ref. Dut]

• ***Summary:*** In Chapter 4, titled "Stem- and stalk-borers," Section 3, about "Flies, *Diptera"* contains a 2-page subsection on the family *Agromyzidae* including *Agromyza sojae* Zehnt. (p. 81-82). This is the soybean borer *(kedeleh-boorder),* an insect pest which attacks soybean plants *(soja-planten),* peanuts *(katjang tanah),* and other legumes. Plate 14, facing p. 82, contains a black-and-white illustration of three views of this fly: (2a) greatly enlarged, (2b) natural size, and (2c) a root with two pupae, greatly enlarged. This book also contains many beautiful full-page color illustrations of insects.

The chapter titled "List of crops with the pests that injure them which are discussed in this book" (p. 333-48) contains an entry (p. 346) which reads: "Soja hispida (soja). See Leguminosen A."

When we look at "Leguminosen A. (pulse and green manures)" (p. 340), the first type of legume is peanuts *(Arachis, aardnoot).* The different parts of the plant damaged by insects are then listed. Under borers is listed a type of fly, *Agroymza sojae* For details, see p. 81. Address: Zoologist at the Department of Agriculture, Industry and Trade, Buitenzorg [later Bogor], Java [Dutch East Indies] (Zoöloog aan het Departement van Landbouw, Nijverheid en Handel te Buitenzorg, Java.

440. Fitzner, Rudolf. 1919. Die Weltwirtschaft der Fettstoffe [World commerce in oils and fats. 3 vols.]. Berlin: Carl Heymanns Verlag. [Ger]*

• ***Summary:*** Vol. 1: Die Oelindustrie Englands [The Oil Industry of England]. Vol. 2: Niederländisch-Indien [The Dutch East Indies]. Vol. 3. Brasilien, Guyana, Venezuela [Brazil, Guyana, Venezuela].

Page 171-72 states: The cultivation of soybeans would seem to have a bright future. In 1918 already some 350,000 tonnes are said to have been harvested.

Note: The figure 350,000 tonnes seems much too large for 1918. Address: Prof. Dr.

441. Heurn, F.C. van. 1919. Verslag van den Directeur, 1 Juli 1918–30 Juni 1919 [Report of the Director, 1 July 1918–30 June 1919]. *Mededelingen van het Algemeen Proefstation der A.V.R.O.S. Algemeene Series (Indonesia)* No. 7. 66 p. See p. 60. [Dut]

• ***Summary:*** This report is issued by the acting director in Dr. Rutger's absence. In the chapter on entomological investigations (p. 50-60) is a section titled "Food crops" *(Voedings-gewassen)* which states (p. 60) that *Adoratus* species and *Apogonia destructor* were found on kedele *[Glycine soja].*

Note: A.V.R.O.S. stands for *Algemeene Vereen v. Rubberplanters Oostkust van Sumatra* [General Union of Rubber Planters of the East Coast of Sumatra]. Address: Ir.,

Jhr., den waarnemend [acting] Directeur van het Algemeen Proefstation der A.V.R.O.S.

442. Mattei, G.E. 1919. La soja ed i suoi prodotti [The soybean and its products]. *Bollettino di Studi ed Informazioni del Regio Giardino Coloniale di Palermo* 5(1/2):1-34. [40 ref. Ita]

• ***Summary:*** This article contains one of the best histories seen to date of the soybean in Italy, from 1760 to 1813. Contents: Brief history of the soybean. History of its taxonomic classification. Botanical description of the wild and domestic soybean. Varieties. Introduction of the soybean to Europe (especially France and Italy). The question of the root nodule bacteria. Cultural requirements. Importance / value of the production. Utilization of the seeds. Soy flour *(farina di soja).* Soymilk *(latte di soja).* Soy cheese [tofu] *(formaggio di soja).* Soy oil *(olio di soja).* Soy cakes *(panelli di soja).* Other Japanese preparations: Miso, shoyu, koji. Opportunities for soybean cultivation in Italy. Results of cultural trials at the Colonial Garden *(Giardino Coloniale)* in Italy.

"Introduction of the soybean into Europe: The soybean *(La Soja)* was long confined to East Asia, and it is only towards the 17th century that it appears in the Indian Archipelago; in fact, if it had existed in the Pacific islands at the time of Cook's voyage, Forster surely would have reported it. Its introduction to the East Indies is even more recent. Roxburgh mentions its cultivation in the Botanical Gardens of Calcutta from seeds acquired from the Moluccas, in 1798. On the other hand, as Alphonse de Candolle observes, if its cultivation were ages-old, it would have spread long ago toward the West to Syria and Egypt, which did not occur.

"Its introduction to France is said to date back to 1739, when certain missionaries sent soybean seeds, from China, to the *Jardin des Plantes* in Paris: the uncertainty however arises as to whether, even before this time, it was cultivated in Europe, since, as Saccardo points out, it appears that essays *(saggi)* on the plant exist in the *Herbarium* of Bartolomeo Martini of Verona, Italy, written *(composto)* in 1701.

"In any event, concerning France, the soybean is reported as being grown extensively in about 1821 at Champ-Rond near Etampes; it seems, however, that subsequently its cultivation was nearly lost; in fact, Lachaume, in the *Revue Horticole* of 1857 [pages 568-70. Nov. 16], reports it as a new introduction, thanks to the French Consul in Shanghai, and he describes and illustrates it.

"As for Italy, Pinolini [1905] dates the soybean to 1848 [sic, 1840]. It is possible that its cultivation as an agricultural plant began to spread from that date, but the existence of the soybean in Italy antedates this date by at least a century. Saccardo says in fact: 'cultivated since the mid-18th century, and at times extensively, as in the Treviso region.'

"With the existence, as I have stated, of essays on the soybean in the *Herbarium* of Bartolomeo Martini of Verona, an herbarium written in 1701, one might suspect that from that time the soybean was being cultivated in the Verona region; but who could have brought the seeds? And if this were the case, why do we not find any reports of it in somewhat later authors? Or was the above-mentioned essay brought directly from the Orient. It should be noted that Kaempfer's voyage to Japan dates to 1690, and we have the first accurate reports on the soybean in 1712 with Kaempfer's own publication. Should we perhaps believe that some study, brought back by Kaempfer, was given to Martini? He might have obtained it from Zannichelli who, as Targioni-Tozzetti relates, in the life of Micheli, carried on a correspondence with Martini himself? Assuredly Kaempfer had to regard a plant which is used for so many purposes in Japan as important and it is possible he brought back essays about it, and perhaps even seeds.

"In any event, the Jardin des Plantes in Paris, after 1739, must have distributed seeds to various botanical institutions, including Italian. In fact, from the old *Catalogs (Cataloghi)* of the first Italian botanical gardens and from the pertinent *Index seminum,* we see that in the second half of the 18th century, the soybean is being cultivated almost everywhere: in 1760 Allioni mentions its cultivation in the Botanical Gardens of Turin; in 1780 Abbot *(l'Abate)* Farsetti introduced it to his Santa Maria di Sala garden near Venice; in 1785 Scopoli mentions it in Pavia; in 1787 Guatteri records it in Parma; in 1790, with the Botanical Gardens barely established, Tineo was cultivating it in Palermo, as results [show] from the Catalogue published in precisely that year; in 1793 Zuccagni refers to it in Florence; in 1798 Durazzo had introduced it into his garden Dello Zerbino near Genoa; in 1801 Tilli mentions it in Pisa; in 1805 Graefer refers to it in Caserta; in 1807 Arduino introduced it to the Agricultural Gardens *(Orto Agrario)* of Padua; in 1811 Fabriani refers to it in Modena; in 1813 Tenora points it out in Naples, and the same may be said for other more recent reports. From this we see that, at the end of the 18th century, the soybean was already cultivated throughout Italy, not for agricultural but for scientific purposes, that is, in Botanical Gardens.

"Perhaps this information escaped those, like Pinolini, who did research on the soybean as an agricultural plant because, in all works dealing with plants cultivated at that time, the soybean is found under the name of *Dolichos soja,* the generic name *Soja,* of Moench or Savi, not yet having been adopted."

In 1918 a soybean cultural trial was conducted at the Colonial Garden, Palermo, on a plot of 350 square meters; smaller experiments had been conducted in previous years. A variety was chosen which had almost spherical seed and

was greenish yellow in color. The seeds were planted on March 29, in furrows at a spacing of 30 x 40 cm.; they germinated regularly about 10 days later. The plants were hoed twice to reduce weeds and irrigated eight times from the end of May until the end of August. Flowering began in early July and the seed was harvested on Nov. 15. The entire vegetative period was, therefore, 7½ months. The plants reached an average height of 90 cm. Their growth was luxuriant and there was a normal development of nodules on the roots. From this plot of 350 square meters, 51 kg of clean seed was harvested; this corresponds to a yield of about 1,450 kg/ha, which is considered quite satisfactory and could be increased by manuring. The beans, when cooked in different ways, were found to have an agreeable taste.

Talk with Ted Hymowitz, soybean geneticist, Univ. of Illinois. 2003. Aug. 18. Caution! It is not clear whether the early dates for soybean in Italy this article are based on herbarium specimens or living plants. With herbarium specimens, it is easy to make errors.

Note 1. This document contains the earliest solid dates and the second earliest overall dates seen (Aug. 2003) for soybeans in Italy, or the cultivation of soybeans in Italy (1760). The source of these soybeans is unknown. Yet note that the earliest possible date that the soybean was cultivated in France was about 1740. Perhaps there was some connection between the earliest possible soybean cultivation in France and in Italy.

Note 2. This article was reprinted in the Nov. 1991 issue of *Il Giornale della Soia* (p. 11-16). Address: Royal Botanical Garden (R. [Regio] Orto Botanico), Palermo, Italy.

443. Pool, J.F.A. 1920. Opsporing van ureum [Detection of urea]. *Pharmaceutisch Weekblad voor Nederland* 57(7):178-79. Feb. 14. (Chem. Abst. 14:1692). [2 ref. Dut]
• ***Summary:*** Discusses the enzyme urease and soybeans. Address: PhD, Batavia [Dutch East Indies].

444. Kline, Charles E. 1920. Oil-bearing seeds and nuts in the Shanghai District of China. *Commerce Reports [USA] (Daily Consular and Trade Reports, Bureau of Foreign and Domestic Commerce, Department of Commerce)* 23(98):519-22. April 26.
• ***Summary:*** The chief plants yielding vegetable oils in China are [soy] beans, cotton seed, peanuts, rapeseed, sesamum seed, tea seed, and woodnuts (filberts).

The number of oil mills in China is increasing, and those in northern China treat mainly soya beans, while those in central China produce the other varieties of oil mentioned. The oil mills do not work year round, since there is not sufficient seed available, and also since the high summer temperatures cause the oil to become rancid.

The total capacity of oil mills in Shanghai is 5,400 piculs/day (321 tons/day).

Tables show: (1, p. 520) The quantities of oil, oilseeds, and oil cake exported from the port of Shanghai during the years 1917 and 1918. 1 picul = 133.33 lb. For [soy] bean oil: In 1917–2,351 piculs worth $26,482. In 1918–5,771 piculs worth $71,601. For [soy] bean cake: In 1917–11,213 piculs worth $27,246. In 1918–282 piculs worth $800.

(2, p. 520) The quantities of oil and cake exported from China to the countries of destination; the year (or years) is not given. Both the weight (in piculs; 1 picul = 133.33 lb) and value (in dollars) are given for each destination. In descending order of weight exported:

[Soy] bean oil–United States (incl. Hawaii) 2,136,746 piculs. Japan (incl. Formosa [Taiwan]) 87,673. Korea 23,611, Russia 19,802. Canada 4,001. France 2,132.

[Soy] bean cake: Japan (incl. Formosa) 15,150,706 piculs worth $33,383,750. Korea 635,362 piculs worth $1,292,174. Russia 578,960 piculs worth $968,829. Siam 1,412 piculs worth $4,625. United States (incl. Hawaii) 27 piculs worth $54. Canada 9 piculs worth $17.

(3, p. 521) Ocean freight rates from Shanghai to various ports. Figures are given for bean oil and bean cake in 1917, 1918, and 1919 shipped to San Francisco [California], London, and Marseille, Naples & Venice. Present prices (total) are about five times as great as those at the beginning of the war. Address: Vice Consul, Shanghai [China].

445. *Bulletin Mensuel des Renseignements Agricoles et des Maladies des Plantes (Rome).* 1920. Sélection pédigrée du soya aux Philippines [Selection pedigree of soybeans in the Philippines (Abstract)]. 11(5):643-45. May. [1 ref. Fre]
• ***Summary:*** A French-language summary of the following English-language article: Noroña Maceda, Felix. 1919. "Selection in soy beans." *Philippine Agriculturist* 8(3):92-98. Oct.

446. *Algemeen Landbouwweekblad voor Nederlandsch-Indie.* 1920. De Chineesche productie en uitvoer van Sojaboonen-olie en-koeken [Chinese production and exportation of soybean oil and cakes (Abstract)]. 5(2):277-78. July 9. [1 ref. Dut]
• ***Summary:*** A Dutch-language summary of an article said to be from *Die Weltwirtschaft.* Discusses exports of soybeans and soybean cake from 1901-1917, the Dairen Staple Exchange, the Dairen Trust & Guaranty Company, soybean oil mills in Harbin, Dairen, Newchwang, Antung, and Mukden, the Bean Cake and Bean Oil Factory in dairen (South Manchuria), owned by Suzuki & Company of Kobe, Japan, soybean oil exports from 1911 to 1919, Mitsui & Co.

Note: We have been unable (Oct. 1999) to find the original article in any of the following: (1) *Weltwirtschaft* (1918-1920). (2) *Weltwirtschaftliches Zeitung* (July 1919 to June 1920) (3) *Weltwirtschaftliche Nachrichten* (Looked

through 1919 and the first half of 1920). (4) *Weltwirtschaftliches Archiv* (Kiel) (two issues).

447. Kirjassoff, Max D. 1920. Vegetable-oil-bearing materials of Manchuria. *Commerce Reports [USA] (Daily Consular and Trade Reports, Bureau of Foreign and Domestic Commerce, Department of Commerce)* 23(161):180-85. July 10.

• ***Summary:*** Contents: Introduction. Manchurian production of soya beans–exports of soya beans and products. All materials produced by cultivation–local consumption. Marketing raw materials–inspection–shipments. Methods of purchasing raw materials–brokerage. Storage–transportation methods and costs. Prices paid producers–economic conditions of farmers. Crushing of raw materials–prices paid at crushers. Production capacity of oil mills–types of mills and methods of operation. Quality of oil produced–production of bean oil and cake at Dairen. Fuel used in mills–activity of mills. Number of employees–wages. Marketing of products–Dairen exports of bean cake and oil. Prices of bean oil and cake. Ocean freight rates–export charges, insurance, etc. Increased United States demand–market for oil machinery.

"The oil-bearing materials produced in Manchuria are soya beans, perilla seed, peanuts, hempseed, castor beans, sesame seed, flaxseed, sunflower seed, and rapeseed." Estimates indicate that "about 1,500,000 tons of soya beans are produced in South Manchuria and about 800,000 tons in North Manchuria, or a total of 2,300,000 tons for the whole Province."

Tables show: (1) Exports of soya beans, bean cake, and bean oil each year from 1914 to 1919 (p. 180). (2) Exports of bean-cake each month from Oct. 1918 to Sept. 1919 from Dairen (Manchuria) to Japan (by far the largest), United States, Straits Settlements, China, Korea, and total (p. 184). (3) Exports of bean-oil each month during the same time to Japan (by far the largest), Europe, United States, China, Korea, and total. (4) The prices (in silver yen per picul or piece of cake) of beans, cake, and oil during the same period. Mentions the increasing demand for the oil in the United States. Address: Consul, Dairen [Manchuria].

448. *Matieres Grasses (Les) (Paris).* 1920. A propos des graines de Soja [Concerning soybean seeds]. 12(148):5614-15. Aug. 15. [16 ref. Fre]

• ***Summary:*** A two-page summary of information on soybeans from 16 sources, most of them in French. Soybeans are widely used in Manchuria and Japan. Soybean seeds from Cambodia and lower Laos are superior to those from Manchuria. A table gives the composition of three soybeans from Laos, Tonkin, and Manchuria. Soybeans in Indo-China and their use during World War I in England and France. Vegetable milk made by Li Yu-ying in France. A table gives the composition of three soybeans from Yun-Nan, Tonkin (Lang-Son), and Tonkin (Delta). Mr. Fr. de Roux recommends that soybean be more widely used in France and its colonies. Summarizes soybean research in Connecticut and New Jersey, and soybean production and yields in Ohio. More than 500 soybean varieties have been tested in the USA; the yellow varieties generally work best for human foods, oil and flour, while the brown and black are used for animal feeds. In 1917 cotton seed mills also used soybeans grown locally or in Manchuria. Milk made from soybeans is similar to animal milk and can be used to make cheeses. Soybean oil is used in the USA and England for making paints, but of greatest interest is its use in margarine and other food uses. In Japan, a society was founded with capitalization of 100,000 yen to extract soy protein for use as a substitute for celluloid. Conclusion: "In view of these many uses, it seems interesting to us to pursue in our colonies some cultural trials with this interesting legume. Could it perhaps be developed in certain temperate regions? É.D.W."

449. Hall, C.J.J. van. 1920. Ziekten en plagen der cultuurgewasen in Nederlandsch-Indie in 1919 [Diseases and pests of cultivated plants in the Dutch East Indies in 1919]. *Mededelingen van het Laboratorium voor Plantenziekten (Indonesia)* No. 39. 50 p. [Dut]*

• ***Summary:*** Kedelé *[Glycine soja]* suffered considerable injury from the pod borer *(Etiella zinckenella),* the stem borer *(Agromyza sojae,* later renamed *Melanagromyza sojae),* and the catjang borer *(A. phaseoli,* later renamed *Ophiomia phaseoli).* The last-named fly seems more injurious at certain times; on one estate where planting was done on five separate dates with 15-day intervals, it was only the fifth lot that was badly attacked. A Coccinellid *Epilachna* sp., another beetle *Araccerus* sp., and caterpillars–including those of *Heliothis*–also infested *G. soja.*

450. *Departement de l'Agriculture Ile Maurice (Mauritius Department of Agriculture), General Series, Bulletin (Port Louis) (Bilingual).* 1920. Essais de culture de plantes à racines et tubercules et d'autres plantes alimentaires dans l'île Maurice [Cultural trials of plants with roots and nodules, and other food plants on the Island of Mauritius]. No. 9. 8 p. [Fre]*

• ***Summary:*** Experiments with soybeans are not yet considered conclusive.

The peanut is widely cultivated on Mauritius. The varieties which have been tested and have given the best results are: Madras, Mozambique, Senegal, Federated Malay States, Pondichery, Virginia, Bunch. Address: Paris.

451. Adkins, Dorothy Margaret. 1921. The soya-bean problem. *Science Progress (London)* 15(59):445-51. Jan. [9 ref]

• ***Summary:*** This is a popular article. Contents: Introduction. Practical applications of the bean: Food uses include Tofu, or bean cheese (Japanese), Miso similar to chiang (Chinese), Shoyu (Japanese) and chiang-yu (Chinese), Natto (Japanese), whole dry soybeans, soybeans canned as a green vegetable (see description below), vegetable milk, roasted soybeans as a coffee substitute, soya flour, soya in diabetic diets and macaroni. Utilisation of soya-bean oil: In Italy, China, Manchuria. Utilisation of soya-bean cake and meal: As fertilizer in China and Japan, for feeding stock. Food value of the bean. The cultivation of the soya bean: China, Japan, United States, Australia (New South Wales), South Africa, West Indies, British East Africa, West Africa, Burmah [Burma], England.

"In Japan beans are germinated until the sprouts are about five inches long, and eaten with vinegar; beans, germinated and treated with brine, have also been noted in Spain." Note: It is not stated clearly that these beans in Japan or Spain are soya beans.

"Soya-beans may be cooked and used in the same way as haricot-beans, and may also be picked when young and treated like green peas, in which condition they may be canned."

"In South Africa success has been achieved in growing the plant; in 1910 the outlook was so hopeful that a project for constructing oil mills was suggested. Unfortunately the bean was not taken up by farmers, who preferred to cultivated maize, as it was an easier crop to produce. Thus no extensive culture of the bean was attempted, and the subject was dropped.

"In other parts of the Empire, for example the West Indies, British East Africa and West Africa, trials of soya-beans have proved successful, but in no district have promising early experiments been followed by tests on a larger scale."

"In certain parts of India, for example Burmah, soya-beans are grown on a large scale and are consumed by the natives." Address: Royal Holloway College, London.

452. Thom, Charles; Church, Margaret B. 1921. *Aspergillus flavus, A. oryzae,* and associated species. *American J. of Botany* 8(2):103-26. Feb. [54 ref]

• ***Summary:*** Introduction. "The numerous strains align themselves into groups of closely related forms which may for convenience be considered here under three series names."

*Aspergillus flavus-oryzae* series. The saké industry of Japan is based upon the diastatic power of *A. oryzae* (Ahlb.) Cohn. When "numerous cultures from the soy or shoyu industry of Japan and China are brought together, a whole series of forms are found which bridge the gap morphologically between *A. oryzae* as the saké organism and *A. flavus* as described and distributed also by Wehmer. Material taken directly from fermenting vats in China by Dr. Yamei Kin, formerly of the Bureau of Chemistry, shows strains of this character. Inoculating material furnished by Dr. Teizo Takahashi for experimental work on the fermentation of soy sauce or shoyu proved to be a member of this series. Dr. Takahashi had selected his strain for this type of fermentation from among several recognized and studied by him in Tokyo... All of these strains are regarded by him as varieties of *Aspergillus oryzae,* not *A. flavus."*

*Aspergillus oryzae* series. "In the Oriental industries in which it has been long used, the separateness of this form is largely lost. It becomes, therefore, a gigantic race in a group in which other members possess the same habits, the same essentials of structure, but differ slightly in color and greatly in size... *Aspergillus flavus* was first described by Link (1809) in terms vague enough to baffle any attempt at certain identification."

*Aspergillus Wentii* and related forms. "The Java culture originally sent by Went to Wehmer was used in rice and soy fermentation on that island by Chinese workmen." *Aspergillus tamari* and allies. "A second brown series of forms is more closely associated in occurrence and in habit with *A. flavus* and its allies than is *A. Wentii.* Many cultures in this series have been obtained in forage and feeding stuffs, from the Oriental soy fermentations... In size of colony, habit, and appearance aside from color, these forms resemble *A. flavus.* In the markings of conidia they suggest *A. niger...* Kita (1913) described as *A. tamari* a culture discovered as a contamination in a Japanese fermented product, tamari-koji."

A photo (photomicrograph) shows the wide variety of heads in a species and in a strain of *Aspergillus tamari.* Includes a calyptrate head. Note: This is the second earliest study seen of a fermented food published by USDA researchers. Address: USDA Bureau of Chemistry, Washington, DC.

453. *Commerce Reports [USA] (Daily Consular and Trade Reports, Bureau of Foreign and Domestic Commerce, Department of Commerce).*1921. Japanese trade and economic notes. 24(84):252-53. April 12.

• ***Summary:*** "Export of beans and bean products from Dairen during 1920:" A table shows the exports (in piculs) of [soya] beans, bean cake, and bean by destination. The three leading destinations are Japan, England, and Egypt. Others are Hongkong, Dutch East Indies, Sweden, Denmark, Holland, France, Korea, United States.

454. Chauveau, Dr. 1921. L'exportation du soja de Chine [Exportation of soybeans from China]. *Moniteur d'Indochine (Hanoi).* April. [Fre]*

455. *Bulletin Economique de l'Indochine (Hanoi).*1921. L'exportation du Soja entre 1912-1919 [Exports of soya (beans, oil, and cake from Manchuria) during 1912-1919].

24(148):348. May/June. Extract from Bulletin Commercial d'Extreme-Orient, April 1921. [1 ref. Fre]

• ***Summary:*** A table shows the exports of soybeans, soy oil, and soy cake from Manchuria between 1912-1919 in weight (piculs) and value ("valeur tls.").

For soybeans the weight exported fluctuated widely from a low of 63.71 million piculs in 1919 to a high of 112.270 million piculs in 1919, worth 287.75 million taels.

For soy oil, the weight increased steadily from 5.25 million taels in 1912 to 23.61 million taels in 1919, worth 210.60 million taels.

For soybean cake, the weight increased steadily from 81.62 million taels in 1912 to 207.240 million taels in 1919, worth 441.37 million taels.

Thus, in terms of value in 1919, the cake was worth the most, followed by the soybeans and then the oil.

456. *USDA Bureau of Plant Industry, Inventory.*1921. Seeds and plants imported by the Office of Foreign Seed and Plant Introduction during the period from October 1 to December 31, 1916. Nos. 43391 to 43979. No. 49. 117 p. Sept. 14.

• ***Summary:*** David Fairchild is presently the Agricultural Explorer in Charge of the Office of Foreign Seed and Plant Introduction. In the "Introductory Statement," he reports "the death of our agricultural explorer, Frank N. Meyer, whose unique and interesting descriptions of plants, particularly from China, Siberia, and Turkestan, have formed for the past 10 years so important a part of the reading matter of these inventories.

"The particulars regarding Mr. Meyer's death will probably never be known. The cabled advices show that he fell overboard into the Yangtze River on the evening of June 1, 1919, from the steamer *Feng Yang Maru* while en route from Hankow to Shanghai and that his body was discovered 30 miles above the town of Wuhu, near Nanking. The facts that his wanderings in search of plants are over and his contributions to these inventories at an end are chronicled with great regret. It is perhaps a significant coincidence that his only contribution to this number is a weeping variety (No. 43791) of the dry-land elm, which was one of his substantial additions to our list of useful trees."

Soy bean introductions: *Soja max* (L.) Piper. Fabaceæ. *(Glycine hispida* Maxim.) "43529-43533. An important leguminous plant valuable for food and forage.

"43529. 'Variety 1, race 1.'

"43530. 'Variety 1, race 2.'

"43531. 'Variety 1, race 3.'

"43532. 'Variety 2.'

"43533. 'Variety 3'

"43639-43641. From Canton, China. Presented by the American consul general, through the Department of Commerce. Received November 27, 1916. 'Four varieties of beans are grown in the Canton consular district: The black, the red, the yellow, and the so-called white. These beans are cultivated along the banks of the Tsochiang and the Yuchiang, in Kwangsi. The best varieties are said to come from near Siangshui and Lungchow in the southwestern part of the Province. The actual acreage under cultivation can not be estimated, on account of the fact that the beans are not cultivated in any one district but in many places and in small patches of from 1 to 3 mou. (the mou varies in different parts of China; in Canton 4.847 mou equal one acre.)' (From *Consular Report, November 7, 1916, p. 504.)*

"43639. *'White bean.* The white bean is called by the Chinese *chutou* or *pearl-shaped* bean. It is grown principally in the Province of Kwangsi, although certain quantities are produced in Kwangtung, Yunnan, and Kweichow Provinces, which are within this consular jurisdiction.' *(Consular Report, November 7, 1916, p. 504.)*

"43640. 'Black beans.'

"43641. 'Yellow beans.'"

43492 *Botor tetragonoloba* (L.) Kuntze. Fabaceæ. Goa bean. *(Psophocarpus tetragonolobus* DC.) From Mandalay, Burma. "A climbing legume grown in tropical or subtropical regions for the young tubers, which are eaten raw or cooked, and for the young pods, which are an excellent vegetable." Address: Washington, DC.

457. Grinenco, Ivan; Capone, Giorgio. eds. 1921. Produits oléagineux et huiles végétales: Etude statistique sur leur production et leur movement commercial [Oleaginous products and vegetable oils: Statistical study on their production and trade]. Rome, Italy: Institute Internationale d'Agriculture, Service de la Statistique Générale. xxxii + 421p. See p. XX-XXI, 140-41, 144-47, 442-43, 480-81. Sept. 15. Index in front. [Fre]

• ***Summary:*** In Sept. 1921 the IIA *(Institute Internationale d'Agriculture)* published this monograph in French. Two years later, by popular demand, an updated English-language edition was published. Contents: Introduction. Northern hemisphere: Europe, America, Asia, Africa, Oceania (Hawaii, Guam). Southern hemisphere: America, Asia, Africa, Oceania. Recapitulative tables of commerce, 1910-19. Note 1. All import and export statistics are given in quintals. 1 quintal = 100 kg.

The soybean (introductory information, p. xxii-xxiii, xxxii). Northern hemisphere–Europe. Germany (imports of soybean and soy oil 1910-14, p. 4). Denmark (production of soy oil in 1917, p. 17; imports and exports of soybeans and soy oil 1910-19, p. 18-20). France (imports and exports of soybeans and soy oil 1910-19, p. 28-31). Great Britain and Ireland (treated as one country; imports, exports, and reexports of soybeans and soy oil 1910-19, p. 32-35). Norway (imports of soybeans 1910-19, p. 47). Netherlands (Pays-Bas, imports and exports of soybeans and soy oil 1910-19, p. 49-52). Romania (In 1915 production of soybeans on 3 hectares was 3,600 liters). Russia (in Europe

and Asia, imports of soy oil 1909-17, p. 70-71). Sweden (imports and exports of soybeans and soy oil 1910-19, p. 74-76).

Note 2. This is the earliest document seen (Jan. 2009) that gives soybean production or area statistics for Eastern Europe.

America: Canada (imports of coconut, palm, and soy oil {combined} for the production of soap {in hectoliters} 1915-19, p. 88-89). Cuba (various attempts have been made to introduce the soybean, p. 94).

United States (area and production in 1909 {659 ha}, then from 1917-1920, p. 97-98). An overview of soybeans in the USA (p. 103, 105) states that the soybean, known in the USA since 1804, has become of great economic importance during the past few years. It is becoming popular mainly as a forage plant, but also for its seeds, for extraction of oil, and for making other products. Statistics have been published regularly since 1917. The census for 1909 showed 659 hectares cultivated in soybeans. During the years from 1917 to 1919 the cultivated area surpassed 60,000 ha. The three main states for soybean cultivation are North Carolina, Virginia, and Mississippi, which in 1919 cultivated respectively 33,185, 12,141, and 3,238 hectares; this was almost 75% of the total cultivated to soybeans in the USA. In 1910, the seeds were used for the extraction of oil in the USA, and for the first time the seeds were imported from Manchuria. In 1915, domestically grown soybean were used as a source of oil. This industry is developing rapidly, because the extraction of the oil is easily adapted to existing facilities that press oil from cottonseed and linseed. A table (p. 106) shows production of 16 vegetable oils in the USA from 1912 to 1917. Soybean oil production (in quintals) has increased from 12,537 in 1914, to 44,996 in 1916, to 190,843 in 1917. Figures are also given for peanut oil, sesame oil, etc. Other tables (p. 108-10) show imports, exports, and reexports of soybeans and soy oil from 1910 to 1919.

Asia: China (exports of soybeans and soy oil 1910-19, p. 161-62). French Indo-China (overview, esp. Cambodia and Tonkin, p. 187). Japan (area planted and production of soybeans 1877-1919, p. 190; overview, p. 191; production of soy oil 1909-18, p. 192; imports and exports of soybeans and soy oil 1910-19, p. 192-93). Korea (area planted and production of soybeans 1909-1918, p. 194; imports and exports of soybeans and soy oil 1909-11, p. 195). Formosa [Taiwan] (area planted and production of soybeans 1901-06, p. 196; imports and exports of soybeans and soy oil 1909-17, p. 197. In 1901 10,888 ha produced 8,056,400 liters of soybeans. In 1904 21,960 ha produced 24,401,700 liters of soybeans). Note 3. This is the earliest document seen (Jan. 2005) that gives soybean production or area statistics for Formosa (Taiwan; ceded to Japan in 1895 after Japan won the Sino-Japanese War).

Kwantung [Kwantung Leased Territory in Manchuria] (area planted and production of soybeans 1911-17, p. 198. In 1911 14,627 ha of soybeans produced 102,112 quintals. In 1916 29,902 ha produced 153,995 quintals of soybeans).

Africa: Algeria (in recent years, trials have been made to introduce soybean culture to Algeria, p. 238). Egypt (imports of soy oil 1919, p. 244-47).

Southern hemisphere–America: (Note 4. Soy is not mentioned at Argentina, Brazil, or any other South American country). Asia: Netherlands Indies. (A) In Java and Madura, the area planted to soybeans was 162,800 ha in 1916, 175,696 ha in 1917, and 157,844 ha in 1918. Gives imports of soy oil (1,085 quintals in 1914) and exports of soybeans (46 quintals in 1913) (p. 297-98). (B) In outlying territories, gives imports of soybeans from 1913 to 1919 (p. 299). Africa: Southern Rhodesia (attempts have been made to introduce soybeans and several other oil plants from temperate climates, p. 317). Oceania: Soy is not mentioned at Australia, New Zealand, British New Guinea, former German New Guinea [later Papua New Guinea], or any other country in southern Oceania. (p. 297). Recapitulative tables–Imports and exports from 1910-1919. Soybeans, p. 368-69. Peanuts, p. 370-75. Sesame seeds, p. 376-79. Palm fruits *(Amandes de palme,* from which palm oil is obtained), p. 392-93. Peanut oil, p. 414-17. Corn oil, p. 416-17. Sesame oil, p. 418-19. Soy oil, p. 420-21. Other oils covered in detail by this book are: Cottonseed, hempseed, linseed, rapeseed *(colza* and *navette),* poppy *(pavot* or *oeilette),* castor, olive, coconut, palm, and other–non-specified. Address: 1. Doctor of Agronomics; 2. Doctor of Economics. Both: IIA, Rome, Italy.

458. Wester, P.J. 1921. The food plants of the Philippines. *Philippine Agricultural Review* 14(3):211-384. Third quarter. See p. 360.

• ***Summary:*** "Soya. *Glycine max* M. Leguminosae. An erect, annual herb 35 or more cm tall, the beans of which are made into flour or otherwise prepared in various ways for the table in India, China and Japan, and from which a valuable culinary oil is obtained. Of limited distribution and rarely cultivated. Has proven very productive in Bukidnon and Lanao below 700 meters altitude. A crop of undoubted value for the Philippines, both for human food and as a stock feed. Said to have been introduced during the Spanish régime. The Soy bean."

Note: The Spanish ruled the Philippines for about 100 years (putting down many revolts) until Dec. 1898 when the Spanish-American War brought the archipelago under American control; the revolts continued. Address: Agricultural Advisor.

459. *Oil and Colour Trades Journal (London).* 1921. The soya bean industry of S. Manchuria: Consular news. 60(1207):2080. Dec. 3.

• ***Summary:*** "The annual production of soya beans in Manchuria is estimated at 2,500,000 tons, of which about three-fourths is exported, 30 per cent. in the form of beans, and the balance in the form of bean cake or bean oil." A table shows the weight (in piculs) of these three products exported in 1919 and 1920. For 1920: Beans 10,224,437. Bean cake 21,479,033. Bean oil 1,805,107. The total value of exports in 1920 was approximately 92,350,000 taels.

Until the Russo-Japanese War of 1904-05 [soya] beans were only exported from South Manchuria in the form of bean cake and bean oil, and the sole market for them was in China, the cake being used as a fertiliser in the sugar-cane fields of the Canton and Fukien [Fujian] Provinces, and the oil chiefly as a food and an illuminant. The valuable properties of bean cake as a fertiliser were then discovered in Japan, to which the market for the product extended, the demand from Japan soon exceeding that from China. In 1908 a trial shipment of beans to England also opened the eyes of British oil-seed manufacturers to the value of the soya bean for the same purposes for which cotton and linseed oil were used, with the result that in that year 400,000 tons of beans were shipped to England. Since then the trade has never looked back. The demand soon extended to the Continent of Europe, and finally to America, which for a time became the chief market for bean oil, though the exports to that country have laterally declined."

A second table shows the destination and amounts of beans, bean cake, and bean oil exported from South Manchuria in 1920. The destinations (listed alphabetically) are: Denmark, Dutch Indies, Egypt, Germany, Great Britain, Hong Kong, Japan and Korea, Netherlands, United States, Chinese ports, other countries. The top four importers (in piculs) of soya beans are Japan and Korea (5,637,882), Chinese ports (2,490,727), Denmark (682,297), and Dutch Indies (546,186). The top four importers (in piculs) of bean cake are Japan and Korea (17,781,698), Chinese ports (3,430,483), United States (182,669), and Denmark (83,285). The top four importers (in piculs) of soya bean oil are Netherlands (616,204), United States (460,379), Japan and Korea (279,823), and Chinese ports (167,598).

This "table includes the exports by steamer from Dairen, Newchwang, and Antung and across the Korean frontier through Antung, Hunchun, and Lungchingtsun, but excludes those by native jung which were also considerable and went almost entirely to South China. All the exports to Europe and America and the bulk of those to Japan were shipped from Dairen, while Newchwang was the chief port of shipment for the exports to Chinese ports. The export of bean oil to the Netherlands is a new trade. It is possible that the ultimate destination of the bulk of the oil was Germany."

Source: *British Consular Report.*

460. Hall, C.J.J. van. 1921. Ziekten en plagen der cultuurgewasen in Nederlandsch-Indië in 1921 [Diseases and pests of cultivated plants in the Dutch East Indies during 1921]. *Mededeelingen van het Instituut voor Plantenziekten (Buitenzorg)* No. 53. 46 p. See p. 6, 19-21. [Dut]

• ***Summary:*** Discusses *Aproaerema modicella*, Chrysomelidae, *Etiella zinckenella, Melanagromyza sojae,* Noctuidae, Sphingdae. A bacterium (=pseudomonas) solanacearum was isolated from soybeans. These pests were observed at the following locations: Cheribon, Djokjakarta (Yogyakarta), Soerakarta, Semarang [Central Java], Madioen, Kediri, Soerabaja, and Besoeki.

461. Hall, C.J.J. van. 1921. Ziekten en plagen der cultuurgewasen in Nederlandsch-Indië in 1920 [Diseases and pests of cultivated plants in the Dutch East Indies in 1920]. *Mededelingen van het Laboratorium voor Plantenziekten (Indonesia)* No. 46. 50 p. See p. 20-21. [Dut]

• ***Summary:*** Discusses Chrysomelidae, *Epilachna, Etiella zinckenella, Melanagromyza sojae.* These pests were observed on soybeans *(kedelee)* at the following locations: Cheribon, Kedoe, Djokjakarta (Yogyakarta), Madioen, Kediri, Soerabaja, Besoeki, and Menado. Address: Netherlands Indies.

462. Jumelle, Henri Lucien. 1921. Les huiles végétales: Origines, procédés de préparation, caractères et emplois [The vegetable oils: Origins, processing methods, characteristics, and use]. Paris: Librairie J.-B. Baillière et Fils. 496 p. Illust. 18 cm. [Fre]

• ***Summary:*** In the section titled "Huile de soja," soybean oil is discussed on pages 346-351. The great center of production for the exportation of seeds, oil and cakes is Manchuria, although there are still large crops in many provinces of the New China (Chan Toung [Shandong / Shantung], Kiang Sou [Shanxi / Shansi], Hou Pé [Hebei / Hopei], Ho Nan [Henan / Honan], etc.).

The soybean is known as *teou* in China, *daizu* in Japan, *dau nanh* or *dau tuong* in Indochina, *katjang kadele* in China, and *pak tau* in Hong Kong.

The author was born in 1866. An illustration (line drawing by Thiebault) shows a soy bean plant, with an inset of the pods. Address: Prof., Faculté des Sciences de Marseille, Directeur du Musée Colonial.

463. Rouest, Leon. 1921. Le soja et son lait végétal: Applications agricoles et industrielles [The soybean and its vegetable milk. Agricultural and industrial applications]. Carcassone (Aude), France: Lucie-Grazaille. 157 p. Illust. No index. 25 cm. [42 ref. Fre]

• ***Summary:*** Contents: Introduction–What is soya? 1. History of the dissemination of soya: In 1712 the naturalist Kaempfer introduced soya, introduction of soya to France and Europe, soya is cultivated in Austria in 1875 by Prof. Haberlandt, soya is the object of many trials in France from

1876 to 1881, the study and acclimatization of soya becomes widespread, the causes of setbacks in the cultivation of soya.

2. Cultivation of soya: Botanical characteristics of soya, the varieties of soya, Chinese varieties and soya in China, Japanese varieties and soya in Japan, American varieties and soya in America (varieties: Mammoth, Hollybrook, Ito San, Guelph, Haberlandt, Medium Yellow, Wilson, Peking, Tokio, Mandchu [Manchu], Black Eyebrow, Barchet), soya in Europe–France and Italy, seven varieties of soya tested in France, soya in the experimental farms for new crops *(les Fermes Expérimentales de Néoculture;* Many varieties from the USA were tested, including Manchu, Wilson Five, Haberlandt, Tokio, Virginia, Hato [Hahto], Early Medium Green), the cultural and geographical appearance of soya, its production worldwide, planting soybeans, heat units *(degré thermique)* and the germination of soya, the importance of spacing between plants, number of seeds per hectare, soya during its vegetative stage, the vegetation of soya compared with that of the haricot at high altitudes, rolling the seeds and types of crop maintenance, growth of the plant, acclimatization, the enemies of soya.

3. Composition of the soybean plant. 4. Soya forage: Green soya forage, soya hay, soya as a plant for soil improvement. 5. Harvesting soybean seeds: Maturity of the seed, harvesting soya, the food value and composition of soya seeds. 6. Soya as an oil plant: Richness in oil, defatted soybean cake, imports and exports of soya cake from 1915 to 1919 (Imports to: Sweden, Canada, Korea, Japan, Formosa. Exports from: England, China, Korea), production of soya cake from 1915 to 1919 (Denmark, Great Britain and Ireland, Netherlands, Sweden, USA, Japan, Formosa, Korea, Java and Madura).

7. Soymilk: Its manufacture (in 1910-1913 Li Yu-ying installed a factory named "La Caséo-Sojaïne" at Valées {Asnière-Seine} near Paris. Rouest visited this factory and saw them make soymilk, which was filtered using a filter-press resembling those used in sugar refineries), its properties and composition, composition compared to other types of milk, powdered soymilk, soymilk in the nursing and feeding of animals, soymilk related to tuberculosis in animals and in humans, soymilk would allow the milk and butter from animals to be reserved exclusively for human foods and could be used for raising many piglets, manufacture of non-dairy milk in Canada (a factory is now under construction). 8. Soya in Industry: Soymilk and soy casein, Sojalithe (like Galalithe).

9. Soya in human nutrition: Soy flour and its applications (incl. Li Yu-ying's usine de la Caséo-Sojaïne, and bread made of soya and wheat), soya compared to dry legumes (such as lentils, haricots, peas, beans), soya used as a legume (whole soybeans), the food value of soy sprouts, preserves and confections made from soya, soya chocolate and coffee, the amount of nutrients produced by soya and other crops from a unit of land, a meal of soya served in France (prepared and served some years ago by Li Yu-ying's soyfoods plant La Caséo-Sojaïne for the major print media, the medical press, the National Society for Acclimatization, etc.; it consisted of 2 soups {one with 'soya meat' and one with soymilk}, 2 entrees {an omelet with smoked soya ham, and fritters stuffed with soy meat}, soy [actually mung bean, *lüdou]* sprouts in a salad and sauteed, 3 desserts {soya cake, biscuits, and confection}, and soy coffee; a recipe for each is given; soya meat is smoked tofu).

10. Use of soya in East Asia: Tofu *(fromage végétal),* soy-based condiments (such as natto {Ping ming Natto and Tokio-Natto}, miso, Chinese miso or tao-tjiung [doujiang], and shoyu {Soyou or Schozou}), making soy sauce in Kwantung, China (from Groff).

11. The opinions of several authors concerning soya (from the French medical and hygienic press): Introduction–E. Maurel. Soya and soy bread in diabetic diets–Dr. Dujardin-Beaumetz, Dr. Bloch, Dr. J. Le Goff, L. Beille, M. Gautier. Soya used as a bean–M. Gautier. Soy sauce used in place of meat extracts. The state of cheese. The popularization of soya in Europe–A. Paillieux.

Conclusions: The influence of cultural technology on variation. Appendix: Advice to experimenters on the acclimatization of soya in France. Other methods of obtaining early-maturing soybeans.

The author concludes (p. 140): We must make every effort to acclimatize soya in France. We must develop the will and learn from past mistakes. Most soybean varieties now available in France are too late. We must get varieties from Manchuria, whose climate is similar to that of southeastern France, and from the northeastern USA. It is urgent that, in the near future, we start a Soybean Experiment Station to take responsibility for this work. The setbacks since 1830 can be overcome by present science and genetics. The first step is to introduce better varieties.

On the last page is a full-page advertisement for various seeds sold by Mr. Rouest, including 30 varieties of soybeans *(Soja hispida);* the names of the individual varieties are not given.

Illustrations show: (1) A soy bean plant with many pods (title page). (2) Flowers and pods of the soy bean plant (p. 29). (3) Soy pods and beans (p. 30). (4) A soy bean plant drawn by a Chinese artist (p. 32, from Li Yu-ying). (5) Pods of the Hato [Hahto] variety of soy bean (p. 51). (6) Germinating soy bean seeds (p. 54, from Li Yu-ying). (7) Soy bean roots with nodules (from a photo by Dr. Le Goff; p. 73). (8) Soy bean pods, opened to show 3 beans in each (p. 82).

Tables show: (1) Production of soybeans by color in China in 1916 and 1917 (p. 35, in quintals, from the International Yearbook of Rome, Vol. 1, 1919): In 1917:

Yellow 4,069,822. Other 953,012. Green 181,190. White 71,234. Black 40,066. Total: 5,315,324.

(2) Percentage composition of various oilseed cakes (p. 95, from Kellner). (3) Imports and exports of soybean cake, by country, from 1915 to 1919 (in quintals, p. 96). Imports are given for Sweden, Canada, Korea (from 1916), Japan, and Formosa [Taiwan]. Exports are given for England (6 quintals in 1915), China (including Manchuria, by far the biggest exporter, from 1916), and Korea (from 1916).

(4) Production of soybean cakes, by country, from 1915 to 1919 (p. 97, in quintals, based on statistics from the International Bureau of Agriculture, Rome, 1919). In descending order of production in 1915 (in quintals): Japan 5,439,337. Korea 3,209,238. Great Britain and Ireland: 1,513,059. Denmark 921,782. Java and Madura 503,025. Note that China is not listed. Netherlands 144,523. Formosa [Taiwan] 62,131. Sweden 1,733. USA 0, but 501,822 in 1916. Address: Directeur des Fermes Expérimentales de Néoculture, Carcassonne (Aude), France.

464. Crepin, Pierre. 1922. Séance générale du 5 Décembre 1921 [General meeting of 5 Dec. 1921]. *Bulletin de la Societe d'Acclimatation* 69(1):40-45. Jan. See p. 44. [Fre]
• ***Summary:*** The section titled "Botanical" (p. 44) states: "In order to pursue cultural trials of the soybean *(du Soja),* seeds of diverse varieties have been ordered from Indo-China. The Resident superior, Mr. Garnier, Director of the Economic Agency of Paris, had eleven samples delivered to us from Tonkin, Cochin-China, Cambodia, and the territory of Kwang-cho-wan (French: *Kouang-Tchéou-Wan).*

Note 1. This was a French leased territory on the southwest coast of Guangdong province, in southeast China, on Zhanjiang Gang (Kwangchowan Bay), about 270 miles (435 km) west of Hong Kong. The territory (325 square miles; 842 square km) consisted of a narrow coastal area, two large islands, and many small ones, and adjacent waters acquired by France in 1898 by lease for 99 years; it was attached to French Indochina but during World War II was held by Japanese. In 1945 it was returned to China by France.

"These samples will be distributed among the same colleagues [members] who received the seven varieties of soybeans from America, kindly sent in early 1921, by the Bureau of Plant Industry, from Washington, DC. A report of the results of the cultivation of these soybeans will be published."

Note 2. Prof. Bois, vice-president of the Society, presided at the meeting. Address: Assistant to the Secretary of the Meetings, France.

465. Prudhomme, Em. 1922. Valeur alimentaire de quelques légumineuses cultivées en Indochine [Alimentary value of some legumes cultivated in Indochina]. *Agronomie Coloniale (L')* 6(50):33-41. Feb. (Institut National d'Agronomie Coloniale). [Fre]
• ***Summary:*** A full-page table (p. 35) gives the chemical composition of seven lots of leguminous seeds grown in Indochina. Two of these lots are soybeans *(Soja, Dau-nanh–Soja hispida).* For each is given: The weight of 1,000 seeds: 126.17 to 136.05 gm. Average dimensions of the seed (length, width, height) in millimeters. Percentage composition of water (10.34 to 11.52%), ash (4.74 to 4.80%), oils and fats (17.04-17.16%), protein (40.80 to 41.70%), saccharifiable material (12.00 to 13.08%), crude cellulose (7.86% to 8.45%), and *matieres non doses* (5.06 to 5.4%). These analyses were conducted in the National Institute of Colonial Agronomy by Paul Ammann and L. Rigotard.

Each of these seven legumes is then discussed separately. The section titled "Soja" (p. 39) states: "Soya is well known in Europe, but it is necessary to repeat here that this seed is remarkable in its richness in nitrogenous materials (protein) and in its value as an oil-producing seed. By reason of its composition, this legume would seem to be called on to play an important role in the feeding of both humans and animals.

"Its protein content is more than three times greater than that of oats, wheat, or sorghum, twice that of linseed, and four times that of corn, barley, or rye; it is about the same as decorticated cottonseed cake.

"In order to give a better account of the role that these six different legumes might play in human nourishment, I had the opportunity to conduct some trials in 1917 at the hospital of the colonial garden *(Jardin colonial)* at the request of M. Rhinehart, Inspector general of the colonies, and Director of the Service for the utilization of colonial products for the national defense. These trials resulted in a number of observations which it would seem useful to repeat here. Based on their flavor and ease of cooking, these legumes can be grouped into three categories, as follows:" Phaseolus radiatus is rated the best, whereas soya is rated the lowest, because it takes too long to cook–even though its flavor was found to be agreeable (p. 40-41).

*Phaseolus radiatus* is mentioned on p. 37-38, 40-41. Address: Ingénieur Agronome, Directeur de l'Institut National d'Agronomie Coloniale (Director of the National Institute of Colonial Agronomy).

466. Guillaumin, A. 1922. Les variétés de soya d'Extrème-Orient: Origine probable du soya [The varieties of soybeans in East Asia: The probable origin of the soybean]. *Revue de Botanique Appliquee & d'Agriculture Coloniale* 2(10):254-58. June 30. [10 ref. Fre]
• ***Summary:*** "The soybean *(Le Soya; Glycine Soja* Sieb. et Zucc., *Dolichos Soja* L, *Soja hispida* Moench, *S. angustifolio* Miq.) has been cultivated in the Far East since antiquity. Shen-Nung *(le Shénon),* written up by Houandi in

about 3,000 to 3,500 years before Jesus-Christ, already mentioned the soybean. Since then, its culture has expanded to Indochina, India, Malaysia, Europe, America, and Africa.

"Long ago, in Austria and in France, varieties such as *Soja d'Etampes,* were selected for their high yield. In America, efforts have long been made to obtain, for the diverse climates, both forage varieties and seed varieties. And the U.S. Department of Agriculture has assembled in its test fields more than 500 varieties, of which about 20 are currently in commerce. Among the forage varieties are (Ball 1907): Early Brown, Black Eye Brown, Peking, Wilson Five, Virginia, Barchet, Biloxi, Laredo, Atoo San [sic, Ito San?], Tarheel Black, and Wisconsin Early Black. Among those grown for their seeds are: Ito San, Manchu, Elton, Medium Yellow, Mikado, Hollybrook, Haberlandt, Mammoth, Tokyo, Guelph, Austin, Easy Cook, Morse, Hahto, Early Medium Green, Mandarin, and Chiquita.

Note 1. This is the earliest document seen (Oct. 2004) that mentions the soybean variety Black Eye Brown. However, it does not appear in Ball (1907) as stated, nor does any name even vaguely resembling it appear. The Black Eye Brown variety is mentioned in only 3 known documents, all published in France in 1922.

"Note that the forage varieties all have black- or dark-colored seeds, whereas the seed varieties have yellow or greenish seeds.

"In Turkestan it seems that the only varieties are ovoid (5.7 x 3.7 mm), brilliant yellow, with brown hilum and traversed longitudinally by a bright line." Note 2. Turkistan or Turkestan is an historical region of Central Asia, usually thought to comprise Turkmenistan, Uzbekistan, Kyrgyzstan, Tajikistan, southern Kazakhstan, western China, and northeast Afghanistan.

Note 3. This is the earliest document seen (April 2008) concerning soybeans in Turkestan, or the cultivation of soybeans in Turkestan (not including Chinese Turkestan). This document contains the earliest date seen for soybeans in Turkestan, or the cultivation of soybeans in Turkestan (not including Chinese Turkestan) (1922). The source of these soybeans is unknown. Unfortunately, it is not clear in which part of Turkestan the soybeans were grown.

"In India, soybeans are cultivated in the United Provinces and at the foot of the Hamalayas from Kashmir to Darjeeling." David Hooper (1912) distinguished five different soybean races in India.

"In Cambodia, the only known variety is ovoid (6.3 x 4.2 cm), dull yellow, brown bilum, with a long, clear white line, known as *Sandek sieng* in Cambodian and *dau nanh in Annamite.* It is cultivated along the steep banks of the Mekong River.

"In Cochin China, the soybean is cultivated only on the red soils of the provinces of Chau-doc, Baria, and Bien-Hoa; in the western provinces, cultivation is insignificant and the seeds come from Cambodia. It seems that there is only one variety, closely related to that of Cambodia, called *dau nanh* or *dau-xa,* but it is not well established / widely grown, for it bears black or brown seeds.

"In the province of Baria one can obtain two harvests in a wet year–one in September, the other in December-January. In the province of Bien-Hoa, there is only harvest.

"In Annam, there is one variety similar to that cultivated in the lower parts of the provinces of Bin-dinh, Thua-hien, Dong-hoi, and Tanh-hoa.

In Tonkin, the soybean is known as *dau tuong;* in the [Mekong] delta, one can distinguish a small, ovoid variety (5.1 x 3 mm), with a yellow seed coat and a hilum surrounded by a brownish black aura that sometimes overflows the sides. In the region of Lang-son, on the plateaus 100-500 meters in height, it is replaced by a larger variety, ovoid (7.1 x 5 mm), dull yellow, and a hilum that is uncolored [pale] or brownish; one variety is also cultivated at Lao-kay.

"In Laos, the soybean is known as *Mok toua kon* and *Ta tone,* according to Dr. Spire, but precise information is lacking.

In the territory of Kwang-cho-wan (French: *Kouang-tchéou-wan,* in southeast China) the soybean is cultivated in the region of Taï ping, at an altitude of 30 meters. It is planted in the spring and harvested in the summer. One can distinguish two varieties here. One is very elongated (8 mm x 4.6 mm), dull yellow with a very clear brown hilum, called *Wong tao* or *Wong tao tsaï* in Cantonese. The other is small, flat (6.4 mm x 3.7 mm), dull black, with a large hilum, called *Hat tao* in Cantonese; it is absolutely the same as the variety Nigra cultivated at the botanical gardens of Cluz (Romania), and in Trieste (Italy), but different from that which is cultivated under this name at the botanical gardens of Cracow / Krakow (French: *Cracovie)* (Poland), Tabor (Czechoslovakia), and Delft (Netherlands), which is fatter, more round (7 mm x 4.8 mm) and of a velvety black color.

Note 4. This is the earliest document seen (Feb. 2005) concerning the cultivation of soybeans in Czechoslovakia (which became a country in 1918). This document contains the earliest date seen for the cultivation of soybeans in Czechoslovakia (June 1922). The source of these soybeans is unknown.

"In China, in Szechwan, only the yellow and green varieties are known. In the region of Shanghai, R.P. Courtois, of the Museum of Zi-ka-wei, has assembled an important collection of soybean varieties. Descriptions are given of varieties with the following colors and names: (1) Yellow: *Ta hoang téou* (large, yellow, almost round), *Kiu hoang téou* (ovoid, brilliant yellow). (2) Green: *Tsing pi téou* (roundish, 7.1 x 5.5 mm, clear green with clear hilum). (3) Brown: Large, ovoid (9.1 x 6.4 mm), reddish brown, with a slightly clearer hilum; no name given. (4) Black: Many varieties. (4A) Large ovoid seeds (9 x 4.3 mm), with

large hilum; indigenous name unknown; (4B) A little smaller and bulging (8.3 x 5.4 mm), with ornate hilum and a longitudinal white line, named *Ta hé téou;* (4C) Ovoid (8.1 x 4.7 mm) with a wide hilum traversed by a white line, called *Hé téou;* (4D) Small (6.7 x 3.1 mm) and brownish black named *Siao hé téou;* (4E) And finally a very small, flat (6 x 2.7 mm), brownish black named *Ni téou.* By their shape, form, and color, the seeds of these last appear very similar to the American variety Laredo."

"In Europe, soya has its apostles, but it will never amount to anything more here than a small-time vegetable. Despite the Caséosojaïne at Valées near Paris, France (Li Yu-ying, 1911) and the Soyama Werke at Bockenheim, Germany (1914), the milk, cream, butter, and cheese [tofu] made from soya will never be more than ersatz. The "soy bread" is only good for diabetics and the "soy ham" *(jambon de Soja)* in nothing but a weak imitation of pork. Soybeans themselves are indigestible and require a very long time to cook–even the yellow or white varieties. Soy sprouts *(germes de Soja),* which enjoyed some popularity before the war and deserved it, for they are a nice hors d'oeuvre, are actually nothing but mung bean sprouts."

Based on other sources (most of which are cited), the writer also discusses the soybean varieties of Manchuria (Hosie 1901), and Japan (Lemarié 1910), and discusses soybeans briefly in Korea, Philippines, Netherlands Indies, Also mentions foods made from soybeans in India, Indo-China, China, Japan, and Manchuria and speculates on the origin of the soybean. Address: Asst. to the Crop Service, Museum of Natural History (Assistant du Service de culture au Muséum d'histoire naturelle).

467. *USDA Bureau of Plant Industry, Inventory.* 1922. Seeds and plants imported by the Office of Foreign Seed and Plant Introduction during the period from April 1 to June 30, 1919. Nos. 47349 to 47864. No. 59. 77 p. July 20.
• ***Summary:*** Soy bean introductions: *Soja max* (L.) Piper. Fabaceæ. *(Glycine hispida* Maxim.)

"47436-37. From Wakamatsu, Japan. Presented by Rev. C. Noss. Received April 29, 1919.

"47436. Received as *Ogon daizu.* Seeds large, nearly spherical, golden yellow. The seeds, however, agree with those of S.P.I. No. 40371, *Dekisugi.*

"47437. Received as *hato koroshi daizu.* The seeds agree, however, with those of S.P.I. No. 40119, *Usuao.*"

No. 47510 is Botor tetragonoloba (L.) Kuntze. Fabaceæ. Goa bean. *(Psophocarpus tetragonolobus* DC.). From Zamboanga, Philippine Islands. Presented by Mr. P.J. Wester, agricultural adviser. Received May 12, 1919. Quoted notes by Mr. Wester. *"Seguidilla.* A climbing bean with 4-winged pods which, when used as string beans while tender, are of excellent quality. They should be of great value in Porto Rico and Panama." Address: Washington, DC.

468. Crevost, Charles; Lemarié, Charles. 1922. Catalogue des produits de l'Indochine [Catalog of the products of Indochina]. *Bulletin Economique de l'Indochine (Hanoi)* 25(155):387-430. July/Aug. See p. 426-30. [9 ref. Fre]
• ***Summary:*** In the section titled "Fats and vegetables" *(Matières grasses et végétales)* is a subsection titled "Soja–Soja max" (p. 426-30). It contains a general overview of the soybean, drawing much information from the publications of Li Yu-Ying and Grandvoinnet, including the names of the soybean in Cochin China, Annam, and Tonkin, Cambodia, Laos, China and Japan. Discusses the introduction by Li of soybean culture in the area around Paris, the laboratory and factory established by Li and its soy products, the characteristics of soy oil and its comparison with cottonseed oil, the use of soy oil in Great Britain to make soap and margarine, and the composition of soybeans cultivated in Laos, Tonkin, and Manchuria. The ash of the stem of the soybean, mixed with resin of *Canarium,* is said to be used to make joss-sticks for incense in Indo-China. Also discusses *Perilla ocimoides* (p. 407) and sesame (p. 422-26). Crevost was born in 1858.

Note: in 1920 Crevost was inspector of the agricultural and commercial services, and director-conservator of the agricultural and cultural museum in Hanoi; Lemarié, an Ingénieur-Agronome, was director of the agricultural and commercial services of Tonkin, and laureate of the national society for acclimatization. Address: 1. Inspecteur en chef des Services commerciaux, Directeur-Conservateur du Musée agricole et commercial de Hanoi; 2. Ingénieur agronome, Directeur-adjoint des Services économiques de l'Indochine, Lauréat de la Société nationale d'acclimatation.

469. Oudendijk, Gezant. 1922. De handel in sojaboonen en produkten daarvan te Dairen [Trade in soybeans and products thereof in Dairen, Manchuria]. *Korte Berichten voor Landbouw, Nijverheid en Handel (Buitenzorg/Jakarta)* 12(42):333. Oct. 19. [Dut]*
Address: Dutch "Gesandter" in Peking.

470. *Record of the Board of Commercial Development (Bangkok).* 1922. Oil plants and seed products of Siam. No. 5. p. 8-17. *
• ***Summary:*** This report includes a general review of the value of vegetable oils as a whole, followed by data concerning the most important oil seeds produced on a commercial scale in Siam, including soya, groundnut, and sesame oils. Includes: area under cultivation, estimated yield, distribution, time and period of ripening, local value, nature of oil, uses, and amount imported and exported.

471. Hall, C.J.J. van. 1922. De gezondheidstoestand van onze cultuurgewassen in de jaren 1920 en 1921 [The health

of our cultivated plants in 1920 and 1921]. *Teysmannia (Batavia [Jakarta])* 33(1-2):15-23. See p. 19. [4 ref. Dut]
• ***Summary:*** Soybeans were attacked by *Etiella zinckenella (peuboorder)*, and *Melanagromyza sojae (stengelboorder)*. Address: Instituut vor Plantenziekten.

472. Martindale, William Harrison; Westcott, W. Wynn. 1922. The extra pharmacopoeia of Martindale and Westcott. 17th ed. (Reprint) 2 vols. London: H.K. Lewis & Co., Ltd. See vol. 1, p. 568, 597, 824; vol. II, p. 369, 414-15. Index. 17 cm. [14 ref]
• ***Summary:*** The Preface to volume I notes that the last edition was issued in Jan. 1915, shortly after the European war began. The war was caused by "Germany's long conceived desire to ruin and destroy the British Empire–her best friend commercially..." During the war, brilliant German chemists and chemical factories quickly changed over "to the manufacture of explosives and poison gases"–such as mustard gas.

In the long chapter titled "Materia Medica, Official and Non-Official, alphabetically arranged" is a section on "Nutrimenta" (p. 562-79) that describes foods which can be used as medicines. In the subsection on "Milk preparations" (p. 567-75) we read (p. 568): "Synthetic milk. *Syn.* *Solac (T.M. 346623) [Trade Mark, British registered]. Soya beans are ground to a coarse flour and stirred vigorously in an alkaline solution to extract the soluble proteins. The oil, which is nauseous to the taste, is carefully removed. Finally Arachis and Sesame Oils, Dextrin and the remaining salts of milk are added; after emulsifying, *B. Acid Lactic* is added. The average fat content is 3.5%.

"*Melco* is also made using Pea Nuts as the source of Albumin. The methods are subjects of patents by W.J. Melhuish, *(The Practitioner* {London}, Vol. 10, No. 115, p. 80; *Pharmaceutical Journal and Pharmacist* {London}, Vol. ii, 1916, p. 297; *British Medical Journal*, Vol. ii, 1915, p. 646; Vol. 1/18/430).

"D.F. Ritchie writes that he experimented in the matter some years ago and found that a milk can be made by grinding up Soya Beans with a small quantity of water, and then adding enough water to make an emulsion, but Soya Beans as such cause considerable gastric disturbance *(Pharmaceutical Journal and Pharmacist* {London}, Vol. ii, 1916, p. 244; See also F. Golby, *Pharmaceutical Journal and Pharmacist*, Vol. ii, 1916, p. 214).

The section titled "Oleum papaveris" (p. 597-98) is identical to that in the 1915 edition.

In the chapter titled "Supplementary list of drugs" is a long section (p. 824) on "Soya Bean.–*Glycine Hispida (Leguminosae).*" It is identical to that in the 1915 edition.

The next two sections (p. 824) state: "Synthetic Milk *q.v.* has been made from the bean.

"Sarton (T.M. 322562) is a preparation of the bean for use as a diabetic food.

The next section, titled "Soya Oil" (p. 824) is almost identical to that in the 1915 edition.

In Vol. II, the section titled "Lecithin" (p. 87-88) is very similar to that in the 1915 edition; soy is not mentioned. In the chapter on "Analytical memoranda," the section on estimation of urea in the blood (p. 369) notes that "Urease contained in Soya Bean is used. It converts urea quantitatively into Ammonium Carbonate, but has no effect on other nitrogen constituents. (The hydrolysis is complete in 15 minutes.)... Caprylic Alcohol is used in conjunction with the Soy Bean flour. See for further details, pp. 414, 415."

The section titled "Urease method of estimating urea" (p. 414-15) begins: "Mix 25 Cc. of the urine with a pinch of powdered Soy Bean flour (2 to 3 Gm.)... It must be remembered that the urease [in the soy bean flour] attacks [hydrolyzes] only *urea*, 1 molecule of urea producing 1 molecule of Ammonium Carbonate." Details are given. can be used.

William Martindale lived 1840-1902. Volume I also discusses: Gluten (p. 576-77–Synonym: Vegetable Albumin). Diabetic foods (p. 576-77, incl. starchless bread; soy is not mentioned). *Oleum sesami* / Sesame Oil (p. 603-04; also called Benné oil, gingelli oil, teel oil). *Arachis Hypogæa.* (p. 780; also called Pea Nut, Ground Nut Goober Nut, Manilla grain [Manila grain], Chinese Almond).

Volume II also discusses: Proprietary medicines (p. 562-81, incl. Carter's Little Liver Pills, Ovaltine, and Pinkham's (Mrs. Lydia E.) Vegetable Compound, Woodward's Gripe Water). Address: 1. Ph.D., F.C.S.; 2. M.B.Lond., D.P.H.

473. Meijere, J.C.H. de. 1922. Zur Kenntnis javanischer agromyzinen [Toward a knowledge of the agromyzids of Java]. *Bijdragen tot de Dierkunde (Netherlands)* 22:17-24. [3 soy ref. Dut]
• ***Summary:*** The section titled "Melanagromyza sojae Zehntn." (p. 18-19) discusses various insect pests of soybeans: *Agromyza, Melanagromyza, M. dolichostigma, M. sojae, Ophiomyia, O. phaseoli.* An illustration (line drawing) shows the larva of *Melanagromyza sojae* and various parts of its body. Address: Amsterdam, Netherlands.

474. Piper, Charles V.; Morse, William J. 1923. The soybean. New York, NY: McGraw-Hill Book Company, Inc. xv + 329 p. Feb. Illust. Index. 24 cm. Reprinted unrevised in 1943 by Peter Smith Publishers, New York. [563 ref]
• ***Summary:*** This is the first comprehensive book about the soybean written in English, and the most important book on soybeans and soyfoods written in its time. Contains an excellent review of the world literature on soybeans and soyfoods with a bibliography on soy that is larger than any published prior to that time (563 references), a good description of the present status of the soybean worldwide

based on the authors' extensive contacts, and a great deal of original information. It quickly became a key source for people and organizations working with soybeans and soyfoods in all countries, and a major factor in the expansion of the soybean in the western world. Because of its scope and influence, Soyfoods Center considers the year of its publication to mark the end of the "Early Years" of the soybean worldwide. It remained in print until about 1986.

Contents: Preface. 1. Introduction: Name of the plant, origin, literature, use by the Chinese and Japanese, present importance, future prospects in the U.S., recognition of the possibilities. 2. The commercial status of the soybean: Manchuria and China, Japan, Europe, U.S., other countries, summary of imports and exports of soybeans and soybean oil. 3. Botanical history of the soybean: History prior to Linnaeus' "Species Plantarum" 1753, Linnaeus' misunderstandings of the soybean, Prain's elucidation, other and the correct botanical name.

4. Agricultural history of the soybean: Vernacular names of the soybean, China, Korea, and Japan, India and neighboring regions, Cochin China, Malayan region, early introduction into the United States, later U.S. introductions, the early introduced varieties (grown in the USA by 1898– Ito San, Mammoth, Buckshot, Guelph or Medium Green, Butterball, Kingston, Samarow, Eda, Ogemaw or Ogema), soybean in Europe, varieties grown in Europe and identification, Hawaiian Islands, Australia, Africa, Argentina (p. 50), Canada ("Soybeans are grown in very small quantities in Canada and then usually as a forage crop"), Philippines, Egypt, Cuba (p. 52), British Guiana, Mauritius (p. 53), present culture distribution. 5. Culture of the soybean: Climatic adaptations, soil preferences, water requirement, preparation of seed bed, time of planting, methods and rate of seeding, seeding for pasturage, depth of seeding, inoculation, fertilizer reactions, cultivation, soybeans in mixtures (with cowpeas, sorghums, Sudan grass, Johnson grass, millet, corn, or sunflowers and corn).

6. Harvesting and storage of soybeans: harvesting soybeans for hay, silage, for the seed, seed yields, proportion of straw to seed, storing seed, separation of cracked from whole soybean seed, viability of soybean seed, pedigreed, inspected, registered, and certified seed. 7. Composition of the soybean: Proportions of stems, leaves and pods, composition of plant and seed, nutritive and mineral constituents, forms of nitrogen in soybean nodules, factors affecting oil content of seed. 8. Utilization of the soybean: Diversity of uses (a chart, p. 129, shows 59 products that can be made from soybean seeds, and 6 more that can be made from soybean plants), soybeans for green manure, pasturage, soiling, ensilage, hay, straw.

9. Varieties: Japanese, Manchurian, botanical classifications, vital characteristics, descriptions of important varieties, key for identification, breeding and improvement, genetic behavior, oil content.

10. Structure of soybean seeds. 11. Soybean oil: Methods of extraction [Manchurian, and solvent], American oil mills, methods of shipping and marketing, prices, utilization in soap manufacture, food, paint manufacture, miscellaneous. 12. Soybean cake or meal: Feeding value, composition, use for feeding for dairy cows, cattle, swine, sheep, poultry, digestibility, injurious effects, fertilizer.

13. Soybean products for human food: Food value of the soybean, digestibility of the soybean and its products, mature or dry soybeans, immature or green soybeans (a "nutritious green vegetable"), soybean flour, digestibility of soybean flour, soybean bran (p. 225-26), soybean sprouts, soybean coffee, soybean or vegetable milk [soymilk] (preparation, composition, residue from the manufacture of vegetable milk [okara], utilization of soybean milk, condensed vegetable milk, vegetable milk powder, fermented vegetable milk), vegetable casein, tofu or soybean curd (names and brief history, method of manufacture, coagulating agents, manufacturing yields, digestibility, utilization of bean curd and manufactured products, bean curd brains or *tofu nao,* dry bean curd or *tofu khan,* thousand folds *{chien chang tofu},* fried bean curd *{tza tofu},* Fragrant dry bean curd *{hsiang khan},* frozen tofu *{kori tofu},* Chinese preparation, various dishes), natto, hamananatto [hamanatto], yuba, miso, shoyu [soy sauce], confections. 14. Table dishes of soybeans and soybean products: mature or dry beans, flour, tofu, sprouts (86 recipes). 15. Enemies of the soybean: bacterial, mosaic, fungous [fungus], and nematode diseases, insects, rodents. This last chapter is a comprehensive review of the literature on soybean diseases and insects published before 1922.

The Preface begins: "The soybean, also known as soya or soja bean, has assumed great importance in recent years and offers far-reaching possibilities of the future, particularly in the United States. It is, therefore, desirable to bring together in a single volume the accumulated information concerning this crop...

"The aim has been to present the information so as to make it useful from both agricultural and commercial standpoints, not omitting, however, much that is mainly of historical or botanical interest..."

The introduction begins: "There is a wide and growing belief that the soybean is destined to become one of the leading farm crops in the United States."

Note 1. C.V. Piper lived 1867-1926. Note 2. This is the earliest English-language document seen (July 2003) that uses the term "soybean bran" to refer to soy bran.

Note 3. This is the earliest document seen in which Piper or Morse describe natto, Hamananatto [Hamanatto], yuba, or miso.

Note 4. This book was published by March 1923 (See *Ohio Farmer,* 10 March 1923, p. 313). Address: 1. Agrostologist; 2. Agronomist. Both: United States Dep. of Agriculture, Washington, DC.

475. Bois, D. 1923. Essais de culture faits au Jardin d'Expériences du Muséum en 1922 [Cultivation trials made at the experiment garden of the Museum of Natural History (Paris) in 1922]. *Revue d'Histoire Naturelle Appliquee* 4(3):83-92. March. [4 ref. Fre]

• ***Summary:*** Recently new soy bean varieties have been received from the governor general of Indochina, the director of the Museum of Z-Ka-Wei, near Shanghai, China, and M. Rouest from Luxey (Landes). The results of trials during 1922 are compared with those of 1921, based on the source of the seeds (USA, European botanical gardens, Rouest, Indochina and Cambodia, and China). Address: Professeur au Museum national d'Histoire naturelle.

476. Meunissier, A. 1923. Observations faites sur les Sojas chez MM. Vilmorin-Andrieux à Verrières-le-Buisson (Seine-et-Oise) [Observations on soybeans at MM. Vilmorin-Andrieux & Co. at Verrières-le-Buisson in Seine-et-Oise]. *Revue d'Histoire Naturelle Appliquee* 4(3):93-94. March. [1 ref. Fre]

• ***Summary:*** "In 1922, we cultivated a collection of 25 varieties of soybeans, of which 23 were received from the USA via the National Society for Acclimatization. The varieties which seemed the best for our climate that year were Oto San [Ito San], Manchu, Peking, Guelf [Guelph], Black Eyebrow, Early Brown, Mandarin, Wisconsin Early Black, and Chiquita (provided by USDA, Washington, DC) and Tokyo Black, a variety already cultivated in the region of Paris. This year we received a more important collection of 47 varieties was received as follows: 20 from last year's harvest at Verrières of which 19 were from USDA in Washington, DC; 2 from the agricultural station at Wageningen, Netherlands (Yaskioka chiuriu, and O Yachi); 3 from our correspondents in the southwest of France (originally from America); 7 from Indochina (Tonkin, Cochinchine, and Cambodia) via the Society for Acclimatization (they didn't grow); 11 from the experiment station at Buitenzorg (Indonesia); 4 from the botanical gardens at Montpellier (south France; *Soja),* Goettingen (Germany; *Soja nigra),* and Amsterdam (Netherlands; Sangora)."

477. Piper, Charles V.; Morse, William J. 1923. Vernacular names of the soybean (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 35-36.

• ***Summary:*** Name–Locality.

An-ing–Naga Hills, Assam.
Bhat–United Provinces, India.
Bhatmas–United Provinces, India.
Bhatnas or Bhatwas–Nepal.
Bhatwan–Ceylon.
Bhatwas–United Provinces, India; Nepal.
Bhetmas–Bengal, India.
Bhut–Punjab, India.
Botumash, Bhativas or Bhatmais–Buthia, India.
Buncae–Ceylon.
Cadelee–Amboina.
Chlai–Bengal, India.
Coffee Bean–United States.
Dau nanh–Annam; Cochin China; Tonkin.
Dau tuong–Tonkin, French Indo-China.
Daidzu–Japan; Tonkin.
Disomhorac–Santhal, India.
Gari-kalai–Bengal, India.
Hoam teu–Cochin China.
Japan pea–United States.
Kajuna–Nepal.
Kajang koro–Celebes.
Katjang boelec–Java; Sunda.
Katjang-djepoen–Java; Sunda.
Khujoon–N. W. [North-West] Provinces, India.
Kije–Naga Hills, Assam.
Lasi–Kachin, Burma.
Lasi Shapre turu–Bhamo, Burma.
Lasi N'Loi–Myitkyina, Burma.
Lasi N'Hti–Myitkyina, Burma.
Mame–Japan.
Patani–India.
Patani-jokra–Assam.
Pe-kyat-pyin–Burma.
Pe-nga-pi–Burma.
Pois oléagineux de Chine–France.
Ram kurthi–Bengal, India.
Ryambai-ktung–Khasi Hills, Burma.
Salyang (Selliyang)–Sikkim.
San-dek-sieng–Cambodia, French Indo-China.
Sandek an gen sar–Cambodia.
Silliangdun–Sikkim.
Soia–France; Italy.
Soja–France; United States.
Sojaboon–Holland.
Sojabohn–Germany.
Sou–China.
Soy–United States.
Soya–United States; England.
Stock pea–United States.
Sudza–Naga Hills, Assam.
Ta teou–China.
Teou–Tonkin.
Tzuda–Naga Hills, Assam.
Yeou–China.

Geographical notes: Assam: A state in northeast India bordering to the north on Bhutan and Arunachal Pradesh. Bengal: A former province in northeast British India, now a region encompassing West Bengal (in India), and Bangladesh; the capital is Calcutta. United Provinces (in full

United Provinces of Agra and Oudh) are now called Uttar Pradesh, a state in north India bordering to the north on Nepal.

478. Piper, Charles V.; Morse, William J. 1923. Soybeans in the Philippines (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 50-51.

• ***Summary:*** "Philippines: The soybean is not a native crop in the Philippines. Varieties imported from the United States, China and Japan, Java and India have been tried out at various times at the different experiment stations in Luzon. Variety trials at Singalong and Batangas gave returns of forage and seed that were unsatisfactory. At Alabang and Lamao, the plants grew normally in every way, but were one-third smaller than plants of the same variety in Virginia. Layosa (1918) and Norona (1919) have done considerable successful breeding work with strains of this crop. At the present time the soybean is not recommended for general culture in the Philippines."

479. Piper, Charles V.; Morse, William J. 1923. Vegetable casein (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 233-34.

• ***Summary:*** "Vegetable casein can be prepared from soybean milk by precipitating the legumin from the milk, purifying by several washings and precipitations and finally by drying. The soybean casein obtained in this manner is a yellowish powder closely resembling animal casein prepared in the same manner. It is the general opinion that vegetable casein has a coefficient of digestibility much less than that of animal casein. According to the investigations of Labbé (1911 ["Le soja et ses usages"]), however, vegetable albumin is quite as readily assimilated as animal albumin. While vegetable casein has some differences from animal casein, about the same differences exist between the caseins of different animals.

"According to Beltzer (1911 *[see Scientific American Supplement,* 19 Aug. 1911, p. 115]), the manufacture of vegetable casein from the soybean has become an established industry in Cochin China. The extraction of the casein for industrial purposes is obtained from the meal, after the extraction of the oil from the bean."

"The casein obtained from the soybean can be employed in the same ways as animal milk. This vegetable casein is utilized for food and for industrial purposes. The various uses of soybean casein are: Medium for paints, dressing for textiles, size [sizing] for paper, Galalith, waterproofing for textiles, etc. As a food it is used as 'Soy-casein,' a flour like Nestle's, with which sauces, bread, jam, milk, fermented milk, cheese, and concentrated biscuits may be made."

Note 1. See also the separate section in this book titled "Soybean flour" (p. 222-25).

Note 2. This is the earliest English-language document seen (Oct. 2008) that uses the term "soybean casein" or "Soy-casein" to refer to isolated soy protein products.

480. Piper, Charles V.; Morse, William J. 1923. Tofu or soybean curd (Document part). In: Piper and Morse. 1923. The Soybean. New York: McGraw-Hill. xv + 329 p. See p. 234-44, 273-78. [6 ref]

• ***Summary:*** Contents: Introduction. Method of manufacture. Coagulating agents. Manufacturing yields. Composition of soybean curd. Digestibility of soybean curd. Utilization of bean curd and manufactured products. Bean curd brains or *tofu nao.* Dry bean curd or *tofu khan.* Thousand folds *(chien chang tofu).* Fried bean curd *(tza tofu).* Fragrant dry bean curd *(hsiang khan).* Frozen tofu *(kori tofu).* Chinese preparation. Various dishes.

Tofu, "a sort of white cheese or curd,... is called "Teou fu' by the Chinese, 'Tofu' by the Japanese, and 'Dan Phu' by the Annamites [in today's Vietnam]. It is said to have been originated by the Chinese philosopher, Whai Nan Tze, before the Christian Era, and was undoubtedly introduced into Japan from China by the Buddhists."

"The coagulating agents most generally employed throughout the Orient are the concentrated mother liquid obtained from the manufacture of salt from sea water, burned powdered gypsum, and magnesium chloride... The junior author (Morse) has obtained successful results with rennet and I per cent. solutions of acetic, tartaric, and lactic acids. Sour milk has also given satisfactory results as well as the water [whey] drawn from the bean curd after coagulation. By the use of pure salts or rennet the bitter taste which is generally found in the curd made by Oriental methods is avoided."

Yields: In commercial tofu production, 1 pound of beans is said to yield about 3.57 lb of tofu (i.e., the yield is 3.57). Champion (1885) got a yield of 1.53 and Paillieux (1880) got a yield of 1.50. Morse conducted many tests to determine the yield of curd from 19 different soybean varieties. His yields ranged from 0.686 to 0.282–extremely low.

Different types of Chinese tofu: (1) Dry bean curd or *tofu khan:* bean curd squares are dipped in burnt millet-sugar sauce until rich brown in color. "Fine salt also has been rubbed on them. This form of cheese can be kept for several days and is generally eaten in soups." (2) "Thousand folds *(chien chang tofu):* This product is prepared by placing very thin layers of the bean curds on cloths, on top of one another, and subjecting them to considerable pressure and allowing them to dry for a short time. The layers of bean curd are then removed and rolled together like a jamroll. It is said to be eaten cut into strips, like noodles, in

soups. When allowed to mold for several days it is fried in sesame oil and has a meat like flavor."

(3) "Fried bean curd *(tza tofu):* The fresh bean curd is cut into small squares and fried in deep fat. After a few minutes the bean curd pieces float on the surface and they are taken out. This product is often fastened on bamboo fibers (Fig. 65) and may be kept for several days. They may also be eaten with syrup as fritters." (4) "Fragrant dry bean curd *(hsiang khan) [wu-hsiang toufu kan]:* This form is made like the ordinary bean curd but great pressure is applied to drive out as much water as possible. The squares (Fig. 66) are first soaked in a weak brine or bean sauce to which powdered spices and burnt millet-sugar have been added and then are thoroughly dried out. The curd becomes very hard and can be kept indefinitely. It is said to be eaten sliced in soups and in various vegetable dishes."

(5) "Frozen tofu *(kori tofu):* Frozen bean curd is an excellent example of the application of the freezing process for the drying or concentration of a food. Fresh bean curd contains rather a high per cent. of water and is therefore a very unstable product. The fresh bean curd is cut into small pieces and exposed to severe cold weather. By freezing, the vegetable proteid shrinks and forms a porous cake permeated with ice crystals. This frozen cake can be readily thawed out and dried. It forms a product much resembling gluten bread in appearance. If the tofu is not frozen, it is difficult to dry and the resulting material is dense and horn-like..." (6) "Chinese preparation:... Tofu is quite generally preserved in loaves (100 to 150 grams) which are cooked in a decoction of turmeric roots. It is also preserved with salt. Often the curd is cut into small pieces and preserved in rice brandy [to make fermented tofu]. When smoked, the curd also keeps very well and can be wrapped in tinfoil for the market. Smoked curd is prepared by cooking the curd in a sauce diluted with water (80 per cent. and 20 per cent. soy sauce) and after cooking the curd is smoked in the same manner as meat."

Various American- and European-style recipes: "When cut into small pieces and cooked with an egg, it furnishes an excellent omelet. It also may be used as the principal ingredient in baked stuffed peppers. The fresh tofu makes an excellent salad or sandwich filling if the curd is chopped finely and chopped olives, pepper, salt, and mayonnaise dressing are added. When cut into small pieces and cooked in tomato sauce or similar sauces, a very good meat substitute is obtained. Cooked with meat broth, the curd takes the flavor of the meat. It is readily seen that the fresh bean curd can be utilized in many ways and when the people of the western world become better acquainted with this simple method of manufacture, it will no doubt, become more generally utilized."

Nineteen tofu recipes are given on pages 273-78.

Photos show: (1) "Large blocks of freshly made bean curd 'Tofu' ready to be cut up into squares and sold for breakfast." (2) "A large bamboo tray full of various kinds of bean curd. In the little wooden tubs on the ground the watery sorts of curd are kept immersed in saline water." (3) "Squares of fresh bean curd fried in oil and put on a string of bamboo fiber. Called tza tofu (fried bean curd) and said to supply a 'snack' in between meals for hard working Chinese laborers." (4) "A semi-dry bean curd of the consistency of smoked sausage, called 'Hsiang khan' (fragrant dry) which is eaten sliced in soups, and with vegetable dishes." Two squares, each bearing a stamped mark, are shown next to an open pocket knife for size comparison. (5) "A semi-dry fresh bean curd, called 'Lao to fu' (old bean curd) said to be used by the poorer classes of Chinese for breakfast." One square (with a cloth-like texture on the surface) on a small plate, and a broken half square are shown. (6) A room in which fermented tofu is being made. "A dark room of even temperature where wooden frames, full of squares of bean curd are piled, one on the other, the lowest resting on a layer of somewhat damp rice straw." One tray is open, showing the rows of tofu cubes, each covered with a white mycelium. (7) "Large earthen jars, full of squares of bean-curd, which are covered over with spiced brine and soy-sauce. After several months' curing a new product has been formed, called 'Foo-yu'–Bean cheese [fermented tofu], which can be kept for many years and becomes better with age."

Note 1. This is the earliest English-language document seen (Feb. 2007) that uses the term "Foo-yu" to refer to fermented tofu.

Note 2. Each of these 7 photos was taken (probably in China) by Frank N. Meyer, Agricultural Explorer, USDA.

Tables show: (1) Yields of bean curd obtained by William Morse from different varieties of soybeans. Variety #37062 gave the highest yield of tofu. 50 grams of soybeans yielded 34.3 gm of tofu and 30.5 gm of "Cake" [okara]. Note 3. This yield of 0.69 is very low; it should be at least 2.5. Variety #38462 gave the lowest yield, 0.28. (2) Composition of tofu and tofu products, compiled from various sources: Five samples of fresh tofu (6.0% protein on average), one frozen tofu (48.65% protein and 28.65% fat), and one fried tofu (21.96% protein and 18.72% fat).

Note 4. This is the earliest English-language document seen (Feb. 2004) that uses the term "soybean curd" to refer to tofu, or that uses the word "Teou fu" (or "Teou-fu"), or the word "Dan Phu" (or "Dan-Phu") to refer to Chinese-style tofu.

481. Church, Margaret B. 1923. Soy and related fermentations. *USDA Department Bulletin* No. 1152. 26 p. May 12. [27 ref]

• ***Summary:*** This long and very informative paper, with its excellent bibliography and review of the literature, is the third earliest study seen of a fermented food published by a USDA researcher. The focus is on Japanese fermentations

because of the laboratory's contact with Japanese researchers, such as Dr. T. Takahashi and Dr. G. Kita. "The experimental work reported here was conducted under the direction of Charles Thom, mycologist in charge, Microbiological Laboratory, Bureau of Chemistry."

Contents: Introduction. Work of previous investigators. Experimental work: Apparatus, material, preparation of ingredients, shoyu-koji, peanut press cake koji, shoyu-moromi. Proportions of ingredients. Yields. Chinese soy sauce. Peanut sauce. Relation of enzymic activity to soy processes. Manufacture in the United States. Related fermentations (Miso, soy cheese [fermented tofu], natto). Summary. Bibliography. "Soy sauce is a dark-brown salty liquid made by the fermentation of soy beans with, as a rule, some additional starchy component. It is widely used as a seasoning throughout Japan, China, and Java [Indonesia], and has been introduced into the Philippines and Hawaii* (* = See letter from C.W. Carpenter, Sept. 23, 1918). Where the occidental would use a vegetable or meat extract and salt, the oriental daily uses soy sauce. Americans are familiar with soy sauce as it is used in the Chinese-American restaurants and as an ingredient which produces the characteristic flavor of the Worcestershire type of sauce." In Japan, the process of preparing "shoyu-koji," a mold-fermented product made from "tane-koji," takes 3 to 4 days. "The mold-fermented material is emptied into a strong brine, thus producing a mash. Constant daily attention is given to aeration, even distribution, and stirring of the solid ingredients. Progressive changes take place over a period of from six months to several years, until at last the mature 'moromi,' as the mash is designated by the Japanese, is produced. These changes are due partially to the activity of bacteria and yeasts, but chiefly to the enzymes of the mold introduced into the mash with the koji."

"Experimental work: The Department of Agriculture had certain strains of the *Aspergillus flavus-oryzae* group of molds known to be used in making soy sauce. Through the courtesy of W.T. Swingle, of the Bureau of Plant Industry, a can of commercial Japanese rice *tane-koji* designed for shoyu manufacture was also received. Dr. Gen-itsu Kita brought additional samples of shoyu *tane-koji* under sterile conditions directly from Japan. Provided thus with soy beans, wheat, and the mold ferment, experiments with soy sauce were undertaken by the Bureau of Chemistry in 1918.

"Apparatus: The apparatus was made according to specifications drawn by Doctor [T.] Takahashi, of the Imperial University of Tokyo, who worked in the bureau for a month." "The usual Japanese koji room (fig. 2) is 32½ feet long, 11 feet wide, and 7 feet high. The walls are thick, and in the more modern factories are built of brick, which does away with fluctuations in the temperature from without. At one end of the room is an entrance and at the opposite end a window (fig. 3). In the ceiling several openings provide means of escape for the carbon dioxid [dioxide] and the damp air. Steam pipes along the floor make it possible to warm the room in cold weather. The ceiling is built with many layers of straw in order that the condensing moisture may be absorbed. One disadvantage of such a ceiling is that infection always occurs in the wet straw. A large area of infection directly over the piles of koji trays is detrimental to the production of sweet koji. In modern buildings, therefore, the surface of the ceiling is coated with cement. When a cement ceiling is used the condensed water drops on the trays of koji, which also is harmful... The burning of sulphur is useful in combatting any infection of a koji room."

Material: "The mold ferment employed in shoyu-koji manufacture is *Aspergillus flavus* Link, occasionally *A. oryzae* (Ahlb.) Cohn, or strains intermediate between the two species." "Certain Japanese manufacturers add cultures of pure yeast belonging to the genus *Zygosaccharomyces* at the time of placing the first mold-fermented material in the brine."

Preparation of ingredients: While soaking the soy beans, the water should be changed at intervals of several hours to prevent the formation of spore-forming rods, which cause heating and souring. The spores of these bacilli are on the beans as they come from the field. "After being soaked for 20 to 24 hours the swollen beans are cooked in an open kettle or under pressure until they are soft enough to be easily pressed flat between the thumb and finger. This desired softness can be obtained by autoclaving at 15 pounds pressure for 50 minutes and also by much longer cooking in an open kettle. Autoclaving under pressure has the advantage of sterilizing the material." After roasting, the wheat is crushed or cracked. It is important to "reduce some portions of the kernel to a fine powder or dust." The cooked beans and cracked wheat are "mixed in large trays or on mixing tables." Hot beans "may be cooled with a draft of air directed over a thinly spread layer." These "two ingredients need to be thoroughly mixed, so that the wheat dust may form a coat over each bean. The lower water content thus induced on the exterior of the beans makes them better adapted to mold growth than to bacterial growth."

"Shoyu-koji–Ripening: After the beans and wheat are thoroughly mixed, a very small quantity of previously molded material, such as mature rice koji (tane-koji), some shoyu-koji, or a pure mold culture, is thoroughly mixed into the ingredients. The whole mass is then distributed into the small flat koji trays (Plate II, inserted between pages 4 and 5) which are immediately placed into the koji fermentation room before they cool further. Each tray holds about 1.8 liters, or about 2 quarts of raw material. The koji trays are placed in tiers along the wall of the room (Fig. 3)." They are usually stacked in a zigzag fashion to ensure adequate aeration. This is extremely important "because moisture and the lack of oxygen induce the development of mucors and bacteria, and are said to cause the diastatic enzyme to

develop at the expense of the proteolytic enzyme. In some localities in Japan no such trays are used, but a broad straw mat with which very good koji can be secured." "The koji room or compartment is kept at a temperature of 24° to 25° C., with a definite humidity." Continued. Address: Microanalyst, Microbiological Lab., Bureau of Chemistry [USDA].

482. Capus, Guillaume. 1923. Les oléagineux d'Indo-Chine [The oilseeds of Indo-China]. *Chimie & Industrie (Paris)* Special number. p. 784-88? Proceedings of: Congrès et Exposition International des Combustibles Liquides. Held 4-15 Oct. 1922 in Paris, France, at Esplanade des Invalides. 847 + [v] p. Section on vegetable oils. [Fre]

• ***Summary:*** Contents: The richness of oilseeds in the flora of Indochina. Table of statistics concerning exports oil-bearing crops and oils from the French colonies: copra, castor oil seeds, sesame, peanuts, coconut oil, castor oil, and peanut oil in 1920 (weight in tonnes and value in French francs) and weight in 1921. The oil palm, progress made in its cultivation, castor oil, development of consumption during World War I, sesame, peanut, cottonseed, Garcina, camellia, calophyllum, tung *(abrasin),* candlenuts *(bancoilier, Aleurites Moluccana),* other oil-bearing plants (hemp, linseed, kapok, the soybean *{le soja},* cultivated for its seeds and for the manufacture of condiment sauces and of Chinese vermicelli *{et de vermicelle à la chinoise}),* and 15-20 others are listed. Fish oil. Insufficient current production of vegetable oils. Remedies for this situation. Improving local equipment for oilseed processing. Address: Professor at the Colonial School and at the National Institute of Colonial Agronomy (Professeur à l'École coloniale et à l'Institut national d'Agronomie coloniale).

483. *Tropical Life (England).*1923. Vegetable oil notes: Soya-bean oil for leprosy. 19(5):67-68. May.

• ***Summary:*** According to a paper read before the Royal Society of Arts (England), it is well known that chaulmoogra oil is likely to play an important role in the international struggle against leprosy. But "it is not so generally known that recent investigations lead one to believe that cod-liver oil and soya-bean oil will also play an important part in the warfare against this dread disease."

An article on p. 68 titled "The Philippines on the oil treatment of leprosy" also mentions soybean oil.

484. *USDA Bureau of Plant Industry, Inventory.*1923. Seeds and plants imported by the Office of Foreign Seed and Plant Introduction during the period from January 1 to March 31, 1921. Nos. 52306 to 52584. No. 66. 91 p. May.

• ***Summary:*** Soy bean introductions: *Soja max* (L.) Piper. Fabaceæ. *(Glycine hispida* Maxim.)

"52339-52342. From Paris, France. Seeds presented by M. Auguste Chevalier. Received January 11, 1921. Quoted notes by M. Chevalier.

"52345-49.

"52345. *'Witte Kedelei* No. 18, a variety imported from Formosa, which is late ripening, having a growing period of about 120 days.'

"52346. *'Zwarte Kedelei* [Black Soybean] No. 15. Selected Javanese variety which has a growing period of 95 to 100 days.'

"52347. *'White Kedelei* No. 18, a variety imported from Formosa, with a growing period of 95 to 100 days.'

"52348. *'Zwarte Kedelei* No. 17a. Imported from Formosa. This variety has a growing period of 95 to 100 days.'

"52349. *'Zwarte Kedelei* No. 27. Probably a Chinese variety, which has a growing period of 95 to 100 days. *Peking* ripens here in about 75 days.'" Address: Washington, DC.

485. Kikkoman. 1923-1954. [Monthly and annual soy sauce exports from Japan (1923-54)]. Noda: Kikkoman. Statistical tables. 22 p. [Jap; eng+]

• ***Summary:*** In 1923, some 11,720 *koku* of shoyu [soy sauce], worth 799,022 yen, were exported from Japan. (Note: 1 koku = 180 liters or 47.6 gallons). Of this, 5,307 koku went to the USA and Hawaii (3,330 koku to the USA), 709 koku to Canada, 5,108 koku to Asia (incl. 2,311 koku to Canton and 1,447 koku to China), and 201 koku to Europe. In 1924 total exports increased to 13,149 koku.

A table shows Kikkoman's exports of shoyu by country from 1938 to 1944. In 1938 Kikkoman exported 80 tonnes (metric tons) of shoyu to Peru and Argentina. In 1939, the peak year, 10,658 tonnes were exported; of this 4,444 tonnes (41.7% of the total) went to the USA and Hawaii, 2,680 tonnes went to Manchuria, and 2,098 tonnes to China.

Another table shows total Japanese exports of shoyu by country from 1938 to 1944. In 1939, the peak year, 34,838 tonnes (metric tons) were exported; of this 4,351 tonnes (12% of the total) went to the USA and Hawaii, 293 tonnes went to Canada, 50 tonnes to South America (Peru and Argentina), 63 tonnes to Europe (Holland), and 30,081 tonnes to Asia (incl. 9,550 tonnes to Karafuto, 5,803 tonnes to Taiwan, 4,620 tonnes to Manchuria, 4,295 tonnes to China, and 1,336 tonnes to the Philippines).

Another table shows exports of shoyu from Japan after World War II (1949-1954) to various countries and regions by Kikkoman and by all Japanese shoyu makers. Roughly 85% of Japan's exports were by Kikkoman. The total increased from 6,066 koku in 1949 to 9,316 koku in 1954; of the 1954 figure, 7,009 koku went to the USA and 1,476 koku to Asia. Another table shows exports of shoyu from Japan to major cities from 1949 to 1954 by Kikkoman and by all of Japan. In 1954, worldwide, the cities receiving the most shoyu were: San Francisco 2,033 koku, Honolulu 1,926 koku, Los Angeles 1,504 koku, Okinawa 1,376 koku,

Guam 647 koku, Vancouver (BC, Canada) 414 koku, New York 381 koku, Seattle (Washington state) 290 koku. Address: Noda, Japan.

486. Bottari, Fulvio. 1923. La soja nella storia, nell'agricoltura e nelle applicazioni alimentari ed industriali [The soybean in history, in agriculture, and in food and industrial applications]. Torino & Genova, Italy: S. Lattes & Co. 243 p. Preface by Prof. Oreste Mattriolo (R. Università di Torino). With 34 illust. 22 cm. [25 ref. Ita]

• ***Summary:*** Contents: Preface. Reason for the work; its scope and limits. Part I: The origin and history of the soybean. Reason for this history, the origin of the soybean and its early dissemination, soya (including production statistics) in Oriental countries (China, Manchuria, Japan, Formosa, Korea, French Indochina), how the soybean was introduced to Europe, the cultivation of soya in France, Soya in England, Austria, Germany, Denmark, Holland, Russia, Sweden, Alsace-Lorraine (now in northeast France), Spain, Italy, America, Conclusion.

Part II: Cultivation of soya. Part III: Soya in the feeding and nutrition of humans and animals. 1. The analysis and physiology of metabolism as an element in the study of nutrition. 2. Soybean forage in the feeding of animals. 3. Soybeans *(il grano di soja)* and soy products in the feeding of humans and animals. 4. Flour, pasta, and bread in feeding. 5. Soymilk *(il latte di soja)* and its use in the feeding of animals and humans. 6. Tofu *(il formaggio di soja).* 7. Soy oil and oil-cakes *(panelli).* 8. Condiments and sauces: Natto, miso, soy sauce. 9. Enzymes (I fermenti, incl. urease). 10. Conclusions.

Part IV: Industrial applications of soya.

Part V: General conclusions.

The first test of the lactation of calves with soymilk was conducted in the winter of 1916-17 by the Bonafous Institute in Turin. The results were splendid, and have encouraged eminent pediatricians such as Dr. Casalini, Prof. Dr. Alberto Muggia (teacher of clinical pediatrics at the University of Turin), and Dr. Enrico Gasca (vice director general of infants at Turin) to extend their experiments (p. 6).

In Italy vegetable oil production has decreased steadily from 1870 to 1920. Attempts were made to grow sesame, peanuts, and rapeseed, and to import oils from abroad. During World War I, unrefined soy oil was introduced to the market in large quantities, but its unappealing taste disgusted consumers and for a while nothing more was heard of it. Then in 1921 it began to be introduced again, but this time it was refined at Italy's national oil works. The good results obtained encouraged the Italian oil milling company, Sairo, and other oil works to make great progress in soy oil production. Several thousand quintals (i.e. several hundred metric tons) of the best soy oil, sold under the name "refined oil from seeds," were introduced in the first half of 1922 by the national oil works of Genoa.

Returning to the early history of soya in Italy, we find that in 1848 some missionaries brought soybean seeds and a little soil to Italy from Japan. They waited for the cultivation for several years, then nothing else was said. In 1880 the Italian Ministry of Agriculture recommended the cultivation of soybeans as a fodder crop for the future, as was being done in the USA, but their suggestion received no attention. In 1918, according to Mattei, a test of soybean culture was done at the Colonial Garden of Palermo on a parcel of 300 square meters.

Since 1912, after seeds had been brought by foreign delegates to the International Exhibition at Turin in 1911, repeated experiments with soybean cultivation have been conducted at the Bonafous Agricultural Institute in Turin, with the goal of developing two well adapted varieties, one for fodder and one for seed. Their green variety is for fodder and their yellow one for seed.

From 1920 the directorship of the cultural work was given to the head professor at the Institute, Venanzio Manvilli, also professor of the Germano Sommeiller Technical Institute, professor the faculty of agriculture, University of Turin. They worked with seeds already selected from the institute and with those obtained from Prof. Don Ricaldone, and from Tientsin, China, directly. Others who have done important work with soya in Italy are Paolo Bottari (with soymilk at the Bonafous Institute), Tamanini Guido, Mossello and Bellia, Prof. Cav. Giov. Batt. Allaria, Dr. Mose Miccinelli

A table (p. 31) shows soybean and cotton hectarage and production in Korea from 1909 to 1917. Soybean hectarage increased from 277,776 ha to a record 487,134 ha. Soybean production grew from 1,991,126 quintals (1 quintal = 100 kg or 0.1 metric tons) to a record 3,816,498 quintals.

Page 35: "Prof. Rouest of Luxey (Landes) in France wrote us on 30 Nov. 1921. 'I have finished only the period of acclimatization of the soybean. It remains for me to propagate it a little everywhere. The experiments of 1921 were extended in all the Departments, being viewed from an industrial and commercial point of view. I must now study which variety adapts among those I am cultivating. Soy flour will not be able to be made until we have many thousands of hectares under cultivation, and then we will be able to think of other applications as well... Actually the firm Hendebert de Lion sells its flour, originating in China, at 10 French francs per kg, a prohibitive price.'"

Page 206: At the pediatric congress held in Milan in Sept. 1922, the question of lactation (feeding children) with vegetable milk was discussed in a favorable way, proposed by Prof. Muggia and sustained by the illustrious Prof. Berghius, Director of the Pediatric Clinic of the University of Padua, and by Prof. Francioni of Bologna. We can also add that experiments on lactation are proceeding in Italy at

the pediatric clinics of Turin, Bologna, Padua, Genoa, and Florence, and also at the Infant's Dispensary in Turin.

Photos show: (1) Three different varieties of soybean plants (p. 70). (2) 2 soybean plants up close (p. 71). (3) The leaves of 3 different varieties of soybean plants (p. 72). (4) Close-up of the stem and pods of a soybean plant (p. 73). (5) Beans and pods of soybeans (p. 74). (6) Different stages of germinating soybean seeds (p. 75). (7) Close-up of soybean roots (p. 76). (8) Field of soybeans at the "Istituto Bonafous" (p. 106, 108, 113). (9) Field of soybeans grown with corn (p. 122, 123). (10) Cellular transverse section through a soybean (facing p. 152). (11) Pasta made from soy (p. 181). (12) Bread made from soy (p. 183-89).

Note 1. Quite a bit of the historical and non-Italian information in this book comes from Léon Rouest's 1921 book *Le soja et son lait végétal: Applications agricoles et industrielles.*

Note 2. This is the earliest Italian-language document seen (Feb. 2004) that mentions natto, which it calls "il *Natto* in Giappone che corrisponde al *Tao-Teche* della Cina." Address: Dr. of Economic and Commercial Science, Turin [Torino], Italy.

487. Campbell, Persia Crawford. 1923. Chinese coolie emigration to countries within the British Empire. London: P.S. King & Son, Ltd. xxiii + 240 p. Preface by the Hon. W. Pember Reeves. 22 cm.

• ***Summary:*** Discusses the background of the terrible coolie trade and the use of indentured coolie servants and the credit-ticket system. It was largely a veiled slave trade, and the traffic was greatest from 1845 to 1877. Most of the migration was from Kwangtung province in southern China, an area gripped by famine, feud, and economic hardship. The coolie trade was active in different countries at different times: British Malaysia (1877-1916), the USA (1850-1882), British Columbia, Canada (1880s), Australia (1855-1888), Cuba (1870s), British West Indies (1852-1860s), Transvaal, South Africa (1904-1909).

Note: Though soybeans are not discussed in this book, some of these Chinese may have taken soybeans with them to foreign countries.

The author was born in 1898. This is No. 72 in a series of monographs titled "Studies in Economics and Political Science" by writers connected with the London School of Economics and Political Science. Address: British Fellow Bryn Mawr College, Bryn Mawr, Pennsylvania.

488. Capone, Giorgio; Grinenco, Ivan; Costa, Mario. eds. 1923. Oleaginous products and vegetable oils: Production and trade. Rome, Italy: International Institute of Agriculture, Bureau of Statistics. 545 p. See p. XX-XXI, 140-41, 144-47, 442-43, 480-81. No index. 24 cm. [Eng]

• ***Summary:*** In Sept. 1921 the IIA published a monograph on this subject in French. By popular demand, this English edition was published 2 years later. Contents: Introduction (p. VII-XXXII): General scope, general survey of the 9 principal crops (including soya beans) plus others, final points of consideration. Part I (p. 1-402) is an analysis by region, and within each region by country, countries of vegetable oil production and trade. Regions are Europe, North and Central America, South America, Asia, Africa, and Oceania.

Major countries: Denmark (p. 20-23; oil production 1916-1921, oil imports 1910-1922). France (p. 26-34). Germany (p. 35-40). Great Britain and Ireland (p. 41-43). Netherlands (p. 65-68). Norway (p. 69-70). Russia--European and Asiatic (p. 84-93). Sweden (p. 100-03). Canada (p. 111-15). United States (p. 131-47). Argentina (p. 179-85; no soy). Brazil (p. 187-90; no soy). Ceylon (p. 218-21; no soy). China (p. 222-26). Dutch East Indies (Java & Madura, Other islands; p. 229-33). Formosa (p. 238-39; gives soybean production and acreage from 1900 to 1921). Japan (p. 259-64; gives Japanese soybean production and acreage from 1877 to 1921, and production of soya oil from 1909 to 1920. Japan's leading oil produced domestically from 1895 was rapeseed oil). Korea (Chosen, p. 265-67). Kwantung Leased Territory (p. 268). Hawaii (p. 388; Hawaii produced 17 long tons of soybeans on 20 acres in 1909, and 10 tons on 15 acres in 1919).

Part II (p. 403-506) is recapitulatory tables for both soya beans and soya bean oil: Area and production by crop (1909-1922), Trade by crop (1909-1921). Cottonseed (p. 410-11). Linseed (p. 414-15). Soya beans (p. 442-43, 480-81).

Pages XX-XXI state: "In the absence of data from China, the chief grower of soya beans, it is impossible to make even the roughest estimate of the world's yield of this product. Among the few countries of any moment as producers of soya beans, we may mention: Japan, where this crop increased rapidly between 1877 and 1887 and then became nearly stationary at about 500,000 long tons [2,240 lb per long ton] per annum, although in the last few years some further increase has been noticeable; Korea, with a continuous increase in area and yield, from 1910 onwards, (the crop of 1920 was about 600,000 long tons); and United States, where from 1909 to 1921, the area under soya beans increased from about 1,600 to 186,000 acres with a production of about 70 thousand long tons. It may be observed that the increase of this crop during the last twenty years is supplemented by attempts already made and in progress for its introduction into countries with a favourable climate, especially into Africa."

"Exports are exclusively from China and Korea. The Chinese exports have increased very greatly during the last thirty years. Before 1890 they were insignificant, in 1901 they had reached a total of more than 100 thousand tons, and during the decade from 1909 to 1918 they averaged about 600 thousand tons and reached their maximum in

1919 with about 1 million, declining in the two following years to 600 thousand long tons.

"With regard to Korea although we have not a complete series of data for the period 1909-1918, the ever-increasing importance of its exports of soya beans may be emphasized; during the last few years these have been double the average of the years 1909-1911, and in 1921 they already equalled one third of the Chinese exports."

"The chief importers, in Europe are Great Britain, Denmark, and Holland, and, in Asia, Japan, and the Dutch East Indies. To these must also be added Russia-in-Asia as the Chinese Customs register large exports destined for the Russian Pacific ports."

"England, which at one time constituted the greatest market for the soya bean, has continually reduced its imports: these were 420 thousand long tons in 1910, 76 thousand in 1913, and about 60 thousand in the two years 1921-1922... In the Asiatic market, represented in this case by Japan and the Dutch East Indies, imports have continuously increased especially in the last few years of the period under consideration.

"The trade figures of *soya oil* (see tables on pages 480 and 481) indicate that China is the principal exporter, having quadrupled its shipment during the period from 1914 to 1919, attaining in the latter year a total of over 140 thousand long tons."

Other countries unrelated to soy (some no longer in existence): Europe: Esthonia [Estonia], Luxemburg [Luxembourg], Serb-Croat-Slovene State. North and Central America: British Honduras [named Belize after about 1975]. South America: Curaçao [Curacao], Falkland Islands, British Guiana, French Guiana. Asia: Aden [became part of independent Yemen in 1967], Andaman and Nicobar Islands, Bahrein Islands [Bahrain], Borneo (British Protectorates), Dutch East Indies, Federated Malay States, Formosa, French Settlements in India, Indo-China, Persia, Portuguese India [annexed in 1962 by India; became Union territory of Goa, Daman, and Diu], Protected Malay States, Russia, Japanese Saghalin (Karafuto), Siam [later Thailand], Straits Settlements [later Singapore], Timor and Cambing, Wei-Hai-Wei [Weihai, Wei-hai, or Weihaiwei; seaport in northeast Shandong province, northeast China]. Oceania: Australia, Fiji Islands, French Settlements in Oceania, Gilbert and Ellice Islands, Hawaii, Island of Guam, New Caledonia, New Hebrides, Papua, Samoan Islands (American Samoa), Solomon Islands, Territory of New Guinea *(Later German New Guinea),* Tonga, Western Samoa *(Formerly German Samoa).*

Note: This document gives a clear definition of the geographical region named "Oceania." A "quintal" is probably 100 kg. Address: 1. Doctor of Economics; 2. Doctor of Agronomics. Both: IIA, Rome, Italy.

489. Capone, Giorgio; Grinenco, Ivan. 1923. Dutch East Indies (Document part). In: G. Capone & I. Grinenco, eds. 1923. Oleaginous Products and Vegetable Oils: Production and Trade. Rome, Italy: International Institute of Agriculture, Bureau of Statistics. 545 p. See p. 229-34. [Eng]

• ***Summary:*** A. Java and Madura. The principal oil-yielding crops of Java and Madura are the coconut, the oil-palm, groundnuts, sesamum, soya, castoroil and kapok. A table (p. 229, extracted from the *Annuaire Statistique du Royaume des Pays-Bas, Les Colonies)* shows the cultivated area for 3 of these crops from 1916 to 1920 or 1921. In 1920 some 499,381 acres of groundnuts and 401,342 acres of soya were cultivated. In 1921 some 16,556 acres of cotton were cultivated. Acreage in Java and Madura planted to soybeans was 402,294 in 1916, rising to 434,162 in 1917, decreasing to 390,048 in 1918, and 391,579 in 1919.

A table (p. 230) showing area and production of oil-yielding crops in 1917 indicates that coconut is the leading oil-yielding crop (362,000 tons of copra from native production and 3,300 tons from European production), followed by groundnuts (173,738 tons), soya (128,369 tons), kapok seed (47,265 tons), castor oil plant (11,131 tons), and sesamum (3,954 tons) (all the above are native cultivation unless otherwise indicated).

Imports of oleaginous products: The main such product imported is soya beans, which was 49,696 tons in 1913, decreased during World War I, then rose to 92,245 tons in 1922. Only small amounts of vegetable oils are imported, the leading one being linseed oil (about 1,000 tons imported each year).

Exports of oleaginous products: The main product exported is copra, followed by kapok seed. Soya beans were exported during the war, reaching a peak of 4,005 tons in 1916.

Exports of vegetable oils: The leader is coconut oil, which reached a peak of 70,078 tons in 1919. Small amounts of groundnut oil and castor oil are also exported. No soya oil is exported.

B. Other islands. Production data exist only for coconut (apparently the main crop), oil-palm, and cotton. Since 1910 the oil palm has been widely grown in Sumatra.

Imports of oleaginous products: The main such products imported are coconuts (1,138,373 nuts in 1915) and soya beans, which was 2,900 tons in 1913, increasing to 4,918 tons in 1921. Only small amounts of vegetable oils are imported, the leading one being coconut oil (3,698 tons in 1921). Address: 1. Doctor of Economics; 2. Doctor of Agronomics. Both: IIA, Rome, Italy.

490. Chinese Eastern Railway, Economic Bureau. 1923. The Chinese Eastern Railway and its zone. Harbin, Manchuria: C.E.R. Economical Bureau. 32 p. Illust. 27 cm. [Eng]

• ***Summary:*** Section III titled "Agriculture" contains a bar chart showing that [soy] beans comprise 20-30% of the total cultivated area in the seven districts along the rail lines; the 30% is in the southern districts. Yellow [soy] beans yield 22.2 bushels/acre or 90.0 poods per dessiat. 39% of the total cultivated area is taken up by marketable crops for export; 22% by soybeans and 17% by wheat; the remaining 61% is taken up by Chinese native grains (p. 12).

About half of all soybeans exported from North Manchuria go to Japan, where bean-cakes constitute one of the most popular fertilizers for fields. The remaining 50% of these exported beans are either consumed in Asiatic markets (China, Netherlands East Indies) or shipped to oil mills in Europe (United Kingdom, Germany, Scandinavian countries). The demand for Manchurian [soy] beans is growing.

Flour milling is the biggest manufacturing industry along the railway zone, followed by oil milling. "The value of the output from oil-mills equals about 1/2 value of the value of products of flour mills. Bean oil and bean-cakes are in great demand on both the interior and the foreign markets. Exports of bean oil and bean cakes are made partly to Europe and mostly Japan."

Two graphs (p. 27) show transportation by the railway of [soya] "bean-oil" and [soya] "beancakes" (in 1,000 tons) from 1913 to 1922. Transportation of oil rose rapidly to a peak of 30,000 tons in 1919, dropped precipitously to 6,000 tons in 1921 (after the Great War [World War I]), then jumped to 22,000 tons in 1927. Transportation of beancakes rose rapidly to a peak of 140,000 tons in 1917, fell to 80,000 tons in 1918, then leaped to a record 230,000 tons in 1922. Address: Harbin, Manchuria.

491. Ghosh, C.C. 1923. Report of the entomologist, Mandalay, for the year ended June 30, 1922. Rangoon, Mandalay. 14 p. *

• ***Summary:*** The insect pests *Nezara viridula* and *Diacrisa obliqua* were found on *Glycine hispida;* the latter insect was also found on sunflowers and beans. Address: Ranoon, Mandalay.

492. Hall, C.J.J. van. 1923. Ziekten en plagen der cultuurgewasen in Nederlandsch-Indie in 1922 [Diseases and pests of cultivated plants in the Dutch East Indies during 1922]. *Mededeelingen van het Instituut voor Plantenziekten (Buitenzorg)* No. 58. 42 p. See p. 5, 16-17. [Dut]

• ***Summary:*** Discusses *Aproaerema modicella,* Chrysomelidae, *Etiella zinckenella, Melanagromyza sojae,* Noctuidae, and Sphingdae at the following locations: Cheribon, Djokjakarta (Yogyakarta), Soerakarta, Madioen, Kediri, Soerabaja, and Besoeki.

P. van der Goot (1930) says of this document: "In the Indonesian literature there are casual reports of *Agromyza* larvae being harmful to beans and other legumes. Further details are rarely given. It is nearly certain that in most cases one is dealing with *Melanagromyza phaseoli."*

493. Jansen, B.C.P. 1923. On the need of anti-beri-beri-vitamin of the animal organism and on the amount of this vitamin in different foodstuffs. *Mededeelingen van den Burgerlijken Geneeskundigen Dienst in Nederlandsch-Indie* p. 1-122. See p. 65-73. [60* ref. Eng]

• ***Summary:*** Eykman, who discovered the nutritional cause of beri-beri, quickly pointed out the great importance of determining the protective power of various substances against beri-beri. It has been known for 25 years that living mainly on polished rice contributes to beri-beri, "whilst unpolished rice entirely protects against this disease." Most Javanese farmers still pound their own rice; when they do, only a part of the pericarp is removed by pounding. This sort of rice contains sufficient vitamin to protect the population from beri-beri. Industrial workers, who have neither time nor opportunity to pound their own rice, buy polished rice (with the whole pericarp removed) from rice mills. Though nearly devoid of vitamin, it is a product which "much more lasting with regard to storage and transport, and which at the same time by its nicely white aspect fetches a much better price on the market." Therefore the authors are investigating foods that can be eaten with polish rice to help prevent beri-beri.

Section 8, titled "Katjang kedele (Soy-beans)" (p. 65-73) begins: "This is a very important kind of beans for the native dietary." Soy-beans were fed to pigeons with white rice in varying proportions. The higher the proportion of soybeans, the better the health of the pigeons. When a large proportion of the diet was washed and polished white rice, the birds developed polyneuritis and often died or became paralyzed.

On page 68 the author notes that in Java, "soy-beans are not only eaten as such, but also very much in the shape of different native concoctions. It has been asserted (by C.L. van den Burg, 1904) that in this way the hard-to-digest legumins would be made easier to digest. However as far as I know, this assertion has not been founded on any experiment. A priori I think it as probable that by making tempé of the beans the taste is changed to such an extent, that they may be used continually, without being objected to. I hope some time to find an opportunity of experimentally deciding this question. Till at present I only examined, whether in these concoctions the vitamin-content either has increased or lessened... I now experimented with tempe kedele and with tao-tjo" [Indonesian-style miso].

Tempe, purchased on the market in Batavia, was fed in place of the soybeans. The results showed "a rather considerable loss of vitamins may be seen to have taken place during the preparation of tempe kedele from the soy-beans." Tao-tjo (Indonesian-style miso) was then used in

place of soybeans, and it too was found to be a poor source of vitamins.

Note 1. This is the earliest English-language document seen that mentions tempeh, which it calls "tempé" or "tempe" or "tempe kedele." These terms are not italicized in the text.

Note 2. This is the earliest English-language document seen (March. 2009) uses the word "tao-tjo" to refer to Indonesian-style miso. Address: Dr., Head of the Chemical Dep., Medical Lab. at Weltevreden.

494. Kellogg, John Harvey. 1923. The natural diet of man. Battle Creek, Michigan: The Modern Medicine Publishing Co. 386 p. Illust. Index. 20 cm. [50+* ref]

• ***Summary:*** This classic of vegetarian literature contends that a vegetarian diet is the natural diet of man. Contents: 1. Man not naturally a flesh-eater: Modern civilized life unnatural and unbiologic, animal dietaries, lessons from the monkey, porcine wisdom in diet, animals classified by diet, the ancient family of primates, all mammals originally vegetable feeders, when germ diseases were unknown, kinship of higher apes and men, flesh-eating never a universal human custom.

2. Twenty popular delusions about flesh foods: D-1. That meat is superior as a blood-making food, and, hence, is needed in anemia. D-2. That meat is essential as a flesh-building food. D-3. That a flesh diet is essential to support severe or prolonged activity; that is, promotes endurance. D-4. That flesh-eating is necessary to produce physical courage. D-5. That vegetarian races are inferior physically and mentally to races using a mixed diet. D-6. That flesh foods are more refined and more easily digested and, hence, more nutritious than are foods of vegetable origin. D-7. That man is naturally omnivorous. D-8. That flesh foods are stimulating and thus supply an element needed especially by brain workers. D-9. That beef tea is a useful nutrient. D-10. That a meat diet is required to prevent or cure gastric acidity. D-11. That a meat diet is desirable in tuberculosis. D-12. That a meat diet is necessary in diabetes. D-13. That a flesh diet is essential in the treatment of obesity. D-14. That meat is required in beri-beri. D-15. That meat is essential as a "building-up" or restorative food. D-16. That meat is needed by growing children. D-17. That meats are needed as a stimulus to appetite. D-18. That the beef industry is a necessary part of our national economic system. D-19. That a meat diet is necessary to insure reproductive activity. The law of diminishing returns versus flesh-eating. D-20. That meat is a harmless luxury.

3. Scientific objections to the use of meat: Human liver not adapted to meat diet; important differences between meat and milk; meat deficient in vitamins and food lime; Eskimos eagerly seek vegetable food; ill effects of meat diet on Arctic explorers; meat saturated with tissue poisons; meat readily putrefies, natural foods do not; the poisons of meat; meat extracts; why viscera are especially objectionable; bacteriology condemns meat as food; vast numbers of bacteria in meat; putrefactive products of meat; why physicians forbid meat in cases of kidney disease and high blood pressure; how flesh-eating causes constipation.

4. Diseases due to flesh eating: Tuberculosis in animals, cancer from meat eating, cancer rare and appendicitis unknown among flesh abstainers, meat-eating causes disorders of nutrition, acidosis from a flesh diet, a meat diet and scurvy, meat eating and arteriosclerosis, pernicious effects of a meat diet experimentally proven, recognized meat contraindications, the peregrinations of a deadly parasite, typhoid germs in meat products, flesh poisoning, no protection for meat-eaters, oyster poisoning, converting sewage into food.

5. Experimental evidence against flesh eating: McCollum's experiments, Dr. S. Weir Mitchell endorses the meatless regimen, an eminent scientist on meat diet, Fauvel's observations, greater endurance of flesh-abstainers, the death rate reduced by meatless diet, flesh-eating does not develop intelligence, meat-eating and race degeneracy, meat-eating a city habit, non-meat diet best even for carnivorous animals, the Scotchman's dog, the effects of a meat diet on rats, the effects of a flesh diet on rabbits, flesh-eating animals short lived. 6. The ethical argument.

7. Historical facts and authoritative opinions: Biblical teaching about flesh eating, apostles who were flesh abstainers, the Essenes were flesh-abstainers, the diet of the ancient Greeks, King Cyrus a flesh-abstainer, Julius Caesar's army ration, diet of Peruvian soldiers, diet of athletes of ancient Greece, ancient philosophers were flesh-abstainers, Plutarch's essay on flesh-eating, fleshless diet of a Roman emperor, meatless diet endorsed by Gautier, views of Seneca, diet of the ancient Sumerians [today's Iraq], eminent modern flesh abstainers, vegetarian monks, Thoreau on the fleshless diet, a Chinese statesman's experience, the views of two great naturalists, the poet Shelley a food reformer, a child's natural repugnance to meat, Liebig on the advantages of a non-flesh diet, Sylvester Graham's diet reform movement.

8. Interesting facts concerning the dietary habits of various peoples. 9. The marvelous adaptation of the natural diet to human needs. 10. How to discard meats comfortably and safely.

11. Is the disuse of meat advisable from a practical standpoint? The U.S. Department of Agriculture shows the use of less meat to be safe and economic, the importance of planting nut trees, avoidance of meat is necessary to change the intestinal flora, vegetable substitutes for meat, the recent low protein movement in the United States, the half century experience of the Battle Creek Sanitarium with a fleshless diet.

12. Newspaper and magazine misinformation: An "eat-more-meat" campaign, Professor Fisher of Yale University

[Connecticut] refuses to support the "eat-more-meat" campaign of the [Chicago, meat] packers, pernicious piffle.

Soy is mentioned in many places. The section titled "Flesh-eating never a universal custom" states (p. 33-34): "According to Mori, the Japanese peasant of the interior is almost an exclusive vegetarian. He eats fish once or twice a month and meat once or twice a year... The soy bean is held in high esteem and used largely in the form of *miso,* a purée prepared from the bean and fermented; also *to-fu,* a sort of cheese; and *cho-yu* [shoyu], which is prepared by mixing the pulverized beans with wheat flour, salt, and water and fermenting from one and a half to five years. The Chinese peasant lives on essentially the same diet, as do also the Siamese, the Koreans, and most other Oriental peoples. Three-fourths of the world's population eat so little meat that it cannot be regarded as anything more than an incidental factor in their bill of fare."

Page 45: Complete "proteins are found in milk and eggs as well as in most nuts, peanuts, and the soy bean..."

Page 73: "The protein of milk, of the soy bean, and of nuts is known to be superior to meat as a source of body nitrogen." Address: Superintendent of the Battle Creek Sanitarium, Battle Creek, Michigan.

495. Kempski, Karl E. 1923. Die Sojabohne: Geschichte, Kultur und Verwendung unter besonderer Beruecksichtigung der Verhaeltnisse in Niederlaendisch-Indien [The soybean: History, culture and use, with special attention to the situation in the Netherlands-Indies]. Berlin: Paul Parey. 88 p. Illust. Index. 22 cm. [101 ref. Ger]
• ***Summary:*** Contents: Introduction. Some remarks on the soybean's early history. Overproduction of soybeans in Manchuria after the Russo-Japanese War–English oil mills make their first trials. Soybean production in Manchuria. Soybean production in Korea. Soybean production in Japan. Soybean production in America–Soybean meal and soybean milk are introduced. Soybean production has also expanded in Africa, British India, and the Philippines. The introduction of soybean cultivation to Europe. The many uses of the soybean in Europe. Uses of soy oil. Old and new methods of obtaining soy oil. Soybean production and use of soybeans in the Netherlands-Indies. Appendix: Descriptions of how the most important soybean products are manufactured: In Java (tao-hoe [tofu]), tempeh, ketjap [soy sauce], tao-tjiong [or tao-jiung, a term, and perhaps a product, between *doujiang* and *tao-tjo*, Indonesian-style miso], in China and Japan (soy sauce, miso, tofu, frozen tofu, natto, soymilk) (p. 62-68). Supplements: I: Soybeans in Manchuria. II; Hansamuehle [Hansa Muehle] in Hamburg, Germany. III: *The Soybean* by Piper and Morse.

Note the extensive, early bibliography. Unfortunately, it contains many errors.

This book is largely a review of the literature, but with some original information, especially on Indonesia and Germany. In 1923 Java imported 150,000 to 200,000 tons of soybeans and had a population of 35 million. The area of soybeans planted in Java (including Madura) increased from 157,600 ha in 1918 to 164,700 ha in 1922 (p. 32). In 1921, 67.3% of Java's soybean acreage was in Central Java, 20.7% was in East Java, and only 5.7% was in West Java. (p. 35). Large quantities of soybeans are imported to the Netherlands-Indies from Manchuria: 35,105 metric tons (tonnes) in 1920, rising to 95,742 tonnes in 1922. From these and local soybeans are made tempeh [spelled like this!], tofu *(tahoe; Bohnenkäese)*, soy sauce *(Ketjap, Sojasauce)*, etc. In Java, mostly black soybeans are grown. To make tofu yellow, it is cooked in an extract of the *Curcuma* root / rhizome. Sometimes it is also sun-dried or fried/roasted *(gebraten)*. Tempeh is inoculated with a piece of tempeh from a previous fermentation, and often fried in coconut oil. Detailed descriptions are given of the production of soy sauce *(ketjap;* which is made from black soybeans) and Indonesian miso *(taucho; tao-tjiong)*. The author (p. 64) states that ketjap and tao-tjiung are both inoculated using *Hibiscus tiliaceus* (hibiscus) leaves, called *waroe* in Java. Today Germany, like America, produces fresh and dried soymilk, fresh and dried soya cream, meat analogs, and soy sauce (p. 25).

This book contains 17 interesting, old photos. Descriptions of those reproduced from other periodicals are omitted. (1) A soybean field on the farm Kikai Nojo near Sempo-Station, Korea, owned and run by Mr. Moegling (p. 12). (2) A combine used for harvesting regular beans in California in 1918 (p. 19). (3) Many hydraulic presses in a modern American oil factory (p. 29). (4) The equipment used in steaming the soybeans before they are crushed in an American "steam mill" type oil mill (p. 31). (5) The interior of a British oilmill (p. 33). (6) The electrical generators in a modern oilmill (p. 34). (7) Soybeans being harvested manually at Madioen [Madiun, in East Java], Java (p. 48). (8) Harvested soybeans being dried on racks in a field in Java, and carried away by one worker (p. 48). (9) Workers dividing up the harvest in Java (p. 50). (10) Threshing soybeans with bamboo flails in the courtyard of a small farmer in Java (p. 51). (11) Selling soybeans in a small market in Central Java (p. 51).

Tables show: (1) Imports of soybeans to Germany from 1910 (43,500 tonnes) to 1912 (more than 125,200 tonnes) (p. 24). (2) Soybean acreage in Java (including Madoera) from 1918 (157,600 ha) to 1922 (164,700 ha) (p. 32). (3) A breakdown of soybean area in Java in 1921 (of 226,186 bouws) into West Java (12,980 bouws), Central Java (152,154 bouws), and East Java (61,082 bouws) (p. 35). Note: 1 bouw = 1.754 acres (Johnstone 1975). (4) Imports of Manchurian soybeans to Java (including Madoera) and other parts of the Dutch East Indies (mainly Sumatra) from 1920 to 1922 (p. 36). (5) Yields (average or range) of soybeans in various countries: Germany, Italy, British

Indies, Manchuria (incl. China and Korea), Japan, America (up to 2,700 kg/ha), Java (p. 52). (6) Comparison of the nutritional composition of soybeans, peas, and regular beans (Phaseolus varieties) (p. 53). (7) Comparison of the nutritional composition of soya cheese *(Sojakäse,* tofu), beef, and lean pork (p. 53). (8) The prices of white and of black soybeans in Java during January and December 1922 and the same two months of 1923 (in Gulden) (p. 56). (9) Comparison of yields, price, costs, and profit for peanuts *(Katjang tanah)* and soybeans in Java (p. 57-58). (10) Nutritional composition of canned frozen tofu (based on E. Senft) (p. 68). (11) Exports of soybeans from five Manchurian ports (Dairen, Antung, Newchwang, Suifenho [Suifenhe], and Sansing) in 1919, 1920, and 1921 (p. 70). (12) Exports and value of soybeans from all of China to four countries (Netherlands, Russia, Japan, Dutch East Indies) in 1919, 1920, and 1921 (p. 72). (13) Exports of soybean oil from five Manchurian ports (Dairen, Antung, Newchwang, Suifenho [Suifenhe], and Harbin) in 1919, 1920, and 1921 (p. 72). (14) Exports and value of soybean oil from all of China to five countries (England, Netherlands, Belgium, Japan, USA) in 1919, 1920, and 1921 (p. 72). (15) Exports of soybean meal from four Manchurian ports (Dairen, Antung, Newchwang, Suifenho [Suifenhe]) in 1919, 1920, and 1921 (p. 73). (16) Exports and value of soybean meal from all of China to three countries (Japan, Russia, USA) in 1919, 1920, and 1921 (p. 73). (17) Names of the five major railway lines in Manchuria (South Manchuria Railway, Chinese Eastern Railway, Peking Mukden Line, Kirin-Changchun Line, Saupingkai-Taonan Line) (p. 74). (18) Amounts (in tons) of soybeans, soybean cake, and soy oil *(Sojaöl)* shipped over the South Manchuria Railway, and the Chinese Eastern Railway in one year (p. 74). (19) Railway transport and production amounts of the mills (in tons) in Dairen and Newchwang of soybeans, soybean cake, and soy oil *(Sojaöl)* during the year 1921 (p. 74). Address: Agricultural Expert in Poerbasari te Pengalengan, Java.

496. Nacion, Cipriano C. 1924. Study of *Rhizoctonia* blight of beans. *Philippine Agriculturist* 12(8):315-21. Jan. Based on a thesis. [2 ref]

• ***Summary:*** Inoculation of soybean with *Rhizoctonia solani* isolated from lima bean resulted in typical *Rhizoctonia* symptoms. Address: Dep. of Plant Pathology, College of Agriculture, Philippines.

497. Spring, F.G. 1924. The soya bean (Glycine hispida). *Malayan Agricultural Journal* 12(2):55-57. Feb.

• ***Summary:*** "A large quantity of Soya beans is consumed in the Peninsula, particularly by Chinese." Describes how soybeans are grown at Manchis, Pahang, by about 30 Chinese small holders, each growing about 1 acre. "The Soya beans are consumed mostly by the growers themselves but any surplus stock is sold in Bentong or Kuala Pilah where there is a ready market for the produce... The beans are eaten in a number of ways but are generally boiled and eaten alone or in conjunction with rice or other foodstuffs. They are also pounded into flour and made into cakes. In India the beans are eaten in the form of 'dhal.'

"The inhabitants around Manchis are almost entirely self supporting as regards food and it is to be hoped that the growing of the soya bean may be taken up in other districts... The bean is known by the Chinese as *'Wong Tau'* (Cantonese) which means the yellow bean, in Hakka as Vong Theu and in Hokkien as Ui Tau.

"Note. In amplification of the above article a note has been received from the District Officer, Bentong, stating that the Soya Bean is grown not only at Manchis but also nine miles from Bentong on the road to Kuala Lumpur... Hakka vegetable gardeners in Raub are also said to grow the Soya bean freely, interplanted with other crops.

"At Bentong there is a bean curd factory in an attap shed behind the town where the bean curd (or *Tau Fu* in Cantonese) is made for sale in the local market."

Note: *Webster's Third New International Dictionary* (1963) defines atap or attap, derived from the Malay meaning "roof or thatch," as "3. A thatched roof often made with the leaves of the nipa palm." Address: Malaya.

498. Tang, Chi Yu. 1924. An economic study of Chinese agriculture. PhD thesis, Cornell University, Ithaca, New York. 514 p. June. See p. 420-23. [2+ ref]

• ***Summary:*** In Part V, Chief Agricultural Enterprises, chapter 24 is titled "Soy beans." It begins: "China leads the world in the production of soy beans. Statistics on acreage and production of soy beans in China proper are lacking. The soy beans acreage in Manchuria, however, was estimated at 7,200,000 acres, and production 3,700,000 tons" (see *Chinese Economic Bulletin* No. 156, p. 9 {16 Feb. 1924}). "During the period 1891-1904, exports of soy beans and soy bean products were almost entirely absorbed by Japanese markets. The Russo-Japanese war in 1904 and 1905 stimulated the production of soy beans in Manchuria, After the war, the surplus beans had to be disposed of in some markets, and for the first time trial shipments were made by Japanese firms to English mills in 1908... During the period 1909-1922, acreage and production of soy beans increased by leaps and bounds" [in the USA].

The chapter then lists five major reasons that soy beans have become so important in China: "1. Soy beans thrive in a variety of climatic conditions. They do well in dry seasons and at the same time do not reduce greatly in yield in a wet season. 2. Since they are a leguminous crop, soy beans are grown to maintain soil fertility... 3. Soy beans have a high food value in comparison with other foods. They are especially rich in protein... 4. Many by-products are made from soy beans, including bean oil cake, bean meal, bean

flour, bean bran, bean sprouts, bean coffee, bean milk and bean curd. Because of the large range of by-products that have been made, the price of soy beans has become stabilized... 5. Further expansion of soy bean production possible when North Manchurian lands are brought under cultivation."

Table 45 (p. 422) shows China's exports of soy beans, bean cake, and bean oil for the years 1913, 1920, 1921, and 1922 in piculs (133.33 lb) and taels (a monetary unit). Each of the three increased during this period which included World War. I. In 1922 exports of bean cake were worth the most, followed by soy beans and bean oil. Soy bean exports grew from 7,419,511 piculs in 1913 to 12,462,350 piculs in 1922. [Soy] bean oil grew from 49,817 piculs in 1913 to 12,294,006 piculs in 1922.

Table 46 (p. 423) shows the weight and value of these three products exported to various countries. Beans are mostly exported to Russia, Japan, and the Dutch Indies (in that order). Bean cake is mostly exported to Japan (86% of the total) and Russia. Relatively little bean oil is exported: it goes mainly to the "Turkey, Persia, Egypt, etc." [grouped as one unit] (380,000 piculs), Russia (250,000 piculs), Great Britain (246,000 piculs), the Netherlands (201,000 piculs), and the United States (116,000 piculs).

Note: This is the earliest English-language document seen (May 2003) that uses the term "bean bran" to refer to soy bran. Address: Cornell Univ., Ithaca, New York.

499. Ghosh, Charu Chandra. 1924. Report of the entomologist, Mandalay, for the year ended June 30, 1923. Rangoon, Mandalay. 14 p. *

500. Hall, C.J.J. van. 1924. Ziekten en plagen der cultuurgewasen in Nederlandsch-Indie in 1923 [Diseases and pests of cultivated plants in the Dutch East Indies during 1923]. *Mededeelingen van het Instituut voor Plantenziekten (Buitenzorg)* No. 64. 47 p. See p. 19-20. [Dut]

• ***Summary:*** Discusses *Etiella zinckenella, Melanagromyza sojae [Agromyza sojae], Phaedonia inclusa* at the following locations: Preanger Regentschappen, Tjerebon [Cheribon], Jogjakarta [Djokjakarta, Yogyakarta], Soerakarta, Madioen, Soerabaja, and Besoeki. Address: Buitenzorg.

501. Jansen, B.C.P.; Donath, W.F. 1924. Metabolic experiments on rats and digestibility of the proteins of some foodstuffs. *Mededeelingen van den Burgerlijken Geneeskundigen Dienst in Nederlandsch-Indie* p. 25-45. [6 ref. Eng]

• ***Summary:*** Concludes from rat feeding experiments that "the digestibility of the proteins of *tempe kedele* [soy tempeh] is equal to that of *katjang kedele* (soy-beans)." Address: 1. Dr.; 2. Dr. Both: Medical Lab., Weltevreden.

502. Jansen, B.C.P.; Donath, W.F. 1924. The A-vitamin-content of different Indian foodstuffs, and the value of the proteins of these latter, as a supplement to the proteins of rice. *Mededeelingen van den Burgerlijken Geneeskundigen Dienst in Nederlandsch-Indie* p. 46-98. See p. 78-80. Summarized in Experiment Station Record 52:64-65. [7 soy ref. Eng]

• ***Summary:*** In section 7, titled "Meat," a graph (p. 64) shows the growth curves of young rats fed on a diet containing 90 parts rice (not unpolished) and 10 parts dried *tempe kedele* [soybean tempe].

Section 17, titled "Soy-beans" (p. 79-80) states that in Malay, the soy-bean is called *katjang kedele*. However it is usually eaten as *tempe kedele* [soybean tempe] (see below), "which is a very important ingredient in the native dietary. We made experiments as well with *katjang kedele* itself as with *tempe kedele*. Of the soy-beans there exist differently coloured varieties; we experimented with the yellow variety, of which also the *tempe kedele* is made." Soybeans were found to contain a small amount of vitamin A.

Section 18 titled *"tempe kedele"* (p. 80-81) begins: "Usually the soy-beans are not eaten as such, but from the boiled beans a product is prepared by fermentation: the *tempe kedele."* Various experiments showed that "the proteins of *tempe kedele* appear indeed to be as efficient a compliment to the rice-proteins as those of soy-beans. Also with regard to the A-vitamin-content we could not ascertain any difference between soy-beans and *tempe kedele."* Rice "with *tempe* has to be regarded also as the most important ingredient of the basis-food of a large part of the native population..."

The vitamin A content of the following foods is also discussed: Peanut-presscake *(Arachis hypogaea,* L.) (p. 61-62). *Ontjom or tempe bungkil* (p. 62-63; made of peanut-presscake); in the Sunda-lands (and it Batavia as well) it is called *ontjom.* "Of this *ontjom* there exist two varieties: a white one and a yellowish red one. Whereas often (not always) a yellow or yellowish-red colour happens to coincide with a high content of vitamin A, we thought it interesting to examine the red *ontjom* as to its A-vitamin content." Conclusion: *Ontjom* "is not very rich in A-vitamin; yet the content seems to be higher than that of the presscake." Address: 1. Head of the Chemical Dep., Medical Lab., Batavia (Jakarta), Indonesia; 2. Chemist at the Lab.

503. Minami Manshû Tetsudô K.K. Kôgyô-bu. Nômu-ka. [South Manchuria Railway Co., Industrial Div. Bureau of Agriculture]. 1924. Daizu no kakô [Soybean processing]. Dairen, Manchuria: SMRC. 777 p. 30 cm. (Sangyo Shiryo 21). [250 ref. Jap]

• ***Summary:*** Name of company with diacritics is: Minami Manshû Tetsudô K.K. Kôgyô-bu. Nômu-ka. This important, major work was written by Yoshitane Satô. Contents:

Photos (on unnumbered pages at the front of the book) show 16 scenes of soybean transportation, storage, and processing in Manchuria, as follows: (1) Mule drivers whipping mules trying to pull carts loaded with large sacks of soybeans over muddy roads. (2) Cylindrical osier storage bins for soybeans. (3) Row upon row of sacks of soybeans piled high in storage near docks. (4) Soy sauce being made in a courtyard; each earthenware jar is covered with a woven conical lid. (5) The inside of a huge and modern soy sauce plant. (6) Wooden kegs and glass bottles of Yamasa shoyu. (7) Soy sprouts growing in round woven baskets. (8-11) Soy oil being pressed using vertical screw presses [as an alternative to hydraulic presses]–four views. (12) Boilers used in a soybean mill. (13) A wooden barrel of soybean oil being sealed. (14) Soy oil packaged in many small containers, each surrounded by a wicker basket. (15) Round soybean cakes stacked high on railway flatcars. (16) The inside of a modern soy oil factory.

Contents: 1. Current status of soybean production and consumption: A. Production: Overview (p. 2), Japan (p. 4), Korea (p. 12), Manchuria (p. 16), China (except 3 eastern provinces, but including Eastern Inner Mongolia, p. 31), USA (p. 34), British colonies (p. 37), European countries (p. 40). B. Consumption: Japan (p. 41), Korea (p. 52), Manchuria (p. 57), China (p. 59), Dutch East Indies (Indonesia, p. 60), USA (p. 61), European countries (p. 63).

2. Characteristics of soybeans: A. From a physical sciences viewpoint (p. 67): Structure (overview, cotyledons, hypocotyl, seed coat), contents of each system (p. 70), appearance (p. 73; color, gloss, shape, size, hilum *(fusuma)* color, young plumule leaf color, ratio of seed to seed coat). B. From chemical viewpoint (p. 82): General composition, structure of each component (p. 109; protein, oil, carbohydrate, ash/minerals, vitamins). C. Appearance and relationship between oil and protein content (p. 126): Oil and protein color related to color, glossiness, shape, size, hilum color, young plumule leaf color. D. Evaluating soybean quality (p. 140): Overview, key points (sizes, shapes, colors, glossiness, hilum color, young plumule leaf color, ratio of seed coat to seed, dryness of seed, volume, weight, smell, mixing of different varieties, ratio of imperfect seeds, amount of other types of seeds), collection of materials for testing, testing and evaluating commercial soybeans.

3. Soybean usage and processing (p. 175). A. One view of main usage of soybeans. B. Nutritional value of soybeans as food (p. 183): Nutritional value of soy protein. C. Processed soyfoods (p. 208): Soy sprouts (p. 208), natto *(itohiki nattô,* p. 212, Hamanatto, p. 224), types of tofu (regular tofu *[nama-dôfu,* p. 226], *kori-dofu* or *koya-dofu,* p. 240, aburaage, p. 245, tofu curds *[tofu nô,* p. 247], hard tofu *[tofu-kan,* p. 247], fragrant hard tofu *[kô-kan,* p. 248], *senchô tofu,* p. 249, fermented tofu *[nyûfu or funyû,* p. 249]), *tofu-p'i* or yuba (p. 256), soymilk and artificial cow's milk, p. 259, soybean flour raw, or roasted (kinako, p. 263), shoyu (p. 266; overview of miso and shoyu, Japanese traditional regular shoyu, p. 267, Japanese traditional special shoyu and tamari, p. 269, Chinese soy sauce, p. 272, recent shoyu research and development, p. 274), miso (p. 280; Japanese traditional regular miso, Japanese traditional special and processed miso, p. 282, Chinese miso, recent miso research and development, p, 285). D. Soybeans as feed or fodder (p. 287; green soybeans as feed, p. 290): Fresh forage, dried forage or hay. E. Soybeans as manure or fertilizer *(hiryô,* p. 297; in the Kaijô area of Manchuria, have been roasted and steamed, and mixed with compost, and used for green manure *(ryokuhi)* or soybean cake *(daizu kasu).* This method has also been used in the northeastern provinces *(Tohoku chiho)* of Japan in rice fields). F. Soybeans as oilseeds (p. 302). G. Use of soybean protein in industrial products (p. 304).

4. The soy oil extraction industry (p. 305): A. Methods of removing the oil (origins, traditional methods, hydraulic pressing, extraction method, p. 340). B. Advantages and disadvantages of each method (p. 348). C. The soy oil industry in Manchuria (p. 357): History of development, important places for soy oil on the Manchurian Railway, economic condition of the Manchurian oil industry (p. 420), oil extraction in Japan (history, p. 437, commercial factories, p. 442, development of these factories, p. 451).

5. Soybean meal or cake and its composition (p. 464). A. The varieties of soybean meal or cake and the composition of each. B. Evaluation of quality (p. 473). C. Soybean meal or cake as a fodder (p. 478): Feeding value and digestibility, incorrectness of the theory that there are bad effects from feeding soybean meal or cake (p. 479). D. Soybean meal or cake as a fertilizer (p. 490). E. Soybean meal or cake as food (p. 504): Use as a raw material for shoyu production (p. 506), use to make soy flour (p. 509). F. Soybean meal or cake as a source of protein in industrial products.

6. Soy oil and its processing (p. 526). A. Characteristics of soy oil: Composition, physical characteristics (p. 535), chemical characteristics, testing and evaluating soy oil (p. 564), the quality of commercial soy oil products (p. 577). B. Refining soy oil (p. 587). C. The use and processing of soy oil (p. 631): Overview, refined soy oil as a food, substitute for salad oil, or for deep-frying oil, as an illuminant, as a cutting oil, lard substitute, margarine, in paints, soap, hardened oil, for waterproofing, substitute for petroleum oil, glycerin, fatty acids, stearine.

7. Exports and imports of soybeans, soybean meal or cake, and soy oil (p. 708). A. Manchuria. B. Manchurian exports. C. China. D. Japan. E. Korea. Appendix: Bibliography of soybeans (Japanese-, German, and English-language works; p. 748). List of photos.

Note 1. This is the earliest Japanese-language document seen (April 2001) that mentions fermented tofu, which it

calls *nyûfu* or *funyû*.

Note 2. This is the earliest Japanese-language document seen (Feb. 4) that uses the term *itohiki nattô* to refer to natto. Address: Dairen, Manchuria.

504. Relazione su l'attività della stazione nel biennio 1922-1923 [Report on the activities Bari Agricultural Station for the years 1922-1923]. 1924. Bari, Italy: Stazione Agraria Sperimentale–Bari. 148 p. See p. 73-75. [Ita]

• ***Summary:*** The soybean was the object of diligent research, with the aid of Dr. Savelli. In 1922 the following varieties were cultivated:

Varieties provided by the USA: Amarilla, Arlington, Austin 1432, Biloxi, Black Eyebrow 371 and 817, Early Black, Easy Cook [Easycook], Haberlandt, Hurrelbrink, Hahto, Incas 1201, Ito-San 87, Kentucky 1421, Mammoth Yellow, Mandarin 397, Manchu, Manchuria 815 and 1408, Medium Yellow, Mongol, Morse, Negra, Ohio, Peking 376, S.P.I. 28050, 30600 36576, 37063, 40175, Tokyo, Virginia, Wilson 243, Yokoten.

Varieties provided by India: Coimbatore, Burmali, Bianca, Bruna, Nera, and Verde of Nagpur; Varieties from Mandalay [Burma]: Pen-ga-pè, and San-to-nauk.

In 1923 the station distributed to other agriculturists the following soybean varieties: Borzi, Haberlandt, Morse, Ohio, Peking, and Virginia. Other varieties matured at the Bari farm but the Borzi variety produced better than all others. Address: Stazione Agraria Sperimentale, Bari, Italy.

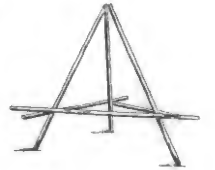
505. Ochse, J.J. 1925. Tropische groenten. Geteelde en in 't wild groeiende gewassen, die door de Indische bevolking worden gegeten [Tropical vegetables: Cultivated and wild plants eaten by the Indonesian people]. Weltevreden: Uitgave en Druk Volkslectuur. 215 p. July. See p. 92-95. Illust. Also listed as series #686. [Dut]

• ***Summary:*** This is the original Dutch-language edition, which was revised in 1931 as *Indische Groenten* and translated into English in 1931 as *Vegetables of the Dutch East Indies.* Ochse lived 1891-1970. After describing the plant, the author notes that there are two varieties of soybeans: one is yellowish brown and the other is black. The first is used to make tempeh and tofu; the second to make kétjap. Very popular soy products in the Indonesian market are tofu and firm tofu *(tahoe* and *takoäh).* Also discusses *tao tjo* (Indonesian-style miso; has a consistency like paste or porridge), tao dji (soy nuggets), témpé, and ontjom. The process for making each of these soyfoods is described.

Illustrations show: (1) A young soybean plant with leaves and pods (half size).

(2) A bamboo scaffolding or curing frame, in tripod form with 3 horizontal supports, used for drying bunches of soybeans.

Note: This is the earliest document seen (April 2001) that contains the word *takoäh.* Address: Buitenzorg [Bogor], Java.



506. Vera, Bonifacio de. 1925. The effect on leprosy of certain oils not in the chaulmoogra group. *J. of the Philippine Islands Medical Association* 5(12):374-78. Dec. [4 ref. Eng]

• ***Summary:*** "Antileprosy treatment at the Culion Leper Colony is based mainly on chaulmoogra oil derivatives. However, other oils are also being tried... Cod liver oil ethyl esters and soya bean oil ethyl esters [extracted using ethyl

alcohol] were tried, following reports by Rogers *(Lancet,* June 28, 1924, p. 1297) that such highly unsaturated oil derivatives give favorable results in leprosy."

"The effect of the oils and their derivatives studied was found to depend upon the degree of unsaturation. Further, in the 2 cases where an oil and its ethyl esters were both used, it was found that the ethyl esters gave better results." Address: Supervising Physician, Culion Leper Colony.

507. Wester, P.J. 1925. The food plants of the Philippines: Soya. *Philippine Bureau of Agriculture, Bulletin* No. 39. p. 180-. *
Address: Bureau of Agriculture, Philippines.

508. Hall, C.J.J. van. 1925. Ziekten en plagen der cultuurgewassen in Nederlandsch-Indië in 1924 [Diseases and pests of cultivated plants in the Dutch East Indies during 1924]. *Mededeelingen van het Instituut voor Plantenziekten (Buitenzorg)* No. 67. 53 p. See p. 21-22. [Dut]
• ***Summary:*** Discusses *Aproarema modicella, Etiella zinckenella, Melanagromyza sojae* at the following locations: Preanger Regentschappen, Resedentie Tjerebon [Cheribon], Jogjakarta [Djokjakarta, Yogyakarta], Soerakarta, Madioen, and Soerabaja. Address: Buitenzorg.

509. Koens, A.J. 1925. Teelt van tweede gewassen in de afdeeling Soemedang [The cultivation of secondary crops]. Weltevreden [Batavia, Dutch East Indies]: Landsdrukkerij. viii + 63 p. 22 cm. [Dut]*
• ***Summary:*** Sumedang is a town in West Java, Indonesia, approximately 35 km northeast of Bandung. The town is famous for *tahu Sumedang,* a local variety of deep fried tofu.

510. Salazar, Leopoldo G. 1925. The manufacture and chemical control of some soybean products under Los Baños conditions. Bachelor of Agriculture thesis, Dep. of Agricultural Chemistry, College of Agric., University of the Philippines, Los Banos. Publ. No. 231. *
Address: Univ. of the Philippines, Los Baños.

511. Vinall, H.N. 1926. Charles Vancouver Piper [Obituary]. *J. of the American Society of Agronomy* 18(3):295-300. March. [66* ref]
• ***Summary:*** This obituary contains the best biography of Charles V. Piper we have seen. An ex-president and recently elected Fellow of the American Society of Agronomy, he died on February 11, 1926 at Washington, DC, at age 58. He is survived by a wife, mother, three brothers, and three sisters. "The immediate cause of his death was uremic poisoning due to Bright's disease [a kidney disease]. High blood pressure forced him to be careful in his work for several years before his death.

He was born on 16 June 1867 in Victoria, BC, Canada, one of the nine children of Andrew William and Minna (Hausman) Piper. After completing his common school education, he entered the University of Washington and received the degrees of Bachelor of Science in 1885, and Master of Science in 1892. In 1893 he went to Pullman, Washington, as Professor of Botany and Zoology in the Washington Agricultural College (now State College of Washington) and remained as head of the department until 1903. He married Laura Maude Hungate on 15 Sept. 1897. In 1900 he attended summer school at Harvard University (in Massachusetts) and earned an M.S. degree there.

In 1903 he went to work for the U.S. Department of Agriculture in Washington, DC. He was in charge of the Office of Forage Crop Investigations from the time of its organization as a separate unit in 1905 until his death.

He was Editor of the Agricultural Series of McGraw Hill books and of the agronomy division of Botanical Abstracts; and Associate Editor (Crops) for the Journal of the American Society of Agronomy.

But he was first and foremost a botanist, recognized worldwide. He was deeply interested in taxonomy and nomenclature. "He became the proponent of many new agronomic terms and served as chairman of the standing committee on Agronomic Terminology in the American Society of Agronomy."

In 1911 at the request of the War Department, he spent 4½ months in the Philippines surveying forage crops potentially useful to army horses and mules. He returned via Java, India, Egypt, and Europe, collecting plants and seeds for the USDA and visiting botanic gardens and museums en route.

"In Dr. Piper's conduct of forage investigations his most spectacular achievement was his introduction of Sudan grass into the United States. Since 1918 it has been worth an estimated $10 million annually to the country.

His seven books include three, *The Flora of the Palouse Region* (1901), *Flora of Southeastern Washington and Adjacent Idaho* (1914), and *Flora of the Northwest Coast* in collaboration with R. Kent Beattie; *Turf for Golf Courses* (1917) in collaboration with R.A. Oakley; *The Soybean* (1923) in collaboration with W.J. Morse; and two of which he was the sole author, *Flora of the State of Washington* (1906), and *Forage Plants and Their Culture* (1914, 1924).

Between 1893 and 1926 some 51 botanical papers (all but one of which he was sole author) and 55 agricultural papers and bulletins were published. A chronological bibliography of these is given.

512. Adolph, W.H. 1926. Analyses of Chinese food materials. *Philippine J. of Science* 30(3):287. July.
• ***Summary:*** Good historical information on tofu. Address: Shantung Christian Univ., Tsinanfu, China.

513. Salazar, Leopoldo G. 1926. The manufacture and chemical control of some soybean products under Los Baños conditions. *Philippine Agriculturist* 15(4):219-31. Sept. [12 ref]

• ***Summary:*** "The Chinese and Japanese manufacture a large variety of food products from the soybean, among which may be mentioned soy sauce or *toyo,* bean curd or *tokua,* soybean milk, flour, salad oils, and lard substitutes.

"Of these products, the sauce and curd are the most important. To the Americans the sauce is known as *soy sauce,* to the Japanese as *shoyu,* to the Chinese as *ch'au yau,* or drawing oil; to the Filipinos as *toyo.* The curd, cake, or cheese is known as *teou-fu* and *tao-hu* in China; *tofu* in Japan; and *tokua* in the Philippines. Soybean cheese is a misnomer as the product is obtained without any ripening process.

"The objects of this work were: (a) to determine the possibility of preparing toyo [soy sauce] and tokua [tofu] under Los Baños conditions; and (b) to determine the time at which the toyo contains the highest percentage of nitrogen. This work was performed in the laboratory of the Department of Agricultural Chemistry, University of the Philippines, Los Baños, Laguna, from April, 1924, to February, 1925."

A review of the literature shows that in the Philippines, only three prior investigations on this subject have been reported, those of Barrett (1911), Gibbs and Agcaoili (1912), and Gibbs, Agcaoili, and Shilling (1912). A photo shows the hand-turned stone mill and other tools used for making tokua, following the method used by the Chinese in Manila. The residue left after making tofu (okara) is called "sapal," and that left from soy sauce is called "tahuse."

"After 8 weeks of fermentation, the toyo was found to be ready for the first drawing. Analyses showed that the toyo prepared in the laboratory compared favorably in composition, odor, and flavor with the superior grade product of the market."

Note 1. This is the earliest document seen (Feb. 2004) that uses the word "tokua" to refer to tofu.

Note 2. This is the earliest English-language document seen (March 2007) that uses the word "sapal" to refer to okara.

Note 3. This is the earliest English-language document seen (March 2007) that uses the word "tahuse" to refer to the residue left after making soy sauce. Address: College of Agriculture, No. 231, the Philippines.

514. South Manchuria Railway Co. 1926. Soya beans in Manchuria. Dairen: SMRC Agricultural Office. 40 p. Nov. 26 cm. [Eng]

• ***Summary:*** Contents: 1. How Manchurian beans are produced: Soybean production in the world (Japan, Chosen {Korea}, Manchuria, China proper, United States), bean cultivation in Manchuria (how production has been increased, Manchuria suited for bean production {meteorological peculiarities, Manchurian soil and bean cultivation, local adaptability}). 2. World-wide demand for Manchurian beans: Supply and demand in Manchuria, bean demand in destination countries (demands in Japan, in China proper, in Java {Dutch East Indies}, in European countries). 3. Uses of beans: Introduction (gives uses as food, cattle feed, and fertilizer, and uses for the oil), general uses of beans (beans, bean oil, bean cake, food), value of beans as food (from general constituents, food value of beans from new dietetic point of view, conclusion), uses of bean oil (properties of bean oil, miscellaneous uses of bean oil {direct uses (native), refined bean oil for table use, substitute for lard, substitute for butter, paint solvent, soap, glycerine and fatty acid, candles, water proof, substitute for petroleum, substitute for India Rubber, etc.}), uses of bean cake (as fertilizer, bean cake as cattle feed, bean powder [probably defatted soybean flour] made from bean cake & its uses, "soy" made from bean residuum, "Aji-no-moto" made from bean residuum, water-paint made {Solite, invented by Mr. T. Suzuki and manufactured and sold by the Dairen Solite & Co. until several years ago}, protein products made from bean residuum {such as paper sizing, celluloid substitutes, and Satolite [soybean plastic]}). 4. Bean milling in Manchuria: History of development, oil milling processes (expressing process, by process of operation, by kinds of expressing devices, by chemical / benzine extraction at Honen Bean Mill, Dairen), advantages & disadvantages of different processes (wedge, screw, & hydraulic systems compared; round cake, plate cake, & extraction system compared {advantages & disadvantages of extraction system, advantages & disadvantages of bean plate, advantages & disadvantages of hydraulic pressure system}), bean mills in Manchuria. 5. Accumulation & distribution of beans, bean cake & oil: Produce movements in South Manchuria, produce movements in North Manchuria. 6. Business in Manchurian produce: Business on the Exchange (Japanese Exchanges, Chinese Exchanges), business outside the Exchanges (spot deals in beans {river beans, market beans, osier bin beans, train beans}, by forward contract {by future contract, business in the green field, by speculation}, business in bean cake & oil). 7. Export staple produce: Staple produce in Manchurian trade, exports of staple produce in South & North Manchuria compared, position of custom houses in Manchuria concerning export of staple produce.

In Chapter 4, "Bean milling in Manchuria," section 1 titled "History of development" states: The [soya] Bean milling industry was established in China a few hundred years ago. In Manchuria, hemp oil mills used to be practically all that existed up until about 60 years ago [i.e., until about 1866]. Around Tiehling and Changchun, which were important [soya] bean markets, the process for

expressing oil from hempseed was applied to Beans with excellent results; this was the origin of the bean milling industry in Manchuria. As the demand for bean oil kept rising, hempseed oil found its uses gradually reduced, and in time the term "oil mill" came to refer to a bean oil factory. At that time, the object of the mills lay chiefly in producing Bean Oil; Bean Cake was regarded as a by-product, good only for cattle feed. Most of the demand was local and the milling process was primitive and on a small scale, often conducted by hand or by means of a donkey.

Phase II: The Sino-Japanese War (1894-1895) marked the start of Bean Cake exports to Japan. As its fertilizing value came to be recognized, demand for to Japan expanded rapidly. Starting at this time, Bean Cake came to be seen as the main product and Bean Oil as the by-product.

Phase III: In recent years, with the worldwide shortage of oils and fats, Manchurian Bean Oil has come to be exported worldwide; exports to the West have begun and increased dramatically. Demand reached its zenith during the Great War [World War I].

Photos show: Seed-bean field (Agricultural Experiment Station, Kunchuling). Soya beans in pods. Sowing of seed beans. Bean plant in harvesting season. Weeding in bean field. Beans being threshed in farm-yard. Beans harvested & carted away. Beans stored in Osier Bins in the yard of the local merchant. Bean carts wending their way the Market in the Interior. Old screw patterned presses in Manchuria. Hills of bags of beans in Changchun Station Yard. Train loads of bean cake to be shunted to quay of shipment. Hydraulic pressure system in Manchuria.

The section titled "'Aji-no-moto' made from bean residuum" (p. 17) states: "In the amino acid that constitutes [soy] bean protein is contained much glutamic acid that serves as the chief source of 'ajinomoto,' a very popular flavor at Japanese table. Thus, be decomposing the constituents of bean residuum [defatted soybean meal], the manufacture of glutamic acid soda will be easily accomplished." Note: This is the earliest document seen (Oct. 2005) concerning "aji-no-moto" / "ajinomoto" (mono-sodium-glutamate) made from soybeans.

515. Hall, C.J.J. van. 1926. Ziekten en plagen der cultuurgewasen in Nederlandsch-Indie in 1925 [Diseases and pests of cultivated plants in the Dutch East Indies during 1925]. *Mededeelingen van het Instituut voor Plantenziekten (Buitenzorg)* No. 70. 51 p. See p. 20-21. [Dut]

• ***Summary:*** Discusses *Etiella zinckenella, Melanagromyza sojae* at the following locations: Residenties Cheribon and Indramajoe, Residentie Pekalongan, Jogjakarta [Djokjakarta, Yogyakarta], Soerakarta, Semarang [Central Java], Rembang, Madioen, Kediri, Soerabaja, and Besoeki. Address: Buitenzorg.

516. International Institute of Agriculture. Bureau of Statistics. 1926. Production et commerce des produits oleagineux de huiles vegetales [Oleaginous products and vegetable oils–Production and trade]. Rome, Italy: Institut International d'Agriculture. Service de la Statistique Generale. 192 p. Index 24 cm. [30+ ref. Fre; Eng]

• ***Summary:*** The Introduction begins: "This volume is a continuation of a the monograph on oleaginous products *(produits oléagineux)* and vegetable oils, published in 1921 in French, then in 1923, with numerous amplifications and modifications, in English.

Soya is discussed in detail in English on pages 70-73. Tables show: (1) World production of soybeans in 1909-13, 1921, 1922, 1923, and 1924 in the following countries (in thousands of quintals): China (incl. Manchuria), Korea, Japan, United States, Java & Madura, and Kwangtung (French: Koung-Toung; today's Guangdong province in southern China). In 1923, China was by far the leading country (22,680), followed by Korea (6,466), Japan (4,378), USA (2,434), and Java and Madura (973). (2) Exports of soybeans worldwide (during the same 5 years as (1) above). (3) Exports of soy oil worldwide (during the same 5 years as (1) above). Note: This same basic information is given in French on pages 24-27.

Pages 60-63 give a worldwide overview in English. Tables show: (4) World production of primary oleaginous products (during the same 5 years as (1) above). The eight products are: Groundnuts, rapeseed, linseed, hempseed, cottonseed, sesamum, soya and copra. For sesamum, soya, and copra, values are given only for the year 1924. (5) World production of primary oleaginous products (expressed in terms of oil, in thousands of quintals). (6) World exports of primary oleaginous products (in thousands of quintals). (7) Excess of imports (+) or of exports (-) of primary oleaginous products terms of oil (in thousands of quintals). For the eight products for the years 1909-1913 and 1924 for: Europe, North and Central America, South America, Asia, Africa, Oceania. (8) World exports of vegetable oils (in thousands of quintals during the same 5 years as (1) above).

There are also detailed sections in English on groundnuts (p. 64-68), and sesamum (p. 68-71). Address: Rome, Italy.

517. Mendiola, N.B. 1926. A manual of plant breeding for the tropics. Manila. 365 p. See p. 230-31, Improvement of Minor Crops.

• ***Summary:*** Recommended growing soybeans in the Philippines for their nutritive value. Address: Assoc. Prof. of Agronomy, College of Agriculture, Univ. of the Philippines and Consulting Plant Breeder, Bureau of Agriculture.

518. Stevenson, John Albert. 1926. Foreign plant diseases: A manual of economic plant diseases which are new to or not widely distributed in the United States. Washington, DC: USDA, Office of the Secretary. viii + 198 p. See p. 171-72. 23 cm. [ soy ref]

• ***Summary:*** Pages 171-72, under "Soja," list 19 diseases attacking *Soja* spp. which are new to or not widely distributed in the U.S.: *"Aecidium glycines* P. Henn. Leaf rust on *S. max* in Tanganyika and Uganda." Note: This is the earliest document seen (Aug. 2009) concerning soybeans in Uganda, or the cultivation of soybeans in Uganda.

*"Ascochyta* sp. On *S. max* in Japan.

*"Bacterium* sp. A leaf-spotting disease of *S. max,* said to be due to a bacterium distinct from other species on this host, is reported from Japan.

*"Cercospora daizii* Miura. Leaf spot on *S. max* in Manchuria.

*"Cercospora glycines* Cke. Definite dark-brown leaf spots on *Glycine clandestina* in Australia.

*"Colletotrichum glycines* Hori. Anthracnose on stems and pods of *S. max* in Japan and Chosen.

*"Fusarium* sp. Causes ring spot disease of *S. max* in Manchuria.

*"Hypochnus centrifugus* Tul. Causes cankers on stems, blighting infected plants of *S. max* in Manchuria.

*"Hypochnus cucumeris* Frank. See Cucumis.

*"Mosaic.* Mosaic disease of *S. max* reported from Japan is probably the same as the mosaic and crinkling reported from the United States.

*"Mycosphaerella phaseotarum* Siem. See Phaseolus.

*"Peronospora manshurica* (Naoum) Syd. *(P. trifoliorum* De B. var. *manshurica* Naoum.) Downy mildew on leaves of *S. max* in Siberia, India, Formosa, and Manchuria, causing premature leaf fall.

*"Phyllosticta sojaecola* Massal. *(Phaeosphaerulina sojaecola* Miura.) Subcircular, dull-brown leaf spots on *S. max* in Japan, Russia, Manchuria, and Italy.

*"Pseudomonas glycines* Nak. Circular yellow leaf spots, becoming brown to dark-brown with yellow margins on *S. max* in Japan. The spots may be as numerous as 70 to 80 per square centimeter, causing death of infected leaves.

*"Septoria glycines* T. Hem. Brown leaf spots on *S. max* in Japan and Manchuria.

*"Septoria sojina* v. Thuem. Irregular yellowish leaf spots on *S. max* in Italy, Japan, and Austria.

*"Trotteria venturioides* Sacc. Black mildew on leaves of *S. max* in the Philippines.

*"Uredo vignae* Bres. See Vigna.

*"Uromyces sojae* (P. Henn.) Syd. Brown rust pustules on leaves of *S. max* in Japan, Java, China, India, Formosa, Manchuria, and the Philippines." Address: Chief Pathological Inspector, Federal Horticultural Board.

519. Vavilov, N. 1926. Studies on the origin of cultivated plants. *Trudy po Prikladnoi Botanike, Genetike i Selektsii (Bulletin of Applied Botany, Genetics and Plant Breeding, Leningrad)* 16(2):139-248. See p. 242. [111* ref. Eng]

• ***Summary:*** Candolle believed that the main cultivated plants came from three great regions, which had no communication with each other. Vavilov enlarged on this concept by showing that all major crops originated in the tropical to subtropical regions of the world, and in some 11 or 12 centers of origin, based on his concept that centers of diversity could be equated with centers of origin. In addition, he contended that the origins of plant domestication were to be found in mountain zones in these centers.

Vavilov shows that a number of domesticated plants were not cultivated directly from the wild but arose in a somewhat different manner at a later stage as weeds of cultivation. Thus he divides cultivated plants into two distinct groups: (1) Primary crops, comprising all those ancient crops which, as far as we know, were domesticated directly from wild plants (even though these wild plants had strong weedy tendencies): Examples: Wheat, barley, rice, soybean, flax, and cotton. (2) Secondary crops, which originated as weeds in admixture with the primary crops, and generally at a much later date. Examples: Rye and oats.

Soybeans originated in the South-Eastern Asia Center. There is only one line on soya, on p. 242.

520. Veer, K. van der. 1926. Tweede gewassen [Secondary crops]. Buitenzorg [Dutch East Indies]: Archipel Drukkerij. 182 p. See p. 99. 24 cm. [Dut]*

521. Pantanelli, G. 1927. Le nostre esperienze sulla Soja [Our experiences with soya]. *Coltivatore (Il)* 73(5):133-38. Feb. 20. [5 ref. Ita]

• ***Summary:*** Page 134 states: *"Dopo alcuni tentativi sporadici che vanno dal 1740 al 1880, ricordiamo la prova fatta da Antonino Borzi at the Giardino Coloniale di Palermo, ove una varieta a semi gialli quasi sferici dette, con 8 irrigazioni, 51 kg di seme su 350 mq."* This paragraph can be translated: "After some sporadic [soybean] trials that went from 1740 to 1880, we will recall the trial conducted by Antonino Borzi at the Colonial Garden at Palermo, where a variety of yellow [soybean] seeds that were almost spherical, with 8 irrigations, yielded 51 kg of seed per 350 mq."

Note: This document contains the earliest dates seen (Aug. 2003) for soybeans in Italy, or the cultivation of soybeans in Italy (1740). The source of these soybeans is unknown, and the date "1740" is undocumented. Yet note that the earliest possible date that the soybean was cultivated in France was about 1740. Perhaps there was some connection between the earliest possible soybean cultivation in France and in Italy.

"At the same time, at the Bonafous Agricultural Institute in Turin, a yellow and a green soybean variety were being cultivated. Both had seeds that were round, large, and well suited to cultivation in that area."

Soybeans were first cultivated at the Bari Agricultural Station in Italy in 1921, Borzi being the favorite. The next year, many varieties were received from the USA, and in following years favorite varieties from agricultural stations in British India: Coimbatore, Burmali, Nepal, Bianca, Bruna, Nera, Verde di Nagpur, Pen-ga-pe, Ber-rhum and San-to-Nauk of Mandalay. In 1923 seeds were distributed to other agriculturists. In 1924 seed from the Bari station matured at various localities in Puglia, and at the Bari farm, Borzi, Ito San, and Incas were again cultivated. Borzi was the best producer. In 1925 cultivation was repeated at Bari and at Lecce. Finally in 1926 the yellow Borzi soybean was cultivated at Cerignolo, Bari, Cassano Murgie, and at Matera. The author concludes by noting that Italy imports large quantities of soybeans worth several million lira; these could probably be grown domestically. Address: Bari, Stazione Agraria Sperimentale.

522. *New York Times.*1927. Department of Agriculture scouts scour the world for useful horticultural specimens. March 27. p. XX8.

• ***Summary:*** "P.H. Dorsett, a department explorer, returned recently from a 2½ year trip through China, the tropical islands of Sumatra, Java and Ceylon, where he collected new varieties of wheat, barley, soybeans and mungbeans. He obtained, with the help of B.W. Skvortzow, a Russian botanist at Harbin, Manchuria, what is regarded as the best collection of soybean varieties ever brought to the United States." Many varieties on the roughly 4,000,000 acres now grown in the USA are the result of previous introductions by plant explorers.

Note 1. This is the earliest English-language document seen (Nov. 2008) that contains the word "mungbean" (or "mungbeans").

523. Morse, W.J. 1927. Soy beans: Culture and varieties. *USDA Farmers' Bulletin* No. 1520. 34 p. April. Revised 1939 and 1949. Supersedes Morse 1918b. The Soy Bean. USDA Farmers' Bulletin No. 973. [36 ref]

• ***Summary:*** Contents: History of the soy bean. Climatic adaptations. Soil preferences. Varieties. Descriptions of varieties. Varieties recommended for different areas. Preparation of seed bed. Fertilizers. Inoculation. Time of seeding. Methods of seeding. Rate of seeding. Depth of seeding. Cultivation. Soy beans in rotations. Soy beans in mixtures: Soy beans and corn, cowpeas, Sudan grass, millet. Insect enemies of soy beans: Grasshoppers, blister beetles, Mexican bean beetle, other beetle enemies, leaf hoppers, army worms and other caterpillars, the green clover worm, chinch bugs. Diseases of the soy bean: Bacterial blight, bacterial pustule, mosaic, fusarium blight or wilt disease, stem rot, pod and stem blight, sunburn, downy mildew, anthracnose, root knot (caused by a tiny eelworm or nematode, *Heterodera radicicola).* Other enemies of soy beans (rabbits, woodchucks).

The soy bean is "also called the soja bean, the soya bean, and in North Carolina the stock pea." "Previous to 1908 the trade in soy beans was largely confined to oriental countries, particularly China, Manchuria, and Japan. Since that time the value of the soy bean and its products has gradually been realized in other countries, and during the last decade they have attained considerable importance in the world's commerce. At the present time the soy bean is cultivated principally in China, Manchuria, Japan, Chosen (Korea), and the United States, but it is also of more or less importance in northern India, Indo China, and the Malayan Islands. Soy beans are grown also in Italy, France, southern Russia, Hungary, Hawaii, Egypt, South Africa, and in a few countries of South America, but the acreage in these countries is very limited.

"The soy bean was introduced into the United States as early as 1804 and for several decades was regarded more as a botanical curiosity than as a plant of economic importance. Since 1890 nearly all of the State Agricultural Experiments have experimented with soy beans and many bulletins have been published dealing wholly or partly with the crop."

"The soy bean has been used mainly for forage purposes in the United States, but as a forage crop alone it would not likely become one of the major field crops. The acreage in soy beans has increased very rapidly during the last decade. Previous to 1917 considerably less than 500,000 acres were grown. In 1924 there were more than 2,500,000 acres, of which 1,000,000 were grown for hay, 932,000 for pasture and silage, and 613,000 for the production of seed. More than 10,000,000 bushels of soybean seed and about 1,360,000 tons of soybean hay were produced in 1924."

The 103 soy bean varieties and synonyms described on pages 5-11 are as follows (in alphabetical order): A.K., Aksarben, Arlington, Austin, Banner–same as Midwest, Barchet, Biloxi, Black Beauty–same as Ebony, Black Eyebrow, Black Sable–same as Peking, Bopp–same as Chernie, Brown–same as Mammoth Brown, Chernie, Chestnut, Chiquita, Columbia (from China), Columbian–same as Columbia, Dixie, Dunfield, Early Brown, Early Green–same as Medium Green, Early Virginia Brown–same as Virginia, Early Wilson–same as Wilson, Early Wisconsin Black–same as Wisconsin Black, Early Yellow–same as Ito San, Easycook (from Shantung province, China in 1894), Ebony, Elton, Essex–same as Peking, Extra Early Black Eyebrow–same as Black Eyebrow, Extra Select Sable–same as Peking, Giant Brown–same as Mammoth Brown, Goshen Prolific, Green–same as Medium Green, Guelph–same as

Medium Green, Habaro, Haberlandt, Hahto ("Introduced under S.P.I. No. 40118 from Wakamatsu, Japan, in 1915. It is commonly known in Japan as 'dove killer,' and is said to be used boiled in the green stage... Especially valuable as a green vegetable bean when three-fourths to full grown"), Hamilton, Herman, Hollybrook, Hongkong, Hoosier, Illini, Ilsoy, Indiana Hollybrook–same as Midwest, Ito San, Jet, Laredo, Large Brown–same as Mammoth Brown, Large Yellow–same as Mammoth Yellow, Late Yellow–same as Mammoth Yellow, Lexington, Mammoth–same as Mammoth Yellow, Mammoth Black–same as Tarheel Black, Mammoth Brown, Mammoth Yellow, Manchu, Manchuria–same as Pinpu, Mandarin, Medium Early Green–same as Medium Green, Medium Early Yellow–same as Ito San, Medium Green, Medium Yellow–same as Midwest, Merko, Midwest, Mikado, Minsoy, Mongol–same as Midwest, Morse, Ogemaw, Ohio 9035–same as Hamilton, Old Dominion, Otootan, Peking, Perley's Mongol–same as Midwest, Pinpu, Red Sable–same as Peking, Roosevelt–same as Midwest, Roosevelt Medium Early Yellow–same as Midwest, Royal–same as Wilson Five, Sable–same as Peking, Shanghai–same as Tarheel Black, Sooty, Southern–same as Mammoth Yellow, Southern Prolific, Soysota, Tarheel–same as Tarheel Black, Tarheel Black, Tarheel Brown–same as Mammoth Brown, Tokyo, Virginia, Virginia Early Brown–same as Virginia, Wea, White Eyebrow, Wilson, Wilson-Five, Wisconsin Black, Wisconsin Early Black–same as Wisconsin Black, Wisconsin Pedigreed Black–same as Wisconsin Black, Yoko–same as Yokoten, Yokoten, Yellow–same as Mammoth Yellow.

Note 1. This is the earliest document seen (Oct. 2004) that mentions the soybean varieties Black Sable, Early Virginia Brown, Extra Early Black Eyebrow, Giant Brown, Large Brown, Tarheel Brown, Virginia Early Brown, or Wisconsin Pedigreed Black.

Note 2. This is the earliest document seen (Oct. 2004) which states that Black Sable is the same as Peking, or that Brown, Giant Brown, Large Brown, and Tarheel Brown are the same as Mammoth Brown, or that Early Green is the same as Medium Green, or that Early Virginia Brown and Virginia Early Brown are the same as Virginia, or that Early Wisconsin Black and Wisconsin Early Black and Wisconsin Pedigreed Black are the same as Wisconsin Black, or that Extra Early Black Eyebrow is the same as Black Eyebrow, or that Mammoth Black is the same as Tarheel Black, or that Yellow is the same as Mammoth Yellow. Address: Agronomist, Office of Forage Crops, Bureau of Plant Industry, USDA, Washington, DC.

524. *Washington Post.* 1927. Russian corporation sues. July 6. p. 20.

• ***Summary:*** "The Amdur Shipping and Trading Co., a Russian corporation with headquarters in Berlin, Germany, filed suit yesterday in Equity Court against the alien property custodian to recover $31,964 a sum which represents the price obtained by the American Government in the sale of a cargo of soja beans belonging to the plaintiff in Manila" [Philippines].

525. *New York Times.* 1927. Weird food for gourmets: Paris scientists test with relish the new gastronomic discoveries of the year. Sept. 18. p. SM18.

• ***Summary:*** Those who enjoy dining at "foreign restaurants and tasting strange dishes would have relished the opportunity of attending the dinner that the Société Nationale d'Acclimatation [Society for Acclimatization] recently offered to its members in Paris." Some of the dishes were of exotic origin and all were extremely rare.

Dr. Gauducheau has developed a recipe for roasted chicken, called "inter-sauced" chicken, in which the sauce is injected into the veins of the chicken after the blood has been removed. He gets the "best results from sho-yu [shoyu], the juice of the Soja bean, and from nuoc-mam, the juice of salted fish prepared by the Annamites" [from today's central Vietnam].

526. Rossem, C. van. 1927. De samenstelling van de belangrijkste plantaardige voedingsmiddelen van Nederlandsch-Indië [The composition of the most important foods of plant origin in the Netherlands Indies]. *Mededeelingen van het Algemeen Proefstation voor den Landbouw* No. 24. 76 p. [4 soy ref. Dut; eng]

• ***Summary:*** Information on the composition of the soybean (including black soybeans) is given on pages 17-19, 66, 68, and 72. Page 70 states that the physiological heat from combustion (in calories) of 100 gm of air-dried soy-beans is 369 calories ± 5.6 calories, and that of moisture-free soybeans is 423 calories ± 6.3 calories. On page 76 is an English-language summary. Address: Hoofd van het Scheikundig Laboratorium.

527. Heyne, K. 1927. De nuttige planten van Nederlandsch Indie [The useful plants of the Netherlands Indies. 3 vols.]. The Hague, Netherlands: W. van Hoeve. 1662 + CCXLI p. See vol. 2, p. 789-90, 814-20. Index. 28 cm. See also 3rd ed. 1950. [14 ref. Dut]

• ***Summary:*** Contents: Ontjom. Dagé. The soybean (Sojaboon, Kedele). Cultivation. Seeds. Utilization: Témpé [tempeh], tao hoe [tofu], tao koan [pressed tofu; doufu-gan], tao tjo [Indonesian-style miso], soja (kètjap).

Note: One other edition of this work (same author and title) was published in 1927: 2nd improved and expanded edition, 3 vols, published in the Dutch East Indies (Buitenzorg) by Departement van Landbouw, Nijverheid en Handel. Printed by Ruygrok & Co. (Batavia) (1662 + ccxli p.). OCLC Accession No.: 756-9335 and 588-3707. Owned by 30 + 24 = 54 libraries worldwide. Address: Hoofd van

het Museum voor Economische Botanie te Buitenzorg (Bogor).

528. Jumelle, Henri Lucien. 1927. Les cultures coloniales: Plantes industrielles. Vol. 5. Plantes oléagineuses [Crops of the colonies: Industrial plants. Vol. 5. Oil-producing plants: Glycine hispida]. Paris: Librairie J.-B. Bailliere et Fils. 112 + xx p. Illust. Index. 19 cm. [Fre]
• ***Summary:*** The contents of this book is the same as that of the 1914 edition. The section titled *Glycine hispida* Max. (p. 108-12) discusses soybeans and soyfoods. Also discusses: Peanuts (p. 64-79) and sesame (p. 79-86). Address: Prof., Faculté des Sciences de Marseille.

529. Kellogg, John Harvey. 1927. The new dietetics: A guide to scientific feeding in health and disease. 3rd ed. Battle Creek, Michigan: The Modern Medicine Publishing Co. 1031 p. See p. 188-93, 322-28. Illust. Index. 24 cm.
• ***Summary:*** This is an encyclopedia of food, diet, and nutrition. Earlier editions were published in 1921 and 1923. The author, a physician and a vegetarian, lists his credentials on the title page: "Fellow of the Royal Society of Medicine of Great Britain, of the American Medical Association, Member of the American Economic Association, and of the National Geographical Society, Member of the Société d'Hygiene of France, Late Member of the Michigan State Board of Health, Editor of "Good Health," Superintendent of the Battle Creek Sanitarium, President of Battle Creek College.

Table XIV (p. 188) lists soy beans as a food rich in lime (calcium), containing 0.46%. Pages 189-93 discuss "Acids and bases of food–The acid alkaline balance." It begins: "As pointed out by Bunge many years ago, and as further shown by an extensive research conducted by Sherman, of Columbia University, foodstuffs differ in relation to their acid and basic contents. In certain foods, bases or alkalies predominate, while in others the mineral acids predominate.

"The waste products of the body are predominantly acid; consequently it is desirable that the foodstuffs should be predominantly basic. If acids predominate in the ration, and this condition continues for a considerable period of time, the effect will be to disturb the nice balance between acids and bases which is normally maintained in the body fluids and which is essential for life. A deficiency of alkalies constitutes acidosis.

"It is necessary that the alkalinity of the blood should be constantly maintained as the only means by which the acid wastes of the body which are constantly accumulating as the result of all sorts of vital work may be promptly removed." All flesh foods leave highly acid residues. Eggs are also acidic, though less strongly than meat. Cereals and bread are acidic, though much less so than meats. Milk is slightly alkaline. Most fruits, and all green and root vegetables are strongly basic and tend to alkalinize the tissue fluids... Generally it is better to select foods which afford a large basic margin so as to add to the alkali reserve of the body, which always tends toward diminution, especially in old age. A strongly basic diet is especially indicated in cases of arteriosclerosis and disease of the kidneys, in fevers, in pregnant women, in all forms of acidosis, and in old age...

"At the present time all physiologists are agreed that the highest degree of physical vigor and efficiency may be maintained on a diet which excludes flesh foods and physiologists the world over are unanimous in advising a curtailment rather than an increase in meat consumption."

Table XVI (p. 192-93) is titled "Excess of acid or alkali in one ounce and in 100 calorie portions of common foodstuffs." The Soy bean has an excess of base (alkali), 12.0 units per 100 calories or per 1 ounce.

In the chapter on Legumes, pages 322-28 give a detailed and accurate discussion of the soy bean and various soyfoods, including the history and nutritional composition of the soy bean, soy bean milk, to fu [tofu], soy sauce, and soy bean sprouts. On the first page, Dr. Kellogg states: "The soy is the best of all beans."

In the chapter titled "Infant Feeding," under "Vegetable Milk" (p. 956), Dr. Kellogg states: "The Chinese have for ages made from the soy bean a preparation which so closely resembles the dairy product that it may not inappropriately be called vegetable milk. A much better preparation is made from walnuts, almonds, and even peanuts... Milk prepared from walnuts and almonds is used in China, the Philippines and throughout the Orient, as a food for nurslings for whom a wet nurse can not be provided. This custom prevails extensively in those Asiatic countries in which cow's milk is but little used.

"A nut milk commonly known as 'Malted Nuts' has been made in this country for more than thirty years and has come into extensive use... These plant protein milks render great service especially in the treatment of infants and invalids who are sensitized to cow's milk. They are also valuable resources in the treatment of colitis in infants and in cases in which change of the flora is found difficult, so that the suppression of all animal proteins becomes necessary."

Also discusses quinoa, kaoliang, and the adsuki bean.

Note: This is the earliest English-language document seen (Feb. 2004) that uses the word "alkalinize" to refer to making a food more alkaline. Address: Battle Creek, Michigan.

530. Nakazawa, Ryoji. 1928. Nanyô-san ontjom, tempeh o tsukuru shijôkin ni tsuite [On the filamentous fungi used to make onchom and tempeh in the South Pacific (Java and Sumatra)]. *Nihon Nogei Kagakkai Shi (J. of the Agricultural Chemical Society of Japan)* 4(4):252-63. April. See also

Zentralblatt fuer Bakteriologie. II. 80:114 (1930) and Biological Abstracts 4:25213 (1930). [13 ref. Jap]
• ***Summary:*** Discusses *Mucor, Aspergillus, Rhizopus,* and *Penicillium* molds.

Onchom is made from peanuts and tempeh from soybeans. The authors note that Prinsen Geerligs (1896) had reported that these foods were fermented using *Rhizopus oryzae,* whereas Went (1901) had said they were fermented using *Monilia sitophila.*

In 1912 Nakazawa had asked a person from Southeast Asia to bring him samples of tempeh and ontjom (made from peanut presscake). He analyzed their microorganisms and repeatedly found *Penicillium,* a grayish-brown mold, to be the predominant genus.

In 1924 Yoshito Takeda, Nakazawa's co-worker, obtained more samples of these foods from Southeast Asia, and again found *Penicillium* to be predominant. *Monilia* (which in 1901 Went had said was the predominant microorganism) was not found; Takeda he assumed it had died during transport.

In April and May of 1926 (Taisho 15) Nakazawa took a research trip to Java and Sumatra and carefully collected (in sterile containers) 59 samples of soy tempeh and onchom from various markets and small manufacturers. Tempeh was collected from Medan, Semarang, and Soerabaya, while ontjom was collected from only Buitenzorg and Medan. Nakazawa and Takeda analyzed the microorganisms in these fermented foods and in this document reported that they found the onchom microorganisms to be almost exclusively *Penicillium* and the tempeh microorganisms to be mostly *Penicillium,* but with substantial amounts of *Mucor, Rhizopus* (all light grayish-brown) and *Aspergillus* (dark green) as well. No *Monilia* was found and no species names were reported. Dr. Grounewege at the Buitenzorg Agricultural Research Laboratory confirmed that these were the predominant species.

Note 1. This is the earliest document seen (Dec. 1998) worldwide which uses the spelling "tempeh" to refer to this fermented Indonesian soybean food. This word, written in roman letters, appears throughout the publication and by the 1960s had become the standard spelling in English and most other European languages.

Note 2. This is the earliest Japanese-language document seen (one of two documents) that mentions tempeh.

Note 3. Today most tempeh is made with *Rhizopus* species and most ontjom with *Monilia* species.

Note 4. Dr. Nakazawa never made tempeh, probably for lack of a suitable inoculum. Address: Taiwan Sotokufu Chuo Kenkyujo, Kogyo-bu Hokoku.

531. Nakazawa, Ryoji; Takeda, Yoshito. 1928. Nanyô-san ontjom, tempeh o tsukuru shijôkin ni tsuite [On the filamentous fungi used to make onchom and tempeh in the South Pacific (Java and Sumatra)]. *Taiwan Sotokufu Chuo Kenkyujo, Kogyobu Hokoku (Report of the Industrial Section, Central Research Institute, Taiwan Governor-General's Office)* 4(4):252-63. April. See also Zentralblatt fuer Bakteriologie. II. 80:114 (1930) and Biological Abstracts 4:25213 (1930). [13 ref. Jap]
Address: Taiwan Sôtokufu Chûô Kenkyûjo, Kôgyô-bu.

532. Nakazawa, R.; Takeda, Y. 1928. Ueber die Schimmelpilze welche sich bei der Herstellung des Leckerbissens "Ontjom" und "Tempeh" (Java und Sumatra) mitwirken [Molds that assist the production and fermentation of the delicacies "ontjom" and "tempeh" in Java and Sumatra]. *Bulletin of the Agricultural Chemical Society of Japan* 4(4/6):86. April/June. [2 ref. Ger]
• ***Summary:*** "Ontjom" and "Tempeh" are the names of foodstuffs which the indigenous people of the aforementioned islands make. According to a communication from Prinsen Geerligs, *Rhizopus Oryzae* is used for making Ontjom from peanuts and for making Tempeh from soybeans. Went observes, however, that both these foods are made from *Monilia sitophila.* Address: [Japan].

533. Dorsett, P.H.; Morse, W.J. 1928-1932. Agricultural explorations in Japan, Chosen (Korea), Northeastern China, Taiwan (Formosa), Singapore, Java, Sumatra and Ceylon (Log–unpublished). Washington, DC: USDA Bureau of Plant Industry. Foreign Plant Introduction and Forage Crop Investigations. 7,410 p. Unpublished typescript log. Illust. Partially indexed. 28 cm.
• ***Summary:*** Also called the "Log of the Dorsett Morse Expedition to East Asia" and (by the National Archives) "Dorsett-Morse Expedition to the Far East, 1929-31," this is one of the most important documents ever produced on soybeans and soyfoods. It consists of 17 volumes of typewritten unpublished manuscript plus handwritten notebooks. Hundreds of photos are pasted on the pages, each with a number and a caption. The first quarter of the pages (to about page 2,500) are indexed, using 4 separate indexes. The only original and 2 microfilm copies were at the American Soybean Assoc. (St. Louis, Missouri), however as of Oct. 2004 they are on permanent loan to Special Collections at the National Agricultural Library (Beltsville, Maryland)–which also has 7 photograph albums that accompany the 7 log books. One photocopy of a microfilm copy is at the Soyfoods Center (Lafayette, California). One microfilm copy is at the National Archives in Washington, DC, in Records of the Bureau of Plant Industry, Soils, and Agricultural Engineering, Record Group 54. See: "National Archives Microfilm Publication No. M840. Expedition Reports of the Office of Foreign Seed and Plant Introduction of the Department of Agriculture, 1900–1938." Rolls 16-20, volumes 56-73. These microfilm rolls may also be available for viewing or duplication at one

of the various regional branches of the National Archives (e.g. San Bruno, California).

A brief itinerary of the trip is as follows: 1929 Feb. 18–The party of 5 people leaves Washington, DC, for Los Angeles by train. It consists of Morse, his wife Edna, their daughter Margaret (age 7), Dorsett, and his daughter-in-law Ruth (Bobbie; the widow of Dorsett's son, she served as Dorsett's secretary and general helper). March 1–They sail from San Francisco to Yokohama on the S.S. *President Grant* of the Dollar Steamship Lines. March 29–Arrive in Yokohama, proceed directly to Tokyo, establish headquarters with rooms at the Imperial Hotel, and hire an interpreter, Mr. Suyetake, who works with them for the next 2 years. May 21–The Morses go to Hokkaido, the Dorsetts to Kyoto, by sleeper train. Morse returns to Tokyo. Aug. 17–The entire party arrives in Hokkaido and establishes headquarters in Sapporo to study soybeans. Oct. 8–Leave Hokkaido for the Northeast Provinces, then arrive in Tokyo on Oct. 15. Oct. 22–Arrive in Keijo (Seoul), Korea, then take many side trips. Note: 1929 Oct. 29–Great Depression begins in USA with stock market crash. Dec. 8–Return to Japan via Kyushu, then to Tokyo to study soyfoods. They buy and photograph many!

1930 April 1–Travel by steamer to Dairen, Manchuria, where they set up headquarters. Dorsett very sick from April 11 to June 11; almost dies of double pneumonia. Morse takes all notes. June 24–Morse takes a quick trip to northern Korea, via Mukden and Antung (Tan-Tung), to look for Zoysia grass. July 1–Returns to Manchuria via Mukden. July 21. Dorsetts leave for Peking by train; Morses and Mr. Suyetake stay in Dairen. Aug. 21–Morse party travels to northern Korea, staying in Heijo (Pyongyang / P'yongyang); takes a 4-day side trip to Seoul. Sept. 28–Morse returns to Dairen, Manchuria. Oct. 19–Morse party leaves Dairen, arriving in Peking the next day. Nov. 9–Morse party returns to Dairen. Nov. 30–Morse arrives in Harbin, north Manchuria, then passing through Mukden, returns to Dairen. Dec. 18–Morses leave Dairen for Japan, passing through Kobe on Dec. 21 and arrive in Tokyo on Dec. 23.

1931 Jan. 12–Travel to Kyoto, Himeiji, and Tatsuno Shoyu. Jan. 16–Visit Okazaki and Hatcho miso. Jan. 17–Return to Tokyo. Feb. 17–Morse party leaves Tokyo for the USA, arriving in San Francisco on March 4. March 15–Dorsett party leaves Peking for Tientsin, Shanghai, and Hankow. March 27. Dorsetts sail from Shanghai to San Francisco. Note: This is the log (unpublished) seen (Oct. 2001) that mentions soy. Address: Agricultural Explorers, from USDA, Washington, DC.

534. Jardine, William M. 1929. Re: Letter of introduction for Mr. William J. Morse. 1 p.
• ***Summary:*** A letter of introduction for William Morse, dated 26 January 1929. "Be it known that Mr. William J. Morse, Agricultural Explorer, in the Bureau of Plant Industry, of the United States Department of Agriculture, whose signature appears on the margin hereof, will, in the immediate future, visit Japan, Ceylon, Formosa, Manchuria, China, Chosen, the Dutch East Indies, and other foreign countries, in connection with the work of this Department.

"He is hereby introduced and cordially commended to all persons with whom he may come in contact, whose good offices on his behalf are earnestly requested."

Morse's signature does indeed appear in the margin, and document is signed and sealed by Mr. Jardine. Note: William M. Jardine of Kansas was secretary of agriculture (1925-29) under President Calvin Coolidge. Address: Secretary of Agriculture [USA].

535. Sherman, Hartley Embrey. 1929. Relative vitamin A content of four Oriental foods [including tofu]. *Philippine J. of Science* 38(1):1-7. Jan.
Address: Peking Union Medical College and Bureau of Science, Manila, the Philippines.

536. Sherman, Hartley Embrey. 1929. Relative content of water-soluble vitamin B in thirty Oriental foods. *Philippine J. of Science* 38(1):9-36. Jan. [1 ref]
• ***Summary:*** The following are plentiful sources of vitamin B: Yellow soy bean *(huang tou)*. Yellow soy-bean sprout *(huang tou ya)*. Green soy bean [dry] *(ch'ing tou)*. Green soy-bean sprout *(ch'ing tou ya)*. Soy-bean curd *(tou fou)*. Address: Of the Laboratories of Food Chemistry, Peking Union Medical College, Peking, China, and the Bureau of Science, Manila.

537. Sherman, Hartley Embrey; Wang, Tsan Ch'ing. 1929. Calcium, iron, and magnesium content of sixteen Chinese foods. *Philippine J. of Science* 38(1):81-82. Jan. [2 ref]
• ***Summary:*** Gives the aluminum (calculated as aluminum oxide), iron (calculated as iron oxide), calcium (calculate as calculated oxide), and magnesium (calculated as magnesium oxide) content of whole yellow soybeans *(Huang tou)*, yellow soybeans sprouted in Peking tap water, and yellow soybeans sprouted in distilled water *(Huang tou ya)*.

One figure is given for aluminum plus iron for each food. For whole yellow soybeans it is 0.49%. For yellow soybeans sprouted in Peking tap water it is 0.43%, and for yellow soybeans sprouted in distilled water it is 0.33%.

Note: This is the earliest document seen (Sept. 2004) that mentions aluminum in connection with soybeans or soyfoods, or that gives the aluminum content of either. Address: 1. Laboratories of Food Chemistry, Peking Union Medical College, Peking, China; 2. Bureau of Science, Manila.

538. *Prairie Farmer.*1929. The vegetable oil tariff. 101(13):10. March 30.

• ***Summary:*** "The Republican party promised the farmer adequate tariff protection. The time is almost at hand to make good that promise. There seems to be a disposition on the part of many prominent Republicans to redeem that pledge in counterfeit money.

"Adequate tariff protection against foreign vegetable oils, including those from the Philippines, will probably help agriculture more than any other single tariff schedule. Powerful interests, headed by the soap manufacturers, are massing their forces to prevent farmers from getting this protection."

539. Han, John E.S. 1929. Monosodium glutamate as a chemical condiment. *Industrial Engineering and Chemistry* 21(10):984-87. Oct. [9 ref]

• ***Summary:*** Contents: Glutamic acid. Properties of monosodium glutamate. Uses as a condiment. Commercial production. Problems of Chinese manufacture.

All proteins yield amino acids when hydrolyzed. When any given protein is hydrolyzed, whether by acid, alkali, or steam, the same amino acids are produced and in the same proportion. *d*-Glutamic acid was discovered by Ritthausen in 1866, when he hydrolyzed wheat gluten with sulfuric acid. It is one of the main constituents of meat and vegetable broths. Ikeda, during his research on the seaweed *Laminaria japonica (Jap: kombu),* found that the univalent ion of glutamic acid has a decidedly meatlike taste. It has such an intense taste, that 1 part of monosodium glutamate dissolved in 3,000 parts water is just perceptible to human taste. Thus its flavoring power is 15 times stronger than cane sugar and 7 times stronger than table salt. In 1908 the first patent was issued to Ikeda and Suzuki. In 1909 they applied for a U.S. patent, which was issued in 1912. The inventors emphasized the superiority of monosodium glutamate over shaved bonito *(katsuobushi),* which is widely used in Japanese cooking.

"In China and Japan monosodium glutamate is manufactured on a commercial scale and consumed as a condiment." In East Asia it is widely used to season foods by housewives, restaurants, Buddhists, vegetarians, etc. Monosodium started to be manufactured in China about 8 years ago. In 1928, the Chinese alone used $1,130,000 worth of this condiment. Today monosodium glutamate is sold as "Ajinomoto," which means "the basis of flavor," and is made on a large scale by S. Suzuki & Co. In China, trade names include "Ve-tze-sin," "Gluta," "Aji," and "Chuyu." Substantial and increasing amounts of Chinese-made monosodium glutamate are now exported to the Dutch Indies [later Indonesia], Singapore, the Philippines, etc. Pure monosodium glutamate is currently made in the USA and Europe.

Ikeda pioneered the commercial production of solid monosodium glutamate. "Gluten and soy bean are the preferred proteins and hydrochloric or sulfuric acid the hydrolyzing agent."

Photos show: (1) One of the three plants of the Tien-Chu Factory in China. (2) Furnaces for heating oil at the Tien-Chu Factory. (3) Stoneware vessels for hydrolyzing gluten, China Chemical Works.

A table shows the value of "chemical condiment" imported from Japan and manufactured in China, from 1924 to 1928. "The figures also include a special sauce made from the mother liquor after the crystallization of glutamic acid hydrochloride." The value of the amount made in China increased from $200,000 in 1924 to $630,000 in 1928. The value of the amount imported from Japan increased from $300,000 in 1924 to a peak of $700,000 in 1925 to 1927, then dropped to $500,000 in 1928 due to a boycott of Japanese goods. Address: Y-1065c North Szechuen Road, Shanghai, China.

540. Ferrée, Christian Johan; Tussaud, J.T. 1929. The soya bean and the new soya flour. London: William Heinemann (Medical Books) Ltd. xi + 79 p. Illust. No index. 22 cm. Revised translation from the Dutch by C.J. Ferree and J.T. Tussaud of Die Sojaboon en Duurzaam Sojameel. [29 ref]

• ***Summary:*** Contents: Foreword, by Sir Wm. Arbuthnot Lane, President of The New Health Society. Preface, by C.J. Ferrée (London). 1. Introduction. Literature. Name of the plant. Origin. Botanical particulars. Assimilative power of the soya plant. Inoculation. Soil requirements. Production and cost. 2. General ingredients of the various Manchurian beans. Composition. The value of soya protein. Vitamin in the soya bean. Digestibility of the soya bean and its products. 3. Use in China and Japan: Bean sauce, soy, or shoyu, Chinese chiang (paste), tou-fu or beancurd, beans consumed as a table vegetable, bean refuse and bean cake are used as a fertiliser and for fattening hogs, bean oil is used as an illuminant (where it has not been superseded by kerosene), as a substitute for lard in cooking, and as a lubricant for greasing axles and parts of native machinery, miso and natto. First imports into Europe. Exports during the last five years from China and Japan. Imports during the last five years into Europe and America. The increasing rate of its cultivation. Manchuria–Production. Estimate of the world's production of the soya bean. London the principal market. Future importance.

4. America. Australia. South Africa. Other British possessions and protectorates. Java (Dutch East Indies). Europe. 5. Unsuccessful experiments with soya flour. Ordinary soya flour. Extracted soya flour. Dr. L. Berczeller's discovery. The new soya flour. Comparison with other cereal flour and other foods. Comparison in price with other cereal flour and other foods. Comparison in price of soya protein compared with other cereal foods. Comparative analysis of cereals. 6. Soya milk. Vegetable casein. Lecithin. 7. Increase in food value. Savings.

Industrial application in foodstuffs. The importance of Dr. L. Berczeller's soya flour for the food industry. Soya flour and the food laws. Uses of soya flour in: Bread, pastry, cake, biscuits, confectionery, sausages, infant foods and food for invalids, cocoa, chocolate, soup cubes, pudding flour. Uses in the kitchen. Soya flour recipes (for flour made using the Berczeller process), soya flour for diabetics, recipes for diabetics.

The Preface states: "In the following pages the writer has endeavoured to give an account of the numerous uses to which the soya bean has so far been put, and to visualise its future service to humanity through the means of a totally new and practical process by which this legume... may in future be used as an important article of food for general consumption throughout every quarter of the globe.

"In compiling the details relative to the soya bean flour, with which this brief summary principally deals, he trusts that he has succeeded in giving sufficient data to enable the reader to fully realise its value as a staple food from the economic point of view, as well as from the more domestic standpoint, so that the important fact may be fully realised that a new foodstuff of a very valuable nature... has now been brought within the reach of all nations to serve them in a most practical manner as an economic article of food."

The book includes statistics on the imports and exports from 1923 to 1927 of "soya beans, soya oil, and soya cake in various countries including China, Japan, England, France, Germany, Holland, Norway, Denmark, Sweden, and USA.

The "new soya flour" is that developed by Dr. Berczeller. This book repeatedly praises that flour. "A few years ago Dr. Laszlo Berczeller, a Hungarian physiologist in Vienna, succeeded scientifically in finding a method which enables us to prepare from the soya bean a digestible and pleasantly flavoured flour without detracting from its nutritive value, and this method entirely succeeds in preserving all the good qualities contained in the bean itself. Physiological experts and analysts withhold no praise, as the following extracts will show: -" There follow words of praise from: (1) Dr. Alfred Schwicker, M.P., Royal Hungarian State Institute, Central Depot for Experimental Chemistry. (2) Dr. Stefan Weisser, King's Counsellor, Royal Veterinary Physiological Experimental Station, Budapest. (3) Prof. A. Durig., The Physiological Institute, University of Vienna.

Marakujew (1928) estimates the production of soya beans in "Manchuria at 6 million tons at the utmost, the production of the whole of China at 16 million tons, and he is led to this figure by the conclusions of the Economic Bureau of the South Manchuria Railway, which estimates that the Manchurian crop in 1927 amounted to 37.1 million kobu (5.88 million English tons), of which 2.6 million tons originated from South Manchuria, 3.3 million tons from North Manchuria" (p. 32). A table (p. 33) gives estimated world production of soya beans from 1923 to 1929 (6.6 million tons, forecast). The leading producers in 1929 (in million tons) are: China 5.250. Japan 0.580. USA 0.250. Java and Dutch East Indies 0.120. Other Asiatic countries 0.400. A soya milk factory was recently established in Denmark (p. 54). Although this book contains a bibliography of 29 references, most are very incomplete.

Photos show: (1) A soybean plant with roots, pods, and leaves. (4) Nodules growing on soybean roots. (5) One pod and seed each from inoculated and uninoculated soybean plants. (7) An immense field of soya beans in Manchuria. (8) Soya beans awaiting shipment, in house-shaped stacks under tarps, at Dairen. (13) Seeds of the most important varieties of soya beans now grown in the United States. (10) Two horses and a farmer cultivating a field of soybeans. (11) Harvesting soya beans. (12) Well selected, clean soybean seeds.

A map (frontispiece) shows where soybeans are cultivated worldwide. An illustration (p. 2) shows Shen-Nung, "The Heavenly Farmer," reproduced from a print in a Vienna museum. One bar chart compares the nutritional composition of soya flour with that of cereals and animal products, and other foodstuffs (p. 13), another compares the calories (p. 46), and a third compares the cost of 1,000 calories (p. 48). Address: London.

541. Morse, W.J. 1930. Soybeans in the Orient. *Proceedings of the American Soybean Association* 3:96-100. Eleventh annual field meeting. Held 10-12 Sept. 1930 in Illinois.
• ***Summary:*** This letter was written by William Morse on 20 July 1930 from Dairen, Manchuria, to Dr. W.L. Burlison, President of the American Soybean Growers Assoc. at the University of Illinois. It describes the travels of Dorsett and Morse as agricultural explorers for the USDA, studying soybeans and soyfoods, in Manchuria, Japan (Hokkaido and Tokyo), and Korea (Seoul).

"It is recalled that last season the use of the soybean as a green vegetable was described. Throughout the season, it was found that the green vegetable was a very popular food with the Japanese from one end of the Japanese Empire to the other. The vegetable soybean is classed as a garden bean and as such is extensively grown by the Japanese truck farmers."

The authors were in Hokkaido from mid-August until early October, and they visited all the principal soybean sections. "The Obihiro station in the eastern part of the island [of Hokkaido] is conducting the most extensive work in breeding and variety testing. We succeeded in collecting a very large number of varieties and selections of this northern region as well as information on culture, harvesting, threshing, insect pests, and diseases. To supplement this material, we obtained a large number of still and motion pictures of very interesting scenes of the Hokkaido soybean industry."

They arrived in Korea on 20 Oct. 1929 and established headquarters at Keijo (Seoul). "We found Korea to be a most interesting country and different from anything we had seen in Japan. One of the most amazing things was the extent to which soybeans are grown. Almost equally amazing was the large number of native Korean soybean varieties we found in the various sections and at the experiment stations. At the Suigen Experiment Station, they have more than one thousand native Korean varieties and selections under test. The authorities were very generous and gave us samples of each. In addition to this collection, we obtained a few hundred samples from Korean farmers, grain merchants on village market days and from village and city grain dealers. The Korean Department of Agriculture added about 300 samples to our collection by obtaining seed of the principal varieties from the village agricultural societies in each of the prefectures of Korea.

"Altho the Koreans do not use the soybean as extensively for food as do the Japanese, considerable quantities are used and in quite different ways. The beans are used principally boiled with other grains such as millet or kaoliang. They are also used in making miso and soy sauce, but these products are made quite differently from those of Japan or China. Soybean sprouts are found very abundantly in all of the markets and at all of the small food stores. The beans produced in Korea are for the most part excellent quality and are largely shipped to Japan for the manufacture of miso, soy sauce, bean curd, and natto. Soybeans when soaked with chopped millet of kaoliang straw are used universally for feeding oxen and cows, the common work animals of Korea.

"We left Korea about the first week of December [1929] for our Tokyo headquarters and collected seed samples and products as we went along. From the latter part of December until the latter part of March, we put in full time collecting soybean products and learning of their use and manufacture. We succeeded in collecting a large number of interesting products, as the Japanese use the soybean very extensively in their daily diet. In the making of cakes, candies, and numerous other confections, the roasted soybean is used in a similar manner to the peanut in America. Of course, soy sauce, miso, bean curd, and natto are the principal soybean products and the ones most extensively used. As an example of the large use of miso, which is used as a breakfast soup with vegetables and also in preserving fish, vegetables, and meat, we visited three large miso factories in the Tokyo district and found that each produced about one million pounds of miso yearly. In addition to these three large factories, there were numerous small factories scattered thruout the same district.

"As the planting time was approaching in Manchuria, we left Tokyo the latter part of March and arrived in Dairen, Manchuria, the first of April... This country is the real land of the soybean and Dairen, the real city of the soybean. In 1929, 29.2 percent of the total cultivated area of Manchuria was devoted to the growing of soybeans, producing more than 178,000,000 bushels of seed, thus leading all other crops in acreage and production. The Port of Dairen handles about eighty (80) percent of the exports of beans, bean cake, and bean oil.

"The planting season for soybeans in Manchuria begins about the first of May... We had rather expected to find a large number of products made from beans, bean cake, and bean oil but our findings thus far have been very meager. The oil is used in the manufacture of soaps, paints, lard substitutes, and salad oils, but only a very few factories are engaged in producing these products. The beans are used chiefly for oil and oil cake, but during the last three or four years, the demand of European mills for beans has had a serious effect, not only on the Dairen soybean oil mills, but also on the oil mills throughout North and South Manchuria. In Dairen, at the present time, only about forty-five soybean mills are active during the crushing season, whereas four years ago there were about ninety. The oil cakes are for the most part shipped to the Japanese Islands for feed and fertilizer (chiefly fertilizer), to China and the East Indies for fertilizer, and to America and Europe for cattle and poultry feed."

"With this letter we are sending some lantern slides illustrating various scenes of the soybean industry in oriental countries... With best wishes for a most interesting and successful 1930 meeting."

Note 1. This is the earliest English-language document seen (Feb. 2004) that uses the term "vegetable soybeans" (not preceded by the word "green") to refer to green vegetable soybeans.

Note 2. This letter was reprinted in *Soybean Digest* (April 1945, p. 11-12). Address: USDA, Washington, DC.

542. Nakazawa, R; Takeda, Y. 1930. Ueber die Schimmelpilze welche bei der Herstellung des Leckerbissens "Ontjom" und "Tempeh" (Java und Sumatra) mitwirken [Molds that assist the production and fermentation of the delicacies "ontjom" and "tempeh"] (Abstract). *Biological Abstracts* 4(10):2379 (Abst. #25213). Oct. [1 ref. Ger]

• ***Summary:*** Tempeh and ontjom are the names of foods produced by the natives of Java and Sumatra. Tempeh is made from soybean and ontjom from groundnuts (peanuts). Geerligs reported that *Rhizopus oryzae* is the mold used to produce both these foods, but Went reported it was *Monilia sitophila.* However Nakazawa and Takeda identified *Penicillium brevicaule* as the main mold involved, together with small quantities of *Rhizopus, Aspergillus,* and *Mucor.*

543. Zimmerman, A. 1930. De Indische Culturen [Indonesian crops]. *Indische Culturen (De)* 15:680-93, 720-24. [Dut]*

• ***Summary:*** This periodical was published in Soerabaja [Netherlands East Indies, today's Indonesia] from about the 1920s until 1937 by Goelst & Zoon. Based on a merger of: *Teysmannia,* and, *Nederlandsch-Indisch Rubber- en Theetijdschrift;* continuing the numbering of the latter.

544. Goot, Pieter van der. 1930. De *Agromyza* -vliegjes der inlandsche katjang-gewassen op Java [The *Agromyzid* flies of some native legume crops in Java]. *Mededeelingen van het Instituut voor Plantenziekten (Buitenzorg)* No. 78. vii + 97 p. + 8 plates. See p. 26, 61-62, 75-76, 81-84. (Weltevreden, Landsdrukerij). [26 ref. Dut; eng]

• ***Summary:*** Discusses *Melanagromyza sojae* and *Agromyza phaseoli.* The original (1930) English-language summary (p. 81-82) states: "The present paper intends to clear up the confusion, which up to now has existed in Java regarding the Agromyzid-flies which become injurious to french beans, soybeans and some other native pulses. The injurious species was found to be *Melanagromyza phaseoli* Coq., which causes serious damage to french beans to 'sebyari beans' (= lima beans) and sometimes to soy-beans too. *Melanagromyza sojac* Zehnt., often erroneously cited in literature as injurious to beans, is only found inside the mark of soybeans and a few other plants, causing no apparent injury at all. A third species, also of no oeconomic [economic] importance, is *Melanagromyza dolichostigma* de Mey., causing the withering of the tops of *Phaseolus calcaratus,* soybeans and *Calopogonium mucunoïdes.* A description of these three species is given, with complete notes on their life-history, food plants, and parasites."

"For soybeans, when grown on tilled fields, fairly good results could be obtained by covering the soil with rice-straw. This covering apparently forms a kind of protection against the Agromyza-flies."

*"Melanagromyza sojae,* which has been described originally by Zehntner as far back as 1903, can scarcely be considered of any oeconomic [economic] importance. It is principally found in stems of soybeans, but may also be found in a few other plants, such as green gram *(Phaseolus radiatus), Indigofera suffruticosa,* etc. Eggs are laid inside the leaves, the larvae tunneling into the midrib and afterwards inside the mark of the stems, where also pupation takes place. The whole life-cycle is completed within 21 days."

In Sept. 1984 the Tropical Vegetable Information Service of Shanhua, Taiwan, published an English-language translation from the original Dutch.

545. Watson, Ernest. 1930. The principal articles of Chinese commerce (import and export) with a description of the origin, appearance, characteristics, and general properties of each commodity; an account of the methods of preparation or manufacture; together with various tests, etc., by means of which the different products may be readily identified. 2nd ed. Shanghai, China: Statistical Dept., Inspectorate General of Customs; sold by Kelly & Walsh [etc.]. ix + 630 p. Illust. Index. 28 cm. The Maritime Customs. II. Special Series No. 38.

• ***Summary:*** The first edition was published in 1923. There are sections on "bean oil" *(tou-yu),* the residual meal from the extraction process *(tou-ping fên),* and cakes *(tou-ping;* p. 85-86), soya beans (p. 320-21) including yellow, black, and green varieties, beancurd [tofu], bean milk (tou-fu-chiang), bean sauce (see soy sauce), and bean vermicelli. The latter product, named *fên-ssu, tou-fên-ssu, hsi-t'iao-mien,* or *kua-mien,* is a "famous vermicelli made in the Chefoo district from [soy] beans, most of which are originally imported from Manchuria. It is exported in great quantities from Chefoo to Hongkong, South China, and the Straits Settlements, and forms a favourite and very nutritious food."

Soy or chiang-yu (p. 538) is the name for a "sauce made in China from the soya bean *(Soja hispida).* In preparing it, a quantity of beans are slowly boiled, an equal quantity of coarsely ground wheat or barley being added. The mixture, after being allowed to ferment for some time, is put into a jar with an equal amount of salt, a few aromatics, and three times as much boiling water as there were beans at first; the whole is then allowed to stand for several weeks exposed to the sun, after which the liquor, which constitutes the soy, is separated by pressing and straining the mass. The finished product is afterward packed into jars or bottles ready for market."

"Soy is thin and, in colour, very dark brown or almost black; it becomes brighter and clearer on being kept, has an agreeable salty flavour, and produces a yellowish froth when even slightly shaken. It is much used by the Chinese as a sauce and condiment, as it creates an appetite and is supposed to counteract the injurious properties of contaminated food; it is also used in medicine as an application for burns, scalds, eczema, leprous sores, etc. Soy is often exported from China to foreign countries, where it is extensively used in the manufacture of many European sauces."

"Wheat gluten *(mien-chin)* is prepared in China by washing starch and is used as a nutritious food. The Chinese also prepare "dextrin" *(mai-ch'ao)* from wheat, using it chiefly as a medicine, and considering it to be very nutritious, antifebrile, and quieting..." Address: Tariff Expert, Chinese Maritime Customs.

546. Horvath, A.A. 1931. The soy bean as human food. *Industrial and Engineering Chemistry, News Edition* 9(9):136. May 10.

• ***Summary:*** Contents: Historical background. Properties and uses. Growing interest in soy bean preparations in different countries. Soya foundation proposed.

This article begins: "The soy bean is a plant of early cultivation in China. Its use dates back to the beginning of China's agricultural age under the Emperor Shen Nung. It is mentioned in the *Ben Tsao Gang Mu,* the ancient 'Materia Medica' written in the year 2838 B.C. This bean is remarkable for its richness in oil (average 20 per cent), protein (average 40 per cent), and ash (average 5.5 per cent), and the almost complete absence of starch.

"Since time immemorial the soy bean has been the most universal article in the Chinese dietary. It is also extensively used for food in Korea, Japan, Indo-China, the Philippine Islands, the Dutch Indies, Siam, and India. The Chinese make practically no use of dairy products, and the bulk of the people consume a very meagre amount of meat. Yet, in spite of this, they have lived for centuries on what appears to be a remarkably well-balanced diet by the use of the soy bean."

Also discusses: Soy bean milk, tofu, fried tofu ("called in China 'the meat without the bones'"), miso, chiang, Worcestershire sauce ("liquid soy sauce... when spiced, is sold under the label 'Worcestershire sauce.'"), W.J. Morse of the USDA, soyfoods in Europe, Prof. Berczeller, and work at the Physiological Institute of the University of Vienna under Prof. Durig and Dr. Wastl.

"In Russia, the soy bean is fondly called 'our young revolutionary Chinese ally.' 'Plant soy beans and you plant meat, milk, egg omelets,' is the newspaper cry. Efforts have been made all year to introduce soy bean dishes to restaurants and homes. A Soy Institute was recently organized in Moscow, as well as a special exhibition of soy foods at which 130 varieties of soy dishes, including cutlets, pastry, salads, candy, and beef, were shown. A dinner, prepared entirely of soy beans, was served to representatives of trade unions, factories, Red Army, and the Soviet press. The food was unanimously declared excellent...

"Soya foundation proposed: There are reasons to expect that the United States will become the leader in introducing the soy bean in the daily diet of the white race. An important step should be the establishment of a soya foundation in order to promote the creation of a national soya food research institute." Address: Health Section, Bureau of Mines, Pittsburg, Pennsylvania.

547. Kinney, C. 1931. The omnipotent bean. *Canadian Geographical Journal* 3(1):46-56. July.

• ***Summary:*** This is an excellent study, with many original photographs, of soya beans and soy products in Manchuria. The author, an American journalist, has been associated for some years with the South Manchuria Railway, and has made a study of economic conditions in Manchuria.

Manchuria, a huge region of about 382,000 square miles, includes 3 of China's wealthiest provinces: Mukden (Fengtien), Kirin, and Amur (Heilungkiang). Sometimes known as the "North-Eastern Provinces of China," Manchuria is ruled by Chang Hsueh-liang, popularly known as the "Young Marshal." He is progressive and wants to see the 3 provinces developed.

The original soya bean "producing centres are said to be Cochin China and Java. The beans were first grown in China Proper about 4,000 years ago and were used locally to feed the natives and animals. To-day the chief zones are Manchuria, China, Japan and Korea, but the amount of soya beans produced in Manchuria alone is much greater than the product of the three other countries combined."

After the Russo-Japanese was (1904-05), victorious Japan, through the Portsmouth Treaty, became the lessee of the Kwantung Leased Territory (1,337 square miles), the southernmost point of Manchuria. It contained the greater part of the southern branch of the Chinese Eastern Railway, which is now known as the South Manchuria Railway. Note: The key ports of Dairen (Dalian) and Port Arthur (Lüshun) are in this Leased Territory.

In about 1905 the last remnants of the Chinese ban on immigration of Chinese into Manchuria were removed. Few came, however, until the early 1920s, "when warfare broke out on a large scale in China proper, and hundreds of thousands of Chinese fled from the famine, war-stricken and bandit infested areas of that country into the peaceful and undeveloped, yet fertile provinces of the Manchus." Today it is said that about 70% of Manchuria's population are working directly or indirectly on cultivation of soya beans. "There is no doubt in the minds of all that were it not for the soya bean, Manchuria would be an insignificant country."

The origin of soya bean cultivation in Manchuria is unclear, although most agricultural experts believe the soya beans were brought from districts of Central China. The question as to why they thrive in Manchuria, while in other parts of the world with similar climatic conditions, they fail to give good results, has never been fully answered.

European and U.S. buyers of Manchurian soya beans have long complained that they are not properly cleaned or graded. Soil, poor quality beans, and even large stones have been found mixed with Grade One beans. This problem must be fixed quickly if Manchurian dealers expect to continue to sell their beans to Occidental countries. In 1930 an association was formed, with inspectors placed at major centers to see that soya beans are graded correctly.

Genetic improvement of Manchurian soya beans began shortly after 1905 when the Japanese established the Agricultural and Experimental Station at Kungchuling. Soon Japanese scientists developed a larger soya bean with a much higher oil content. It was widely planted by farmers and prices rose accordingly. The Russians, followed by the Chinese, have founded several soya bean and agricultural stations, where material and advice can be obtained by local farmers. The Central Laboratory of the South Manchuria Railway Co. at Dairen is a leading scientific institution for

studying soya beans; it has discovered many new uses for the beans, and developed a process for extracting the oil using alcohol as a solvent. The uses of the soya bean, its oil ("bean oil") and its cake ("bean cake") are discussed, as is its composition.

In Manchuria today there are 465 soya bean mills for extracting the oil and making bean cakes. They are located as follows: In Dairen 59, Yingkou 22, Antung 21, and Harbin 46. Along the South Manchuria Railway Line 252. Along the Chinese Eastern Railway Line 28. Along the Ssupingkai- Taonan- Anganchi Line 37.

"The latest statistics gathered by the South Manchuria Railway Co. for the year 1929 show that:–10,065,370 acres of land in Manchuria were planted to soya beans; 5,320,555 tons of soya bean were produced... 3,087,320 tons of soya beans, 133,854 tons of soya bean oil, and 1,568,552 tons of soya bean cakes were exported during 1929."

As "soon as the business depression that is sweeping the entire world is over," soya beans are expected by experts to be in great demand in Europe and America.

The captions to the various photos read as follows: "(1) An aerial view of the Port of Dairen, showing many ships at anchor awaiting their turn for berth space. The city of Dairen is in the background. (2) Soya beans in [osier] bins [12-15 feet high and cylindrical in form] at Kaiyuang, one of the produce centers of Manchuria. Many native carts carrying bags of soya beans are shown among the bins. (3) Bags of soya beans are brought on carts from the interior to the railway stations or marketing places. Due to bandits, Chinese guards are hired [one is shown standing on the cart with a rifle] to protect the beans from being stolen. (4) Coolies carrying bean cakes [that look like cartwheels about 2 feet in diameter and 3 inches thick, in high stacks] from the South Manchuria Railway Company warehouse to the freight steamers. (5) Open storage for soya beans near Dairen wharves [in shapes like houses, each covered with a tarpaulin]. During the busy season, beans are brought down from the interior in large quantities, and are placed in the open storage to await shipment. (6) Interior of a soya bean mill. Presses, or oil compressors, crush the beans, which have first been heated, and oil is extracted. The crude oil is pumped into a large vat where the impurities are removed. [The resulting cakes look like cartwheels] (7) Dumping soya beans into [osier] mat bins, North Manchuria. (8) Due to civil warfare, bandits, high taxation and famine, hundreds of thousands of Chinese immigrants have migrated to peaceful Manchuria. Most of the newcomers are farmers and the majority of them cultivate soya beans. (9) A section of the Kungchuling Agricultural Experimental Station, the largest in Manchuria. For years this organization has experimented on the bean and has succeeded in giving the world a larger and better oil producing bean. This station was established and is still financed by the South Manchuria Railway Company, for the betterment of agricultural products in Manchuria. (10) Primitive method of sorting soya beans [they are flailed on mats in a courtyard]. (11) Oil tanks [and barrels] where soya bean oil is placed prior to shipment. Over 133,000 tons of oil are manufactured annually by the various bean oil mills in Manchuria. (12) Hoisting bags of soya beans from Dairen wharves into the holds of the ships. (13) Soya beans in open storage, awaiting shipment at Ssupingkai station, one of the produce centres in Manchuria. (14) Modern railway tank cars bring bean oil to the wharves where it is deposited into large sea-going oil tankers. (15) Unloading soya beans [from railroad flatcars] at Dairen wharves. The bags of beans are brought from the interior of Manchuria to Dairen, the largest port in Manchuria, the beans are then transported by steamers to various parts of the world." Address: American journalist.

548. Genin, G. 1931. La caséine végétale: Propriétés et emplois. I. [Vegetable casein: Properties and uses. I.]. *Industrie Chimique (L')* 18(214):784-85. Nov. Abstracted in Le Genie Civil 100(14):352. April 2, 1932. [1 ref. Fre]
• ***Summary:*** In this article are described the preparation of the vegetable milk from soybeans from which the casein is derived, the preparation of casein in industry, and its industrial uses. To make vegetable casein the oil is first removed from soybeans. Carbon tetrachloride can be used. The protein is then extracted from the defatted cake and precipitated, using acetic acid or soda. (The Chinese and Annamites prepare vegetable casein in sheets, which are very delicate and yellow in color.) The coagulated liquid is separated from the liquid supernatant, washed and dried. The resulting product (which may be treated with formol) can be used to make galalithe/galalith (a hornlike or plastic, often transparent substance), adhesives, porcelain, oil-based paints, paper coatings or sizings (to make paper more resistant to and impenetrable by water), soap, insecticides, and cellulose-type products. Address: Ingenieur Chimiste E.P.C.I.

549. Crince le Roy, H.F. 1931. Java als verbruiks- en productieland van de sojaboon [Java, the land of soybean utilization and production]. *Algemeen Landbouw Weekblad voor Nederlandsch-Indie* 15(47):1321. [Dut]*

550. *Verslagen van Veldproeven. B, Bemestingsproeven (Landbouwkundige Institut).* 1931. Bemestingsproef met kedelee [Fertilization experiments with soybeans]. B. 320. [Dut]*

551. Craib, W.G. 1931. Flora Siamensis enumeratio. A list of plants known from Siam with records of the occurrence. Polypetale. Vol. 1. Bangkok: Siam Society. 809 p. See p. 438. [7 ref. Eng]
• ***Summary:*** "Glycine max... The common soy bean, frequent in cultivation. Local names: "Tua luang" or "Tua

praluang. Siamese: "Tua nao, Lao, Chiengmai." Address: Prof. of Botany, Univ. of Aberdeen, Scotland.

552. Ochse, J.J. 1931. Vegetables of the Dutch East Indies. Buitenzorg (Bogor), Java: Archipel Drukkerij. xxxvi + 1005 p. See p. 366, 389-93, 398, 407-08, 732, 943-71. An entirely revised and greatly enlarged second edition of his Tropische Groenten (1925). Translated by Mr. C.A. Backer. Illust. 25 cm. Index. [10 ref. Eng]

• ***Summary:*** This translation (by Mr. C.A. Baker, the reputed ex-Botanist for the flora of Java) of Ochse's classic "may be taken as an entirely revised and much enlarged second edition of *'Tropische Groenten'* (Tropical Vegetables), which booklet was published in July 1925." The author, a Dutchman who confined his research to Java and Madoera, described the tempeh-making process in detail, saying that the mold used was *Aspergillus oryzae* and that it was obtained from a former batch of tempeh.

Page 366 discusses ontjom (témpé boongkil in Javanese), tetèmpè, and dagè, all made from peanuts. Page 372 notes that the pigeon pea *(Cajanus cajan)* can be used to make témpé bosok.

Pages 389-93 discuss the soya bean, which has various names in local languages. Malay: Katjang djepoon or Kedele. Javanese: Dekeman or Dekenan, Dele, Demekan, Gadele, Kedele, Kedoongsool, or Dangsool. Sundanese: Kadele, Katjang booloo, Katjang djepoon, Katjang kadele. Madura: Kadhele, Kadhellee, or Kedeleh. A description of the plant is given.

Illustrations show: (1) A young soybean plant with leaves and pods (half size). (2) A bamboo scaffolding or curing frame, in tripod form with 3 horizontal supports, used for drying bunches of soybeans.

Soybeans come in two main forms: Light yellowish-brown seeds, and black seeds. The latter are used to make *ketjap* (Indonesian soy sauce). "Of the ripe seeds *pélas* (Jav.) is made, by mixing them with grated young coco-nut [coconut], salt, and other ingredients. The mixture is wrapped in a banana leaf and steamed.

"The seeds can also be roasted and afterwards pounded. The *boobook [bubuk,* roasted soy flour], *boobook* or *boobookan* (Jav.) is eaten in the shape of powder, usually with the addition of lombok and other ingredients.

"The seeds are mixed with a porridge of rice-meal and water and afterwards fried in coco-nut oil. This dish is called *rempeyek* (Jav.). It consists of brown slices in which the black *kedele*-seeds are scattered. *Rempeyek* is eaten either as a delicacy or with the rice table. "Témpé [tempeh, p. 391] is a much used product. In East- and Central-Java it takes the same place as the ontjom in West-Java. It is prepared in much the same way as *ontjom,* the reaction is brought about by the same fungus, *Rhizopus Oryzae,* Went et Prinsen Geerligs, which is transmitted by *ragi.* The seeds are cooked and, after they have cooled, put in a basket. By stirring, rubbing and even by treading, coupled with repeated washing with fresh water, one tries to remove the testa from the seeds. When this has been done, the seeds are put on hurdles *(sasak)* covered with banana- or waroo-leaves. Now the so-called *beeang,* i.e. rests of the fungus used for a former batch, is sprinkled over them and the mass is turned over on other sasaks. The *témpé*-cakes treated in this way are kept within doors and after two or three days the fungus has spread sufficiently for giving a light grey colour to the cakes, which then are soft and dry and ready for use. They are sold on the markets either cut into small pieces or divided at pleasure, according to the amount of money the buyer wishes to spend. *Témpé* is used, fried, in the *sayor* or prepared with all sorts of ingredients.

"Other products for the native market are *tahoo* [tofu] and *takoäh* [pressed tofu; Chinese: doufugan]. Both are eaten either boiled or cut into small slices, fried and added to *gado-gado* or, lombok rawit being added, as a side dish.

"For the preparation of *tahoo* or *takoäh* the seeds are soaked, ground fine, boiled and pressed through a cloth. The juice which is pressed out is mixed with salt, vinegar, coco-nut milk or with unburned gypsum (so-called *batoo tao),* imported from China. By this treatment a white gelatinous mass is formed, which, after cooling, can be cut into pieces."

"Wet *tahoo* does not keep well for a long time. For this reason it is soon made into *takoäh.* For this purpose the *tahoo* is cut into pieces, folded in pieces of cloth, pressed in order to remove part of the water and next boiled in a decoction of koonir [turmeric]. The product obtained in this way has an intense yellow color and is a much relished delicacy, especially with lombok rawit [fiery dwarf chilies]."

*Taotjo* [Indonesian-style miso] is a porridge made of soybeans and rice meal. The soybeans are soaked, dehulled (the testa removed), cooked, and left to cool. Then they are mixed with the meal of rice (regular or glutinous), which has been previously roasted. "The porridge obtained in this way is poured on winnows *(tampah* [winnowing trays]) covered with waroo-leaves, sprinkled with *ragi* or *beeang,* probably of *Aspergillus Wentii,* Wehmer, and covered with leaves. The filled tampahs are piled on each other and left alone till the cakes are very mouldy. Then they are dried in the sun, soaked in brine and mixed with sirup of *arèn* [sugar palm] and with *tapè [tapai;* a sweet fermented cake] of rice and glutinous rice. Next the porridge is placed out of doors. After the seeds have become soft by this treatment, which takes three or four weeks, the *taotjo* is ready for use.

*"Taotjo* must be boiled, otherwise the smell is to strong. It is eaten with cooked or raw vegetables. It is used for dressing some dishes of meat or fish, whilst it is also a material of which diverse side dishes are made."

Note 1. This is the earliest English-language document seen (March 2009) that uses the word "taotjo" to refer to

Indonesian-style miso.

"According to De Bie (1901), *tao djee [tao dji; doushi, douchi]* is *taotjo* alternating with layers of cooked whole *kadelè*-seeds. This stuff is put into a pot or basin with some salt and boiled arèn-sugar. The mass is left to itself during a few days till the *taotjo* has become pervaded by the salt and the sugar and has assumed a uniformly brown colour. Note 2. *Tao djee [doushi]* is soy nuggets, which are not the same as *Taotjo* [Indonesian-style miso]. De Bie (1901) seems to have made a mistake.

"Of the black *kadelè*-seeds *soya* [soy sauce] is made, exclusively by the Chinese and the natives. First the seeds are cooked in a strong solution of salt. After diverse manipulations the cooked seeds are mixed with arèn-sugar and so-called soya-condiments and the mixture is concentrated till the salt begins to crystallize. By diluting this product with more or less water one obtains the diverse qualities of *kètjap* or *soya* found in commerce."

The "Pemimpin Pengoesaha tanah" of 15 Jan. 1915 lists various ingredients that can be used with black soybeans in making ketjap. "Young seedlings, obtained, like *taogè [taugé,* soy / bean sprouts], by fermenting, are called *ketjambah kedele;* they are cooked and eaten as *petjel* (Jav.) with the rice *(ganteng,* Jav.)"

"Finally young leaves of *Kadele* can be eaten, raw or steamed, as *lalab.*

Page 398 describes *dagè* and *témpé bengook* made from these seeds of the velvet bean *(Mucuna pruriens).* Roasted tempeh are also discussed.

Pages 407-08 states that the seeds of the *Katjang oji* (rice bean) can be used for the preparation of tempeh.

Pages 414-15 state that, when they have no soybeans, the Chinese use mung beans *(Katjang eedjo)* to make tofu and takoah, but they are most widely used to make mung bean sprouts *(taogè).* Page 634 mentions témpé bosok (overripe tempeh) made with the foul-smelling bruised leaves of the plant *Paederia foetida.* Page 732 also mentions overripe tempeh.

Note 2. This is the earliest English-language document seen (Dec. 1998) which contains detailed information about tempeh, or which refers to tempeh as "témpé."

Note 3. This is the earliest English-language document seen (Feb. 2004) that uses the word "tahoo" or the word "takoäh" to refer to tofu. Address: Buitenzorg (Bogor), Java, Indonesia.

553. Ochse, J.J. 1931. Indische Groenten [Vegetables of the Dutch East Indies]. Buitenzorg (Bogor), Java: Department Landbouw. 1005 p. See p. 388-92. Index. Illust. 27 cm. [10 ref. Dut]

• ***Summary:*** For details, see the English-language translation, also published in 1931.

Under soybean utilization, the following food products are discussed in detail on pages 390-92: Tempeh *(tèmpè),* tofu *(tahoe)* and firm tofu *(takoä),* Indonesian-style miso *(taotjo),* soy nuggets *(tao dji),* and Indonesian-style soy sauce *(kètjap).* "Témpé is a much used product. In East- and Central-Java it takes the same place as the ontjom in West-Java. It is prepared in much the same way as *ontjom,* the reaction is brought about by the same fungus, *Rhizopus Oryzae,* Went et Prinsen Geerligs, which is transmitted by *ragi."*

On pages 943-970 is an alphabetical "List of Vernacular Names of Objects, Properties or Actions." For example: Kedele oongaran (p. 390, Jav.) is a soybean plantation on a sawah, immediately following the paddy [rice] harvest. Kedele apeetan (p. 390, Jav.) is the second harvest of the year or the second plantation in the same year of Kedele (soybeans; Glycine Soja). Address: Buitenzorg (Bogor), Java.

554. Blokhuis, D.F.; von Liebenstein, E.R. 1932. Over de beteekenis van de sojaboon als handelsproduct [On the commercial significance of the soybean as a commodity]. *Landbouw (Buitenzorg, Java)* 7(9):571-96. March. English-language summary, p. 743-74. Also in: Dutch East Indies Dept. of Agriculture..., ed. 1932. Kedelee. Buitenzorg, Java: Departement van Landbouw, Nijverheid en Handel. Afdeeling Landbouw. p. 5-30, 177-78. [1 ref. Dut; eng]

• ***Summary:*** "Annually Java requires considerable quantities of the soybean, about one half of which is imported... On Java the soybean is used principally for the preparation of soy sauce *(soja of ketjap),* tahoe, tempe, and taotjo (various dietary preparations). Our investigations have proven that the Java-grown soybean can be used for making ketjap, tahoe and tempe just as effectively as the imported soybean. In western Java the manufacturers of soy prefer the imported article, those in central and eastern Java prefer the home-grown bean. This preference, which must be attributed chiefly to habit and conservatism, is also partially to be ascribed to the fact that in western Java but little of this article is grown, whilst in central and eastern Java the production is much more considerable, which causes the former region to be more dependent upon the imported article than the latter districts. For the preparation of tahoe a certain preference is indeed shown for the imported bean, in view of the greater keeping properties of the article prepared therefrom; nevertheless, the soybean grown on Java is also widely used for that purpose. The same holds good for the preparation of tempe, where the imported article is preferred chiefly on account of its larger size. Generally speaking, the imported kinds of soybean are preferred for the preparation of tahoe and tempe because they satisfy to a greater extent the demands of the manufacturers, and also because they are readily obtainable. Taotjo, however, is practically exclusively prepared from the imported bean.

"The general conclusion is that the imported soybean can be replaced, if not entirely, at a rate to a very great extent by the soybean grown on Java, thus indicating that the furtherance of its cultivation in this country can only be of advantage...

"The principal import harbours are Semarang [Central Java], Sourabaia [Surabaya], Tandjong Priok, Tjilatjap, and Cheribon." Address: 1. fd. Hoofd van Afdeeling Handel te Buitenzorg; 2. Vakkundig Ambtenaar bij de Afdeeling Handel, Java.

555. Concepcion, Isabelo. 1932. The greater significance of soy bean in the Filipino dietary. *J. of the Philippine Islands Medical Association* 12(3):97-106. March. [9 ref]

• ***Summary:*** "Read in the Symposium on Nutrition... Manila Medical Society on January 25, 1932." The Philippine diet is considered deficient in animal protein, calcium, vitamins (especially thiamine, leading to beriberi), and fat. One of the foods which can help solve these nutritional problems "and which is available in large quantities in this country is the soy bean *(Glycine max)*, or what is commonly known as Chinese *balatong*. Since time immemorial this article of food has been well known in this country but people have not sufficiently taken advantage of its good dietary qualities... Dr. Manuel L. Roxas, Director of the Bureau of Plant Industry, says 'soy beans are grown in large quantities in Batangas [on the southern tip of the main Philippine island of Luzon] and will grow almost anywhere in the Philippines. The green pods are harvested in October and November and the dried seeds may be had in bulk in December and January.' Statistics show that the production of soy beans in the Philippines increased from 2,481 tons in 1921 to 4,218 tons in 1930, and importations from 1924 to 1930 gave a recorded increase of 4,657 tons. These figures indicate that consumption of soy beans has grown faster than production. They also clearly indicate a growing appreciation of the soy bean in this country. I am convinced, however, that greater efforts toward its popularization among the laity should be exerted, so that we might make it one of our staple foodstuffs."

Tofu is shown to be a good source of minerals, especially calcium. A diagram from Piper and Morse (1923) shows the various ways in which the plants and seeds of soy beans are utilized. A detailed discussion of the value of soy flour and soy milk is given. "The introduction of soy-bean flour as a constituent of bread, muffins, macaroni, biscuits, crackers, etc. not only is desirable but also will diminish tremendously our importations of flour, which are increasing every year."

"Compared with cow's milk, soy-bean milk has in its favor the following points: (1) Soy bean milk can be produced with less contamination; (2) it is free from infection by tuberculosis; (3) its casein breaks down much more readily than the casein of cow's milk and does not form curds in the stomach in the same degree; (4) it is much cheaper than cow's milk. At the present market price the cost of a liter of soy-bean milk is only 0.03 pesos compared with 0.30 pesos for either fresh or artificial milk."

"With a well-laid-out campaign to promote the intelligent use of soy beans, it is probable that inside of ten years the food and population problem will be well out of the way for centuries to come." Address: Dep. of Physiology and Biochemistry, College of Medicine, Univ. of the Philippines.

556. Donath, W.F. 1932. De voedingswaarde der sojaboon en enkele daaruit bereide specifiek Indische voedingsmiddelen [The food value of soybeans and some specifically East Indian foods prepared from them]. *Landbouw (Buitenzorg, Java)* 7(9):705-40. March. English-language summary, p. 759-61. Also in: Dutch East Indies Dept. of Agriculture..., ed. 1932. Kedelee. Buitenzorg, Java: Departement van Landbouw, Nijverheid en Handel. Afdeeling Landbouw. p. 139-74, 193-95. [48 ref. Dut; eng]

• ***Summary:*** Discusses the composition of the soybean. "In contrast with Manchuria, where it is a common article of diet, the soybean is rarely used as such in these parts; but by means of various operations, among which is the action of certain fungi, several products are prepared from it.

"These products, such as *tempe kedele, taotjo, tahoe, taokoan* and *ketjap* are important items in the native diet. Except for the last mentioned, the preparation of these products is such that the albumins are preserved practically intact, so that, especially in tempe, as we were able to point out, the biological albumin value is very high...

*"Soymeal,* which is prepared by removing the husks and then pounding what is left, has the drawback that it tastes somewhat bitter and, in consequence of the high percentage of fat, soon becomes rancid... Berczeller, however, seems to have succeeded in obtaining an improved soy meal...

"Finally, in discussing the importance for the native diet of these beans and the products prepared from them, the author arrives at the conclusion that it is especially the albumins that are important, the people being practically vegetarian and these foods being, in addition, rich in carbohydrates.

"Thus the author expresses his approval of the fact that of late years the *Department of Agriculture, Industry and Commerce* has advocated the growing of the soybean and the consumption of the products prepared therefrom."

Note 1. This is the earliest English-language document seen (the summary) (Sept. 2005) that contains the word "soymeal," which apparently refers to whole (full-fat) soybean flour.

Note 2. This is the earliest document seen (April 2001) that contains the word *taokoan.* Address: Hoofd van het Analyselaboratorium te Buitenzorg, Java.

557. Giessen, C. van der. 1932. Op Java verbouwde kedeleevarieteiten [The varieties of soybean grown on Java]. *Landbouw (Buitenzorg, Java)* 7(9):664-71. March. English-language summary, p. 755-56. Also in: Dutch East Indies Dept. of Agriculture..., ed. 1932. Kedelee. Buitenzorg, Java: Departement van Landbouw, Nijverheid en Handel. Afdeeling Landbouw. p. 98-105, 189-190. [1 ref. Dut; eng]

• ***Summary:*** "It appears... that the varieties having black seeds are grown considerably more extensively than those with white seeds. It is only in certain regions (the coastal plain of Tegal-Brebes, Demak, Koedoes, Loemadjang, and in some parts of Djember) that the white seed varieties are predominant. The reasons why either of these varieties are grown in any particular region are, in part, the following. The varieties with white seeds, it is said, make more demands on the supply of irrigation water than the black seed varieties; also the soil seems to have an influence; whilst furthermore the commercial requirements and the purpose of the seeds are taken into consideration.

"Generally speaking, the white soybean appears to make headway, though but slowly, notwithstanding the initial objections originally made by the local dealers. Most of the native grown varieties mature quickly, requiring a growing period of from 80 to 90 days.

"It is furthermore indicated that as early as in 1915 it was tried in the then existing Selection and Seed Gardens at Buitenzorg to improve the native-grown varieties, but without appreciable success. Varieties imported from Manchuria, Japan and North America were found not to be able to thrive under the conditions prevailing on Java. Better results were obtained with those imported from Formosa, a tropical country; through selection from two varieties imported from that country the superior numbers 27 (black-seeded) and 29 (white-seeded) were obtained, which varieties seem to be very satisfactory under very diverging circumstances.

"In the meantime the Subsection for the Selection of Annual Food Crops of the Agricultural Institute of the General Experimental Station for Agriculture at Buitenzorg in 1928 once again turned its attention to the improvement of the native-grown varieties of the soybean. Samples were obtained from the various centres of cultivation, namely 52 black-seeded, 38 white-seeded, and 2 green-seeded varieties, all of which were subjected to a preliminary test at Buitenzorg. From these a certain number having specific properties were selected, out of which four varieties are being grown for purposes of observation in important soybean centres." Address: Landbouwkundig Instituut van het Algemeen Proefstation voor den Landbouw te Buitenzorg, Java.

558. Giessen, C. van der. 1932. Variëteitenproeven bij kedelee [Variety trials with soybeans (in Java)]. *Landbouw (Buitenzorg, Java)* 7(9):507-35. March. Previously published in Landbouw 7(8) and 7(10). [1 ref. Dut; eng]

• ***Summary:*** Contains a 3½-page English-language summary. In 30 variety trials with soybeans during 1928-1931, three varieties with black-colored seeds (nos. 16, 17 and 30) and 3 varieties with white colored seeds (nos. 17, 28 and 29) were tested, in different locations and different types of soil (marl, laterite). The varieties numbered 16 and 17 were imported in 1918 from Formosa, where they were called "otan" and "botan." The highest average yields were obtained from numbers 27 and 29. Graphs show: (1a, 1b) Yields from the black-colored seeds. (2a, 2b) Yields from the white-colored seeds. Address: Java.

559. Goot, P. van der; Muller, H.R.A. 1932. Plagen en ziekten der kedelee op Java. Beknopt voorloopig overzicht [Pests and diseases of the soybean in Java. A preliminary overview]. *Landbouw (Buitenzorg, Java)* 7(9):683-704. March. English-language summary, p. 758-59. Also in: Dutch East Indies Dept. of Agriculture..., ed. 1932. Kedelee. Buitenzorg, Java: Departement van Landbouw, Nijverheid en Handel. Afdeeling Landbouw. p. 117-38, 192-93. [5 ref. Dut; eng]

• ***Summary:*** "Whilst in most soybean-growing countries pests of this crop are few and of little importance, in Java insect-pests of the soybean crop are numerous and often mean a check to its further cultivation. The present paper gives an enumeration of some 20 species of insects, attacking the soybean in Java, 5 of which occasionally cause serious damage. These are the podborer *(Etiella zinckenella* Fn.), the leafbeetle *(Plagiodera inclusa* Stål.), the podbug *(Riptortus linearis* F.), the tobacco-caterpillar *(Prodenia litura* F.), and the peanut-leafminer *(Aproaerema nerteria* Meyr.)...

"The diseases of the soybean in the Dutch East Indies are mainly of minor importance. They are: Slime disease (caused by *Bacterium solanacearum* E.S.), footrot *(Sclerotium rolfsii* Sacc.) and anthracnose *(Colletotrichum glycines* Hori). Especially under wet conditions footrot [foot-rot] may cause some loss." Address: Respectively Dierkundige en Plantkundige bij het Instituut voor Plantenziekten van het Algemeen Proefstation voor den Landbouw te Buitenzorg, Java.

560. Hove, W. ten; Gerlings, C. 1932. De verbreiding van de kedeleevarieteit no. 27 in de residentie Soerabaja [The distribution of soybean variety number 27 in the Surabaya Residency]. *Landbouw (Buitenzorg, Java)* 7(9):672-82. March. English-language summary, p. 756-58. Also in: Dutch East Indies Dept. of Agriculture..., ed. 1932. Kedelee. Buitenzorg, Java: Departement van Landbouw, Nijverheid

en Handel. Afdeeling Landbouw. p. 106-16, 190-92. [2 ref. Dut; eng]

• ***Summary:*** "The Sourabaia [Surabaya] Residency represents an important soybean center in Java. In the year 1930 the area of cultivation of this produce amounted to 18,193 hectares, producing altogether 166,775 quintals [1 quintal = 100 kg] of seed. This produce is raised almost exclusively on sawahs [wet rice fields]. In the year 1930 the percentages of the total sawah surfaces planted with soybean were 20% for the Regency of Djombang, 13% for the Regency of Modjokerto, and 21% for the Regency of Sidoardjo...

"Amongst the native varieties we find soybeans having white seed and those with black seed; those that ripen early and those that ripen late... The seed used for sowing, after having been carefully selected by the planting natives, is usually kept in petroleum tins. Through this method the germinative power is very well retained and in most cases amounts to 85% or even higher.

"In 1920 variety no 27, having black seeds, was introduced by the formerly existing Selection and Seed Gardens for Rice and Other Annual Native Food Plants (These Gardens were later combined with the General Experimental Station for Agriculture at Buitenzorg). This variety, owing to its excellent productiveness, has gradually become more and more popular in the regions here under discussion." Address: Landbouwconsulten te Modjokerto, Java.

561. Paerels, B.H. 1932. Voorwoord op het Kedelleenummer [Foreword to the soybean issue]. *Landbouw (Buitenzorg, Java)* 7(9):569-70. March. English-language summary, p. 741-42. Also in: Dutch East Indies Dept. of Agriculture..., ed. 1932. Kedelee. Buitenzorg, Java: Departement van Landbouw, Nijverheid en Handel. Afdeeling Landbouw. p. 3-4, 175-76. [Dut]

• ***Summary:*** "It is with considerable satisfaction that I write a short introductory note to this number of our journal *Landbouw,* it being entirely devoted to various aspects of soybean cultivation and marketing.

"From what was originally a local survey, reported by Messrs. Ten Hove and Gerlings, there has grown, at the instance of the Section for Agricultural Economy of the Department of Agriculture, Industry and Commerce, an extended study dealing with the question of the soybean in these lands in all its aspects, and the significance of which reaches far beyond the intention and the purport of the original Report...

"The increasing consumption and the constant shortage of soybean grown in this country, necessitating an ever advancing import of this article, called for a serious investigation of the problem how to increase the local production and the incidental improvement in the trade balance thus to be obtained." Address: Java.

562. Scheltema, A.M.P.A.; Vries, E. de. 1932. Over de opbrengsten van kedelee [The yield of the soybean]. *Landbouw (Buitenzorg, Java)* 7(9):651-63. March. English-language summary, p. 754-55. Also in: Dutch East Indies Dept. of Agriculture..., ed. 1932. Kedelee. Buitenzorg, Java: Departement van Landbouw, Nijverheid en Handel. Afdeeling Landbouw. p. 85-97, 188-89. [Dut; eng]

• ***Summary:*** "Generally speaking the yield is highest from well watered, neo-volcanic soils, whilst it is lowest on the arid marl soils, as is evident from the following yield figures (dry seed in quintals [1 quintal = 100 kg] per hectare) in some of the more important production regions: Kediri 10.4, Sidoardjo-Modjokerto 9.2, Ngandjoek 7.7, Madioen 6.8, Brebes 6.1... The average yield for the whole of Java was figured at 6.06 quintals per hectare." Address: 1. Hoofd van de Afdeeling Landbouwstatistiek van het Centraal Kantoor voor de Statistiek te Batavia; 2. Assistent bij de Afdeeling Landbouweconomie van den Dienst voor Landbouw en Visscherij te Buitenzorg, Java.

563. Vries, E. de. 1932. De cultuur van kedelee op Java [The cultivation of the soybean on Java]. *Landbouw (Buitenzorg, Java)* 7(9):597-650. March. English-language summary, p. 745-53. Also in: Dutch East Indies Dept. of Agriculture..., ed. 1932. Kedelee. Buitenzorg, Java: Departement van Landbouw, Nijverheid en Handel. Afdeeling Landbouw. p. 31-84, 179-87. [6 ref. Dut; eng]

• ***Summary:*** A detailed analysis of all aspects of the subject, with a 9-page English-language summary. "In the year 1930 the area on Java devoted to the cultivation of the soybean amounted to 208,000 hectares, 156,000 of which are sawah [wet rice field], and 53,000 dry grounds." Address: Assistent bij de Afdeeling Landbouweconomie van den Dienst voor Landbouw en Visscherij te Buitenzorg, Java.

564. *Genie Civil (Le).*1932. Chimie industrielle: Propriétés et emplois de la caséine végétale [Industrial chemistry: Properties and use of vegetable casein]. 100(14):352. April 2. (52nd year. No. 2590). [Fre]

• ***Summary:*** Vegetable casein is extracted from the seed of the soybean *(graine de soja (haricot de Mandchourie)).* The Chinese and the Annamites [of today's Vietnam] have long used this casein to prepare very dry, brittle leaves or sheets of a yellowish color [yuba]. Certain European industries use this product as a raw material. In *L'Industrie Chimique* of Nov. 1931 and Jan. 1932, Mr. Genin gives details on the purification of this protein, on the preparation of the casein, and on its principal industrial applications. Address: Paris, France.

565. Dutch East Indies Dept. of Agriculture... (Archipel Drukkerij). ed. 1932. Kedelee [Soybeans]. Departement van Landbouw, Nijverheid en Handel, Afdeling Landbouw.

Buitenzorg, Java. 195 p. Also published as the Kedelee (Soybean) number of Landbouw; Tijdschrift der Vereeniging van Landbouwconsulenten in Nederlandsch-Indie 7(9):569-76. March 1932. [Dut; eng]
• ***Summary:*** Discusses all aspects of soybeans in Java. Contains 8 chapters by various authors, each cited separately and each with a lengthy English abstract. Address: Netherlands Indies.

566. Cruz, Aurelio O.; West, Augustus P. 1932. Composition of Philippine soy beans and soy-bean oil. *Philippine J. of Science* 48(1):77-88. May. [32 ref]
• ***Summary:*** In 1930 the Philippines produced 4,218 tons of soybeans. In 1911 O.W. Barrett, Chief of the Division of Experiment Stations, Philippine Bureau of Agriculture, strongly encouraged the Philippine Agriculturist to "to take up soy bean culture in earnest." But 20 years "after this advice was given we find the Philippines are producing an annual yield of only a few thousand tons of soy beans although, as shown by experiments, this is a very suitable and appropriate crop for this country. With this idea in view," in 1931 staff members of the Philippine Bureau of Science wrote various newspaper articles to popularize soybeans and gave a display of food products made from soy beans at carnival in Manila.

A short survey of the nutritional factors of soy beans is given. The Philippine beans are rich in fats (20%), proteins (39.1%), and carbohydrates (24.96%). The oil had iodine value 128.4, saponification value 193.3, unsaponifiable matter 1.0%, unsaturated fatty acids (corrected) 81.5% (iodine value 151.3), saturated fatty acids (corrected) 12.65%. The composition of the fatty acids is given as: (α-)linolenic 2.1%, linoleic 53.0%, oleic 30.1%, palmitic 8.9%, stearic 3.8%, and arachidic 0.6%. Address: Bureau of Science, Manila.

567. Wats, R.C.; Eyles, C.M.E. 1932. Some sources of vitamin C in India. II. Germinated pulses, tomatoes, mangoes and bananas. *Indian J. of Medical Research* 20(1):89-106. July. [3 ref]
• ***Summary:*** Furst (1912) was the first to discover that germination endowed the various seeds with antiscorbitic properties. Six seeds were tested for their germinating capacities: chana or chick peas, peas, mung or green gram, urd or black gram, lobia *(Vijna catjang)*, and soya bean. Under the procedure used, two of the seeds, lobia and soya bean, germinated very poorly, the radicles being hardly perceptible. Address: District Lab., Maymyo, Burma.

568. Commun, R. 1932. Rapport sur le foctionnement de la Division de Phytopathologie pendant l'année 1931 (Section sud-indochinoise de l'Institut des Recherches agronomiques) [Report on the activity of the Division of Plant Pathology during the year 1931 (South Indochinese section of the Institute of Agronomic Research)]. *Bulletin Economique de l'Indochine (Hanoi)* 35:447B-74B. July/Aug. See p. 473B. [Fre]
• ***Summary:*** The section titled *"Parasites du Soja* (Soybean Pests)" (p. 473B) states that a planter in Cochin China is cultivating soybeans between his rows of rubber trees. The soybean plants have been strongly attacked this year by a small moth closely related to the genus *Cnaphalocrocis* or *Marasmia*. The green caterpillar lives on the leaves and devours them. Address: Chef de la Division de Phytopathologie, et Chef de la Division et du Laboratoire d'Entomologie.

569. Peirier, J.C.; Nguyen, Kim Kinh. 1932. Analyse chimique d'un tuong-dau, sauce de soja [Chemical analysis of tuong-dau, Vietnamese soy sauce]. *Annales de Medicine et de Pharmacie Coloniales* 30:509-16. July/Sept. [Fre]

570. Stewart, C.L.; Burlison, W.L.; Norton, L.J.; Whalin, O.L. 1932. Supply and marketing of soybeans and soybean products: Tables 1-19 (Document part). *Illinois Agricultural Experiment Station, Bulletin* No. 386. p. 425-544. Dec.
• ***Summary:*** Tables show: (1) Value of the soybean crop in Illinois, 1928-31. (2) Soybean production in selected countries, average 1909-13, annual 1920-31 (in tons of 2,000 lb). The countries: Manchuria, Korea, Dutch East Indies, Japan, United States, total for these 5 reporting countries. (3) Soybean production in the United States by geographic divisions, 1929. The greatest production was in the "East North Central" states; 4.977 million bushels comprising 57% of total U.S. production.

(4) Production of gathered soybeans in selected states and in the United States, 1922-1931 (thousand bushels). In 1922 the top six soybean producing states were North Carolina (1,600), Illinois (812), Ohio (465), Indiana (240), Virginia (208), and Missouri (165). Total USA: 4,333. In 1924, Illinois (1,380) passed North Carolina (1,160) to become the leading U.S. producer. In 1931 the top six states were Illinois (6,055), Indiana (3,062), North Carolina (1,498), Missouri (1,080), Iowa (578), and Ohio (560). Total USA: 14,917.

(5) Total equivalent solid acreage of soybeans grown in selected states and in the United States in 1922-1930 (thousands of acres). In 1922 the top 4 states were North Carolina (224), Illinois (169), Tennessee (154), and Indiana and Alabama (113, tie). Total USA: 1,226. In 1923 Illinois passed North Carolina to take first place. In 1930 the top 4 states were Illinois (719), North Carolina (478), Iowa (463), and Indiana (402). Total USA: 3,758. (6) Yield per acre of gathered soybeans in selected states and in the United States, 1922-1931 (bushels per acre). In 1922 the U.S. average was 13.8 bushels. Iowa had the highest: 22 bushels. In 1931 the U.S. average was 15.6 bushels. The top 4 states

were Ohio (20), Indiana (17.8), Illinois (17.5), and Iowa (17).

(7) Proportion of soybean acreage gathered for beans, cut for hay, and interplanted with other crops, Illinois, 1922-1931. Gathered for beans rose from 32.1% in 1925 to 55.7% in 1930. Cut for hay rose from 41.4% in 1922 to 54.4% in 1931. Interplanted with other crops dropped from 20.1% in 1922 to 1.3% in 1931. (8) Production of soybeans in twelve leading Illinois counties, with rank by years, 1929-1931. The top four counties were Christian (692,200 bu in 1931), Champaign, Piatt, and Moultrie. (8A) Soybean varieties in Illinois: Varieties gaining favor: Illini, Manchu, Dunfield, Mansoy, Laredo. Holding their own: Ebony, Virginia, Ilsoy, Peking, Black Eyebrow, Wilson V [Wilson-Five], Hurrelbrink. Losing favor: Haberlandt, Mammoth Yellow, Hamilton (Ohio 9035), Ito San, A.K., Midwest.

(9) Varieties of soybean seed offered for sale by growers, in order of frequency of offers printed in Farm-Bureau publications, Illinois, 1921, 1925, and 1931. For each year the varieties are listed under nine crop reporting districts, and also for the entire state. In 1921 for the entire state, in descending order of frequency: Midwest, Ebony, A.K., Peking, Ohio, Ito San. In 1925: Manchu, Midwest, A.K., Ebony, Virginia, Ilsoy, Ohio, Black Eyebrow, Haberlandt, Peking, Wilson, Ito San. In 1931: Illini, Manchu, Virginia, Ilsoy, Ebony, A.K., Mansoy, Dunfield, Peking, Wilson, Midwest, Black Eyebrow, Haberlandt. (10) Average cost of producing soybean in Illinois and Indiana for specified periods, 1921-1930. The highest return above computed cost per acre (profit) is from soybeans gathered for seed using a combine: $9.55/acre. When soybeans are cut for hay, a loss usually results.

(11) Imports of soybean oil, soybean oil meal and cake, and soybeans, United States, 1915-1931. (12) Duties levied on soybean oil, soybean oil meal and cake, and soybeans under recent tariff acts, United States, 1909-1930. In 1909 and 1913 all three commodities were on the "Free list." In 1921 oil the tariff on oil was 20 cents per gallon (2.67 cents per lb); the other two were free. In 1922 the tariff on oil was reduced to 18.75 cents per gallon (2.5 cents per lb), the tariff on soybeans was ½ cent per lb (30 cents per bushel), and meal was free. In 1930 the tariff on oil was increased to 26.25 cents per gallon (3.5 cents per lb, not less than 45% *ad valorem)*, the tariff on meal and cake was $6/ton, and the tariff on soybeans was increased fourfold to $1.20/bushel.

(13) Domestic production of soybean oil and other vegetable oils from domestic materials, United States, 1912-1931 (thousands of pounds). Statistics are given for cottonseed oil (the leader by far during the entire period), peanut oil, olive oil, corn oil, linseed oil, soybean oil, and total vegetable oil. Soybean oil rose from 751,000 lb in 1922 (the first year for which figures are given) to 39,129,000 lb in 1931. The ranking in 1931 was: Cottonseed oil (1,417,226 x 1,000 lb), linseed oil (203,613), corn oil (113,145), soybean oil (39,129), peanut oil (13,730), and olive oil (1,509).

(14) Imports of foreign vegetable oils, oil equivalent being used for oil-bearing materials, United States, 1910-1931 (thousands of pounds). Statistics are given for soybean oil, coconut oil and copra, peanut oil, olive oil (edible), olive oil (inedible, including olive oil foots), palm oil (incl. palm kernel), linseed oil and flaxseed, all other vegetable oils and materials, total vegetable oils and materials. For net soybean oil imports, the earliest figure is 24,784 in 1912; it peaked at 335,439 in 1918, and had fallen to 4,018 in 1931. Total vegetable oils and materials imported increased from 440,412 in 1910 to 1,525,114 in 1931.

(15) Exports of soybean oil and five other leading vegetable oils, United States, 1919-1931 (thousands of pounds). Statistics are given for soybean, cottonseed, coconut, linseed, corn, and peanut. The leading export throughout this period was cottonseed oil. For soybean oil exports, the figure for the last half of 1919 is 27,715 and fir 1920 it is 43,512. Thereafter the amount exported each year is very small, rising from 1,944 in 1921 to 5,448 in 1931.

(16) Total production, imports, exports, and net balance of vegetable oils and animal fats, exclusive of butterfat but inclusive of fish oils, United States, 1912-1931. (17) Use of soybeans, by acreage, United States, 1915, 1929, and 1930 crops. The percentages of the entire crop acreage in 1915 are: Hay 52%, grazed 15%, plowed under 4%, and gathered for beans 29% (of which: Seed 18.2%, human food 0.9%, and feed 9.9%). In 1930: Hay 56%, grazed 14%, plowed under 4%, and gathered for beans (11,975,000 bushels) 30% (of which: Seed 10.5%, crushed or ground 11.5%, and feed 8.0%).

(17A) Commodities in which soybeans or soybean products are used (p. 460): Food products (USA and Canadian), feed products, industrial products. (18) Soybean oil meal produced and imported into the United States, 1922-1930 (tons of 1,000 lb). Domestic production increased from 3,811 tons in 1922 to 110,000 tons in 1930. Imports increased from 15,612 tons in 1922 to 55,107 tons in 1930. Total of domestic production + imports increased from 19,423 tons in 1922 to 165,107 tons in 1930.

(19) Adaptability of soybean oil to use in various products (p. 464): The products are: Drying products (paint, varnish, linoleum and oil cloth, waterproof goods), soap products (hard and soft soaps), edible products (Lard compounds, cooking oils {if odor permanently eliminated}, salad oils, fountain drinks, candy, mayonnaise, margarin), miscellaneous (core oil, printer's ink). Four levels of adaptation and a maximum percentage are given for each use: Probable, inferior, satisfactory, and superior. The two superior adaptations are paint (to prevent yellowing), and soft soaps. Note: "The margarin industry was one of the first to use considerable amounts of soybean oil and at present it

absorbs in the United States approximately 750,000 pounds annually."

571. Gonzaga, L. 1932. The role of combined oxygen in the efficiency of vegetable oils as motor fuel. *Natural and Applied Science Bulletin (Univ. of the Philippines)* 2:119-24. (Chem. Abst. 27:833). *

572. Heusden, W.C. 1932. De sojaboon, Glycine max Merr., een voordeelige ondergroei in jonge rubbertuinen [The soybean, Glycine max Merr., a profitable undergrowth in young rubber plantations]. *Bergcultures (Batavia, Dutch East Indies)* 6(49):1332. [Dut]*

573. Vries, E. de. 1932. De cultuur en import van sojabonen [The culture and import of soybeans]. *Economisch Weekblad voor Nederlandsch-Indie* 1(17):674. [Dut]*

574. Orosa, Maria Y. 1932. Soybeans as a component of a balanced diet and how to prepare them. *Manila (Philippines) Bureau of Science, Popular Bulletin* No. 13. 53 p. [16 ref]

• ***Summary:*** Contents: Introduction. The cooking of soy beans (89 Filipino recipes, p. 7-35), incl. roasted soy beans, soy-bean soups etc.–most recipes use whole soybeans, but quite a few use tofu *(tokua),* soy sauce *(toyo),* soy-bean flour, or soy-bean milk, and a few use *tahuri* (brine fermented tofu) or soy-bean sprouts. Some common foods made from soy beans and methods of preparing them (p. 35-53): Soy-bean milk, condensed soy-bean milk, soy-bean milk powder, soy-bean casein, soy-bean curd (tofu; *tokua* or *toqua). Tahuri* or *tahuli* (fermented tofu). Frozen tofu. Bean curd brains or *tofu nao.* Dry bean curd or *topu khan* (tofu-kan, dipped in burnt millet sauce and rubbed with fine salt). Fragrant dry bean curd. Thousand folds (thin layers of fresh tofu pressed in cheesecloth. "On standing, the thousand folds mold and develop a meatlike flavor. This is fried in sesame oil and served in place of meat"). Fried bean curd. Soy sauce (called by the Chinese "ch'au yau," or drawing oil; or "pak yau" or white oil' by the Japanese "shoyu"; and the Filipinos, "toyo"). Natto. Hamanatto (p. 49). Yuba. Miso. Soy-bean flour. Soy-bean oil (used in the manufacture of lard and butter substitutes; also in paints, printing inks, etc.). Soy-bean meal. Soy-bean coffee. Soy-bean sprouts.

Note 1. This is the earliest English-language document seen (Oct. 2008) that uses the term "soy-bean casein" (or "soy bean casein" or "soybean casein"), probably to refer to soybean protein.

"When and by whom the soy bean was first introduced into the Philippines, no one can ascertain. The Filipino people have long known some important soy-bean preparations, such as soy sauce, or 'toyo,' bean curd, or 'tokua,' fermented bean curd or 'tahuri,' not knowing that they were prepared from this bean. The seed is known in some parts of the Philippines, where it is grown, as 'utao.'"

"The main object of this pamphlet is to encourage the Filipino people to use more soy beans, and preparations made from them as food" (p. 3-4).

"Soy beans are grown in some parts of the Philippines. According to Doctor Roxas, Director of the Bureau of Plant Industry, 2,481 tons were grown in Batangas in 1921 and 4,218 tons, in 1930. However, the importation of soy beans in 1924 was 4,657 tons. Doctor Roxas says that soybeans can be grown in all parts of the Philippines" (p. 6). "Immature soy beans may be cooked in the same way as lima beans *(patani)"* (p. 7).

"The soy-bean curd was first produced by Whai Nain Tze, before the Christian Era and was introduced into Japan from China by the Buddhists. It was introduced into the Philippines by the Chinese and has become a very popular food in Manila and in places where there are Chinese who manufacture it for sale. 'Tokua' on account of its high fat, protein, and mineral content, is called by the Chinese as 'meat without bone,' or 'the poor man's meat.'" The Chinese use burnt gypsum (about 1.5% by weight) as a coagulant. In some cases, the curds are wrapped in individual pieces of fine cheesecloth about the size of a small handkerchief, then pressed lightly for a few minutes. They are "unwrapped, spread on shallow bamboo trays *(bilao)* and partially dried at room temperature. Then they are dipped in a weak solution of turmeric to coat the outside in light yellow coloring. Some manufacturers soak the small cakes of curd in brine solution for a short time, then dip them in a solution of burnt sugar or molasses and bake them slightly before putting them on the market." 100 gm of dry soybeans typically yield 350 gm of tofu *(tokua)* (p. 41).

The section titled "'Tahuri' or 'Tahuli'" begins with 2 paragraphs and ends with a table very similar to those from Gibbs and Agcaoili (1912): "'Tahuri' is manufactured in China and exported to the Philippines in large stone jars or in small tin cans. There are some 'tokua' manufacturers in Manila that manufacture 'tahuri' for local consumption. Those that are imported from China are preserved in strong brine solution and the cakes are broken during the shipment so the liquid becomes like a thick emulsion containing pieces of the cured curd." It then contains a new paragraph: "In Manila, the Chinese method of manufacture is to pack the large pieces of soy-bean curd, about 5 inches long, 4 inches wide, and 2.5 inches thick, with much crude salt, in empty gasoline cans. The curd is allowed to cure for a period of several months. During the curing period the bean curd changes from white to a brownish yellow color and develops a peculiar salty flavor to which the Chinese and many Filipinos are educated" (p. 42). Note 2. No information about a fermentation microorganism or process is given.

"The bean curd brains known to many Filipinos as 'tojo' is the unpressed soy-bean curd. The method of making 'tojo' is almost the same as the method used in making 'tokua', only that a smaller amount of the coagulating agent is used, and the very soft but solid mass formed is left undisturbed in the wooden container until used. The Chinese used to peddle this preparation in a wooden pail-shaped container, through different parts of Manila, but on account of the Philippine Health Service regulations, this product is now sold in the markets only. / "The 'tojo' is served with a few tablespoonfuls of medium thick brown-sugar syrup, which gives it flavor, the 'tojo' being almost tasteless. Sometimes it is eaten with sweet oil, sauce, and vinegar, or with finely cut meat and spices." (p. 43).

"Dry bean curd: The fresh bean curd when dipped in burnt millet-sugar sauce and rubbed with fine salt will keep longer than the 'tokua' and is called 'topu khan.' This preparation is usually eaten is soups."

Fragrant dry bean curd or *hsiang khan* ("fragrant dry") has the consistency of smoked sausage. "It is made by subjecting the fresh bean curd to great pressure, which eliminates much of the water content. The pieces of semidry curd are soaked in a weak brine solution in which is dissolved burnt millet-sugar and to which is added powdered spices. The curd is then dried to hardness. This preparation keeps indefinitely and is used in soup making and in vegetable dishes" (p. 43).

Note 3. Cruz and West (1932, p. 78) state that as part of a campaign by the Bureau of Science to encourage the Filipino people to use more soy beans, Miss Orosa "has made excellent cakes, cookies, puddings, sauces, soups, custards, ice cream, and other tasty preparations from Philippine soy beans."

Note 4. The author pioneered the branch of the branch of the Home Extension Service in which home demonstrators helped women in solving their home problems. She started the organization as a food preservation unit under the Bureau of Science in 1923, starting with six home demonstrators that she herself trained. That group became the forerunner of the Home Extension Service in the Philippines. For details on her work see: In: A Half Century of Philippine Agriculture. Manila, Philippines: Liwayway Publishing. p. 236-37.

Note 5. This is the earliest English-language document seen (Nov. 2003) that contains the word "meatlike."

Note 6. This is the earliest English-language document seen (Oct. 2008) that uses the word "Hamanatto" to refer to soy nuggets. Orosa's description of Hamanatto is based on that of Sawa (1902). Address: Chief, Div. of Food Preservation, Bureau of Science, Manila.

575. Rozul, J.B. 1932. The cost of production of soy bean *(Glycine hispida)*. Thesis. College of Agriculture, University of the Philippines, Los Banos, Philippines. Experiment Station contribution No. 1192. Abstracted in Philippine Agriculturist. 1937. 26(5):475. *
Address: Los Baños, Philippines.

576. van Veen, A.G. 1932. Over het B-2 vitamine gehalte van verschillende Indische voedingsmiddelen [On the vitamin B-2 content of various Indonesian foods]. *Geneeskundig Tijdschrift voor Nederlandsch Indie* 72(20):1377-99. [25 ref. Dut]
• ***Summary:*** The vitamin content of soybeans (sojaboonen, katjang kedelee) and soy tempeh (tempe kedelee) is given. Address: Chem. Afd., Centraal Geneeskundig Laboratorium, Batvia.

577. *Foreign Crops and Markets (USDA Bureau of Agricultural Economics).* 1933. The Manchurian soy bean situation. 26(7):184-88. Feb. 13.
• ***Summary:*** "The Manchurian soy bean acreage for 1933 probably will be no larger than that of 1932, according to Assistant Agricultural Commissioner Fred J. Rossiter at Shanghai. Unsettled political conditions are expected to continue to restrict the acreage. A large number of farmers have left their homes, while others have lost their work animals and will leave the land uncultivated."

"The amount of soy beans and bean products available for export during the crop year ending September 30, 1933 is considered to be about 30 per cent less than the amount available in 1931-32."

"Review of the 1931-32 season: While the United States disposed of [exported] over two million bushels of soy beans in Europe during the crop year, which ended September 30, 1932, Manchuria shipped to the same destination fifty-six million bushels of beans and the equivalent of over fifteen million bushels in the form of bean oil."

Tables show: (1) Manchuria: Exports of soy beans, bean cake and bean oil, by countries, year ended September 20, 1932. Includes exports from Dairen, Newchwang, Vladivostok and Manchuli. The exports are to Europe, Leningrad, Japan (incl. Chosen and Taiwan), China, East Indies [Indonesia], United States, Others, and Total. Soy bean exports totaled 2,993,923 short tons, with the largest amount going to Europe (1,477,033). Soy bean cake exports totaled 1,503,395 short tons, with the largest amount going to Japan (980,911). Soy bean oil exports totaled 154,418 short tons, with the largest amount going to China (101,784).

(2) Manchuria: Average monthly price of soy beans and soy bean products at Dairen in silver yen and United States currency, 1929-30 to 1932-33.

578. *Foreign Crops and Markets (USDA Bureau of Agricultural Economics).* 1933. The Manchurian soy bean

situation. 26(24):686-88. June 12.
• ***Summary:*** Contents: Introduction. Prices. Exports: Soy beans, soy-bean cake, soy-bean oil. Two tables show statistics related to exports of soy beans and products: (1) By quarters. (2) By destination: Japan, Europe, USA, Malay ports, China, others.

579. R.B.J. 1933. "Supply and Marketing of Soybeans and Soybean Products" by Stewart, Burlison, Norton, and Whalin, Bulletin 386 (1932). *Malayan Agricultural Journal* 21(9):449-50. Sept. [1 ref]
• ***Summary:*** This is a review of the article cited in the title. "The purpose of the present study has been to examine the supply situation with respect to both soybeans and soybean products, the present and potential markets for soybeans, the means and methods by which they are marketed, their economic characteristics in relation to improvements in marketing, and the influence of various factors on the prices paid for them...

"The information herein presented it is believed will be useful, not only as a basis for understanding the economic developments affecting soybeans in recent years, but also as a means of determining the tendencies which will count heavily in the future in establishing the place of this crop in the agriculture of the state."

Contains numerous tables and graphs showing prices for soybean products, and exports for various countries. Address: Malaya.

580. *Foreign Crops and Markets (USDA FAS Bureau of Agricultural Economics).* 1933. Oils and oilseeds: Manchuria has larger soy bean crop. 27(14):348-50. Oct. 2.
• ***Summary:*** "Since mid-July the movement of [soy] beans to Europe has been unusually small in view of the German restrictions on imports of the bean and its products."

Tables show: (1) "Manchuria: Exports of soy beans and bean products, by quarters, seasons 1931-32 and 1932-33." Shows [soy] beans, bean cake, bean oil, and total. These exports are from Dairen, Newchwang, Vladivostok, and Manchouli [W.-G. Man-chou-li, Manzhouli]. Note: Manzhouli is an inland port in Nei Monggol {Inner Mongolia}, northern China, near the border with Russia. As of Jan. 2008 Manzhouli is China's busiest land port of entry, and is responsible for 60% of all imports from and exports to Russia and Eastern Europe. They apparently travel by rail on an east-west axis.

(2) "Manchuria: Exports of soy beans and bean products by countries of destination, Oct. to June, 1931-32 and 1932-33." The countries are Japan [incl. Korea and Formosa], Europe [incl. exports via Manchouli to Leningrad], China, America [USA], Malaysia, and Others. Europe buys the most whole soy beans, Japan the most bean cake, and China the most bean oil.

581. *Foreign Crops and Markets (USDA FAS Bureau of Agricultural Economics).* 1933. The world situation in oils and oilseeds. 27(14):352-76. Oct. 2.
• ***Summary:*** German trade in soy beans has increased. Two full page tables show: (1) Netherlands: Imports of fats and oils, 1928-1932 (includes 20,000–54,000 short tons of soybeans and large amounts of soybean oil). (2) Netherlands: Exports of fats and oils, 1928-1932 (includes 231–344 short tons soybeans and 11,000–17,000 short tons of soybean oil).

The section titled "Soy beans" states: (p. 367) "The total production of soy beans last year in the five leading soy bean producing countries: Manchuria, Chosen and Dutch East Indies, each shows a substantial increase, Chosen producing 677,326 short tons against 634,506 in 1931 and Dutch East Indies 165,345 short tons compared with 141,602 during the previous year. In the United States, on the other hand, 397,350 short tons were harvested, a reduction of about 13 per cent from that of 1931 but about 8 per cent larger than the quantity harvested in 1930. The amount produced by Japan during the past year is not available at the present time. See table, page 374."

A 3rd table (p. 368) shows the production of oilseeds in terms of oil in major producing countries from 1929-30 to 1932-33. The amount stayed about constant during this period, ranging from 1.24 to 1.37 million pounds.

A 4th table, titled "Soybeans" (p. 368) shows the production of soybeans in major producing countries in 1909-1913 (average), 1921-1925 (average), and yearly from 1929-30 to 1932-33 (estimate). The amounts in 1931-32 were (in short tons): Manchuria 3,289,657. Chosen (Korea): 634,506. USA 458,130. Japan 381,551. Dutch East Indies (today's Indonesia): 141,602.

582. Bailey, Ethel Zoe. 1933-1966. Glycine soja–Foreign sources. Part I. Ithaca, New York: L.H. Bailey Hortorium. 3 cards. Unpublished.
• ***Summary:*** *Glycine soja* is the scientific name for the wild soybean, an annual plant. This name has never been used for the cultivated soybean.

These three hand-written index cards are in the Bailey Hortorium's index system of nursery catalogs and/or botanic garden seed lists developed by Ethel Zoe Bailey. In this index system, there are eleven major cards and eight minor cards related to the soybean. On each card are two-part coded entries referring to botanic gardens or nurseries.

Part 1 is the code for the name of the botanic garden, and part 2 is the last two letters of the earliest year in which the plant for that card appeared in this garden's catalog. For example "Buit 33" refers to the 1933 catalog from Buitenzorg, Java. [LR 1982] means that a list of seeds and plants (whether or not it contained soy) was "Last Received" from that source [Buitenzorg] in 1982. There are 72 listings for *Glycine soja* from foreign sources. As of Nov.

1997 most of the catalogs and seed lists mentioned below are available in the Bailey Hortorium, located in Mann Library, Cornell University, Ithaca, New York.

(1) Buit. 33–'s Lands Plantentuin Gov. Bot. Garden, Buitenzorg [later renamed Bogor], Java, Indonesia, 1933 [LR 1977; now known as Botanic Gardens, Kebun Raya, Bogor, Indonesia]. (2) Saig. 36–Hortus Botanicus Saigonensis, Saigon, Vietnam, 1936 [LR 1964]. (3) Turc. 37–Hortus Botanicus Turcomanicus, Turkonen Botanical Garden, 744012 Ashkhabad, Turkmen S.S.R. [later Turkmenistan], 1937 [LR 1976]. (4) Wey. 38–Michael A. Weymarn, 20 Grodekoosky Blvd., Harbin, Manchuria, 1938 [Later part of China]. (5) Lenin. 39–Botanical Garden (Botanitschesky Institut), Leningrad, Russia, USSR, 1939 [LR 1976].

(6) Buc. 40–Hortus Botanicus Universitatis Bucurestiensis "C.I. Parhon," Sos. Cotroceni nr. 32, R.P.R., Bucharest 15, Romania, 1939. (7) Mort. 39–La Mortola (Giardino Botanico Hanbury), Ventimiglia 18036, Italy, 1939 [LR 1975]. (8) Co. 41–Hortus Botanicus Conimbrigensis, Coimbra, Portugal, 1941 [LR 1982]. (9) Port. 42–Estacao Agronomica Nacional, Oeiras (Lisboa), Portugal, 1942 [LR 1982] (10) Dach. 43–All Union Scientific Research Institute of Medicinal Plants, Lenino-Dachnoe, Moscow District, Russia, USSR, 1943 [LR 1943]

(11) Brux. 40–Nationale Plantenuin van Belgie (formerly named Hortus Botanicus Bruxellensis), Dienst Lavende Verzamelingen, Domaine van Bouchot, B-1860 Meise (Brussels), Belgium, 1940 [LR 1981]. (12) Gater. 49–Institut für Kulturpflanzenforschung, DDR-4325 Gatersleben, Kr. Aschersleben, Bezirk Halle, East Germany, 1949 [LR 1981]. (13) Camb. 48–University Botanic Garden (formerly named Horto Cantabrigensis Academiae), Cambridge, England, 1948 [LR 1981]. (14) B.A. 51–Division de Exploraciones e Introduccion de Plantas, Ministerio de Agricultura de la Nacion, Buenos Aires, Argentina, 1951 [LR 1958]. (15) Jena 52–Botanischen Gartens der Friedrich Schiller Universitaet, Jena, Germany, 1952 [LR 1977].

(16) Modena 53–Istituto ed Orto Botanico [Botanical Garden] dell'Universita di Modena, Modena, Italy, 1953 [LR 1979]. (17) Munchen 55–Botanischer Garten Muenchen-Nymphenburg, Menzi ger Str. 63 BRD, D-8000 Muenchen [Munich] 19, Germany, 1955 [LR 1981]. (18) Tar. 56–Villa Taranto Gardens, Pallanza, Italy, 1956 [LR 1974]. (19) Berl. 55–Botanischer Garten, Berlin-Dahlem, Germany, 1955 [LR 1975]. (20) Ruzy. 57–Research Institute for Plant Production, Ruzyne at Prague, Czechoslovakia [in the Czech Republic since Jan. 1993], 1957 [LR 1957].

(21) Kohr. 57–Gerhard Kohres, Bahnstrasse 101, D-6101 Erzhausen, Darmstadt, Germany, 1957 [LR 1973]. (22) Szeg. 57–Hortus Botanicus Universitatis Szeged, Szeged, Hungary, 1957 [LR 1976]. (23) Brno. 58–Botanika Gardeno de Veterinara Universitato, Brno 12, Czechoslovakia [in the Czech Republic since Jan. 1993], 1958 [LR 1968]. (24) Zurich 59–Botanischer Garten der Universitaet Zuerich (and Parco Botanico del Cantone Ticino, Isole di Brissago, Lago Maggiore), Zollikerstrasse 107, CH-8008 Zurich, Switzerland, 1959 [LR 1977]. (25) Gott. 58–Botanischer Garten der Universitaet Goettingen, Gottingen, Germany, 1958 [LR 1981].

(26) Erl. 58–Botanischer Garten der Universitaet Erlangen, Schlossgarten 4, Erlangen, Germany, 1958 [LR 1977]. (27) Hohen. 58–Botanischer Garten der Landwirtschaftlichen Hochschule Stuttgart-Hohenheim, Stuttgart-Hohenheim, Germany, 1958 [LR 1981]. (28) Kassel 58–Botanischer Garten der Stadg. Kassel, Bosestrasse 15 (Park Schonfelf), Kassel, Germany, 1958 [LR 1965]. (29) Marb. 58–Botanischer Garten der Philipps-Universitaet, Auf den Lahnbergen, 3550 Marburg 1, Germany, 1958 [LR 1981; Formerly located at Pilgrimstein 4]. (30) Bonn U. 58–Botanischer Garten der Universitaet Bonn, Meckenheimer Allee 171, Bonn, Germany, 1958 [LR 1979].

(31) Glasgow 60–Botanic Gardens, Glasgow W. 2, Scotland, UK, 1960 [LR 1982]. (32) Lond. 60–University of London, Botanical Supply Unit, Elm Lodge, Englefield Green, Surrey, England, UK, 1960 [LR 1981]. (33) Liv. 61–University of Liverpool Botanic Gardens, Ness, Neston, Wirral, Cheshire, England, UK, 1961 [LR 1982]. (34) Kew 61–Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, England, UK, 1961 [LR 1982]. (35) Monpl. 62–Jardin des Plantes, Universite de Montpellier, Faubourg St. Jaumes, Montpellier, France, 1962 [LR 1978].

(36) Komen. 62–Botanicka Zahrada Univerzity Komensheko, Bratislava, Czechoslovakia, 1962 [LR 1965; Bratislava has been the capital of Slovakia since 1992]. (37) Humb. 63–Institut für Botanik der Landwirtschaftlich-Gaerternischen Fakultaet der Humboldt Universitaet zu Berlin, Invalidenstrasse 42, Berlin 4, Germany, 1963, [LR 1964]. (38) Hok. 64–Botanic Garden of the Faculty of Agriculture, Hokkaido University, Hokkaido, Japan, 1964 [LR 1982]. (39) Padova 63–Istituto Botanico dell'Universita, Via Orto Botanico 15, Padova [Padua], Italy, 1963 [LR 1980]. (40) Kosice 63–Botanicka zahrada University P.J. Safarika, Kosice, Slovakia, 1963 [LR 1981].

(41) Pal. 64–Hortus Botanicus Universitatis Palackianae, Olomouc, Leninova 26, Czechoslovakia, 1964 [LR 1979]. (42) Cluj. 63–Hortus Botanicus Clusiensis, Universitas "Babes-Bolyai," Str. Republicii Nr. 42, 3400 Cluj Napoca, Romania, 1963 [LR 1981]. (43) Pecs 63–Hortus Botanicus Pecs, Ifjusag Utja 6, Pecs, Hungary, 1963 [LR 1976]. (44) Vasak 63–Vladimir Vasak Agricultural Research Station, Sumperk-Temenice, Czechoslovakia [in the Czech Republic since Jan. 1993], 1963 [LR 1963]. (45) Bud. 64–Hortus Botanicus Universitatis Hungariae, Illes u. 25, Budapest VIII, Hungary, 1964 [LR 1981].

(46) Trieste 64–Universita degli studi di Trieste, Italy, 1964 [LR 1964]. (47) Nijm. 65–Hortus Botanicus Universitatis Noviomagensis, University of Nijmengen, Dreihuizerweg 200, Nijmegen, Netherlands, 1965 [LR 1981]. (48) Gob. 66–Prachi Gobeson, Narendra Nager (Dunlop Bridge), P.O. Belgharia, Calcutta-56, India, 1966 [LR 1966; Formerly located at Anandrapuri, P.O. Barrackpore, Calcutta]. (49) Ferr. 65–Hortus Botanicus Ferrariensis, Istituto ed Orto Botanico dell'Universita di Ferrara, Ferrara, Italy, 1965 [LR 1976]. (50) Rouen 66–Jardin Botanique de la Ville de Rouen, 7 Rue de Trianon, Rouen, France, 1966 [LR 1981]. Continued. Address: L.H. Bailey Hortorium, 462 Mann Library, Cornell Univ., Ithaca, New York 14853-4301. Phone: 607-255-7981. Fax: 607-255-7979.

583. Bailey, Ethel Zoe. 1933-1982. Glycine max–Foreign sources. Ithaca, New York: L.H. Bailey Hortorium. 2 cards. Unpublished.

• ***Summary:*** These two hand-written index cards are in the Bailey Hortorium's index system of nursery catalogs and/or botanic garden seed lists developed by Ethel Zoe Bailey. In this index system, there are eleven major cards and eight minor cards related to the soybean. On each card are two-part coded entries referring to botanic gardens or nurseries.

Part 1 is the code for the name of the botanic garden, and part 2 is the last two letters of the earliest year in which the plant for that card appeared in this garden's catalog. For example "Kew 33" refers to the 1933 catalog of the Royal Botanic Gardens at Kew, England. [LR 1982] means that a list of seeds and plants (whether or not it contained soy) was "Last Received" from that source [Kew] in 1982. There are 55 listings for *Glycine max* from foreign sources. As of Nov. 1997 most of the catalogs and seed lists mentioned below are available in the Bailey Hortorium, located in Mann Library, Cornell University, Ithaca, New York.

(1) Kew 33–Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AB, England, UK, 1933 [LR 1982]. (2) Taih. 34–Taihoku Botanic Garden, Taihoku, Formosa [Taiwan], 1934. (3) Adel. 50–Adelaide Botanic Garden, Adelaide, South Australia, 1950 [LR 1982]. (4) Tar. 50–Villa Taranto Gardens, Pallanza, Italy, 1950 [LR 1974]. (5) Upps. 50–Universitets Botaniska Tradgard, P.O. Box 123, Uppsala, Sweden, 1950 [LR 1979].

(6) Port. 51–Estacao Agronomica Nacional, Oeiras (Lisboa), Portugal, 1951 [LR 1982]. (7) Camb. 51–University Botanic Garden, Cambridge, England, UK, 1951 [LR 1981]. (8) Copen. 50–Universitets Botaniske Have Kobenhaven, ø Farimagsgade 2B, DK-1353, Copenhagen K, Denmark, 1950 [LR 1981]. (9) Wien 54–Botanischer Garten der Universitaet Wien, Rennweg 14, Wien III, Austria, 1954 [LR 1976]. (10) Modena 53–Istituto ed Orto Botanico [Botanical Garden] dell'Universita di Modena, Modena, Italy, 1953 [LR 1979].

(11) P.I. 53–Bureau of Plant Industry, Dep. of Agriculture, Manila, Philippines, 1953 [LR 1953]. (12) B.A. 55–Division de Exploraciones e Introduccion de Plantas, Ministerio de Agricultura de la Nacion, Buenos Aires, Argentina, 1953 [LR 1958]. (13) N.H.L. 56–National Institute of Hygienic Sciences (formerly: National Hygienic Laboratory), Kasukabe Experiment Station of Medicinal Plants, No. 30 Kasukabe-shi, Saitama-ken, Japan, 1956 [LR 1963]. (14) Co. 57–Hortus Botanicus Conimbrigensis, Coimbra, Portugal, 1957 [LR 1982]. (15) Gater. 56–Institut für Kulturpflanzenforschung, DDR-4325 Gatersleben, Kr. Aschersleben, Bezirk Halle, East Germany, 1956 [LR 1981].

(16) Prag. 56–Hortus Botanicus Universitatis Carolinae Pragensis, Prague, Czechoslovakia, 1956 [LR 1977]. (17) Hamburg 58–Botanischer Garten Hamburg, Jungiustr. 6, Hamburg 36, Germany, 1958 [LR 1973]. (18) Milan 58–Horticus Botanicus Mediolanensis, Istituto Orto Botanico dell'Universita di Milano, Via Guiseppe Colombo 60, Milan, Italy, 1958 [LR 1980]. (19) Read. 59–Agricultural Botanic Garden, University of Reading, Reading, Berkshire, England, UK, 1959 [LR 1974]. (20) Rabat 63–Institut National de la Recherche Agronomique, B.P. 415, Rabat, Morocco, 1963 [LR 1971; Formerly: 99 Avenue de Temara].

(21) L'zig 63–Botanischer Garten der Karl Marx Universitaet, Leipzig, Germany, 1963 [LR 1976]. (22) Jena 63–Botanischen Gartens der Friedrich Schiller Universitaet, Jena, Germany, 1963 [LR 1977]. (23) Tap. 63–Institutum Agrobotanicum, Orszagos Agrobotanikai Intezet, Tapioszele, Hungary, 1963 [LR 1978]. (24) Brux. 64–Nationale Plantenuin van Belgie (formerly named Hortus Botanicus Bruxellensis), Dienst Lavende Verzamelingen, Domaine van Bouchot, B-1860 Meise (Brussels), Belgium, 1964 [LR 1981]. (25) Berg 65–Hortus Botanicus Bergianus (Bergianska Tradgarden), Stockholm 50, Sweden, 1965 [LR 1981].

(26) Pecs 65–Hortus Botanicus Pecs, Ifjusag Utja 6, Pecs, Hungary, 1965 [LR 1976]. (27) Essen 66–Botanischer Garten Essen, Hortus Botanicus Assindiensis, Essen, Germany, 1966 [LR 1977]. (28) Bonn U. 65–Botanischer Garten der Universitaet Bonn, Meckenheimer Allee 171, Bonn, Germany, 1965 [LR 1979]. (29) Kosice 68–Botanicka zahrada University P.J. Safarika, Kosice, Slovakia, 1968 [LR 1981]. (30) S.C. 68–Jardin Agrobotanico de Santa Catalina, Llavollol FNGR, Argentina, 1968 [LR 1974].

(31) Barc. 70–Institut Botanic de Barcelona, Av. Muntanyans, Parc de Montjuic, Barcelona 4, Spain, 1970 [LR 1981]. (32) Munchen 71–Botanischer Garten Muenchen-Nymphenburg, Menzi ger Str. 63 BRD, D-8000 Muenchen [Munich] 19, Germany, 1971 [LR 1981]. (33) Hohen. 72–Botanischer Garten der Landwirtschaftlichen Hochschule Stuttgart-Hohenheim, Stuttgart-Hohenheim, Germany, 1972 [LR 1981]. (34) Frank. 72–Botanischer

Garten der Johann Wolfgang Goethe Universitaet, Siesmayerstrasse 72, 6 Frankfurt am Main, Germany, 1972 [LR 1980]. (35) Oxf. 73–Botanic Garden, University of Oxford, Rose Lane, Oxford, England, UK, 1973 [LR 1981].

(36) Koln 73–Botanischer Garten und Arboretum der Stadt Koeln [Cologne], Ave. Botanischen Garten, 5000 Koeln 60, Germany, 1973 [LR 1981; Formerly at Amsterdammer Strasse 36]. (37) Hal. 74–Hortus Botanicus Universitatis Halensis, Halle, Germany, 1974 [LR 1982]. (38) Gen. 73–Conservatoire et Jardin Botaniques de la Ville Geneve, Case postale 60, CH. 1292 Chambesy / Geneva, Switzerland, 1973 [LR 1981]. (39) Zurich 74–Botanischer Garten der Universitaet Zuerich (and Parco Botanico del Cantone Ticino, Isole di Brissago, Lago Maggiore), Zollikerstrasse 107, CH-8008 Zurich, Switzerland, 1974 [LR 1977]. (40) Amst. 73–Jardin Botanique de l'Universite Amsterdam, Amsterdam, Netherlands, 1973 [LR 1975].

(41) Bes. 73–Jardin Botanique de la Ville et de l'Universite (de Besancon), Place Marechal Leclerc, 25000 Besancon, France, 1973 [LR 1981]. (42) Dijon 73–Hortus Botanicus Divionensis, Jardin Botanique, 1 Avenue Albert-Premier, 21000 Dijon, France, 1973 [LR 1981]. (43) Wars. 75–Hortus Botanicus Universitatis Varsaviensis, Warsaw, Poland, 1975 [LR 1981]. (44) Berl. 75–Botanischer Garten, Berlin-Dahlem, Germany, 1975 [LR 1975]. (45) Cluj. 76–Hortus Botanicus Clusiensis, Universitas "Babes-Bolyai," Str. Republicii Nr. 42, 3400 Cluj Napoca, Romania, 1976 [LR 1981].

(46) Glasgow 77–Botanic Gardens, Glasgow W. 2, Scotland, UK, 1977 [LR 1982]. (47) Monpl. 78–Jardin des Plantes, Universite de Montpellier, Faubourg St. Jaumes, Montpellier, France, 1978 [LR 1978]. (48) Erl. 77–Botanischer Garten der Universitaet Erlangen, Schlossgarten 4, Erlangen, Germany, 1977 [LR 1977]. (49) Groz. 80–Hortus Agrobotanicus Instituti Agronomici "Dr. Petru Groza," Cluj, Romania, 1980 [LR 1980]. (50) Duss. 79–Botanisches Institut der Universitaet Duesseldorf, Christophstrasse 82, Dusseldorf, Germany, 1979 [LR 1981].

(51) Tubin. 80–Botanischer Garten der Universitaet Tuebingen, Tubingen, Germany, 1980 [LR 1980]. (52) Vac. 82–Research Institute for Botany, Hungarian Academy of Sciences Botanical Garden, 2183 Vacratot, Hungary, 1982 [LR 1982]. (53) Graz 82–Botanischer Garten der Universitaet Graz, Holtei-Gasse 6, A-8010 Graz, Austria, 1982 [LR 1982]. (54) Jo. 81–Botanical Garden, Univ. of Joensuu, P.O. Box 111, SF-80101 Joensuu, Finland, 1981 [LR 1981]. (55) Utr. 82–"Hortus Botanicus" Utrecht & "Cantonspark" Baarn of the State University of Utrecht, Utrecht, Netherlands, 1982 [LR 1982]. Address: L.H. Bailey Hortorium, 462 Mann Library, Cornell Univ., Ithaca, New York 14853-4301. Phone: 607-255-7981. Fax: 607-255-7979.

584. *Verslagen van Veldproeven. A, Variteitenproeven (Landbouwkundige Institut).* 1933. Varieteitenproeven met kedelee [Variety trials with soybeans]. A. p. 90-103. [Dut]*

585. Morse, W.J. 1933. Soybeans now a major crop in United States; Few grown before 1898. *Yearbook of Agriculture (USDA)* p. 198-205. For the year 1933.
• ***Summary:*** Contents: Variety adaptation. Variety utilization (incl. bean curd, bean milk, soy sauce, miso (bean paste), bean sprouts, green vegetable beans, bean flour, roasted beans, bean confections, beverages, oil and meal, special fermented bean products). Soybean oil and meal industry. Soybean meal. Soybean oil. Soybeans for human food. Soybeans as an export crop.

"Variety adaptation: The Virginia, Laredo, Manchu, and Biloxi have a greater range than most other varieties. The Virginia, Mansoy, and Harbinsoy varieties excel on the less productive types of soil, while on better soils the Mansoy and Harbinsoy give inferior results.

"Since the Department of Agriculture began to introduce soybean varieties more than 7,000 samples of beans have been collected from Japan, Chosen [Korea], Manchuria, China, Taiwan (Formosa), Java, Sumatra, and India. There are more than 2,000 distinct types in this large collection, ranging from 75 to more than 200 days in reaching maturity. At present about 40 varieties are generally grown in the United States."

"In Japan, where the soybean is used extensively as a green vegetable, more than 60 varieties, ranging in maturity from 75 to 160 days and differing in flavor, are grown solely for this purpose. The soybean in used in the United States primarily as forage, being preserved either as hay or silage, or cut and fed green as soilage, and is also pastured extensively with hogs and sheep." Address: Bureau of Plant Industry, Washington, DC.

586. *Indische Mercuur (De) (Amsterdam).* 1934. Invoerverbod van kedele [The import prohibition on soybeans]. 57(9):126. Feb. 28. [Dut]

587. R.H.S. [Siccama, G.F.; Rengers Hora, W.]. 1934. Ordonnantie tot verzekering van de marktpositie van rijst en kedelee [Ordinance to assure the market position of rice and soybeans]. *Economisch Weekblad voor Nederlandsch-Indie* 3(10):354-56. March 9. [3 ref. Dut]

588. *Foreign Crops and Markets (USDA Bureau of Agricultural Economics).* 1934. Manchurian soybean output larger than last year. 28(11):288-92. March 12.
• ***Summary:*** Tables show: (1) "Manchuria: Estimated soy bean acreage and production, 1927 to 1933." Final statistics are given for each year. Production was 4,899,560 short tons in 1927. It rose to a peak of 5,838,197 short tons in 1930, then fell gradually to 5,736,000 short tons in 1933.

Source: South Manchuria Railway. (2) "Manchuria: Soybean production and distribution, 1929-30 to 1933-34." For each of the five crop years is given: Production, carryover from last crop year, total supply, total exports, carryover at end of crop year, home consumption and seed. Note: Home consumption and seed is about 20% of production.

"The demand for beancake during 1933-34 is not expected to improve substantially. In Japan low prices of agricultural products and cheap commercial fertilizers will no doubt prevent increased takings." "South China boycott restrictions have been relaxed..."

(3) "Manchuria: Total exports of soy beans and bean products, 1927-28 to 1932-33." For soy beans, exports grew from 2,534,000 short tons in 1927-28 to a peak of 3,014,859 in 1931-32, then fell to 2,491,681 in 1932-33. For soy-bean cake and meal, exports rose from 1,822,000 short tons in 1927-28 to a peak of 1,900,000 in 1930-31, then fell to 1,054,965 in 1932-33. For soy-bean oil, exports rose from 136,000 short tons in 1927-28 to a peak of 170,000 in 1930-31, then fell to 73,379 in 1932-33.

There follows a review of the 1932-33 crop year.

(4) "Manchuria: Exports of soy beans and products by countries of destination, 1931-32 and 1932-33." Each year, statistics are given for soy beans, bean cake, and bean oil. Destinations are: Europe, Leningrad, Japan, China, East Indies, United States, Other, Total. Europe imported the most soy beans, Japan the most soy bean cake, and (in 1931-32) China the most soy bean oil. But in 1932-33 China imported only 31% as much [soy] bean oil as in 1931-32. This was because of the "Manchurian incident" of 18 Sept. 1931, in which Japanese troops occupied Manchuria. In response, in 1932, China boycotted Manchurian goods. (5) "Manchuria: Average monthly price of soy beans and soy bean products at Dairen, in silver yen and United States currency and price of crude soy-bean oil at New York, 1931-32 to 1933-34."

589. *Algemeen Landbouw Weekblad voor Nederlandsch-Indie.* 1934. De sojaboon bij de voeding der Chineezen [The soybean as food of the Chinese]. 18(38):615-17. March 17. [Dut]

590. *Malayan Agricultural Journal.* 1934. Growth of the soya bean industry in America and its effect on the Malayan copra and palm oil trade. 22(3):141-42. March. [3 ref]
• ***Summary:*** "If the importance of copra and oil palm products into the United States is restricted in order to encourage home production of oil-producing crops, it is not improbable that the demand for coconut and oil palm products in the United States will in the future tend to diminish." Address: Malaya.

591. Soesman, F.J.H. 1934. Een economische beschouwing over de kedelee-cultuur op Java [An economic view of the soybean culture in Java]. *Landbouwkundig Tijdschrift, Maandblad* 46(560):416-28. May. [Dut]
Address: Java.

592. Soesman, F.I.H. 1934. De sojaboon, een staatsbelang [The soybean, a vital interest of the state]. *Algemeen Landbouw-Weekblad voor Nederlandsch-Indie* 19(3):41-43. July 21. [Dut]
Address: Java.

593. *Indische Mercuur (De) (Amsterdam).* 1934. Kedelee [Soybeans]. 57(37):573. Sept. 12. [Dut]

594. Adriano, F.T.; Oliveros, S.B.; Santos, D.S.; Villanueva, E.R. 1934. The physical characteristics and chemical composition of various brands of toyo (soy sauce) sold in the Philippines. *Philippine J. of Agriculture* 5(3):171-86. July/Sept. [14 ref. Eng]
• ***Summary:*** Gives detailed descriptions of methods of manufacture of soy sauce, and an analysis of 21 samples (18 from Philippine factories, two from China, and one from Japan). Table 3 (p. 179) gives the brand name, and the name and address of the manufacturer of these 21 sample products. Most Philippine soy sauce is made in and around Manila using traditional Chinese methods, including large earthenware jars with conical, woven bamboo covers; these jars are left in the open for sunning. Most of the soy beans used are imported from China, the yellow variety being the most commonly used. When ready, the "brown liquid is siphoned off with a foot valve made out of bamboo at the intake end of the siphon. The drawn sauce may be boiled, but generally it is bottled without heat treatment to be sold as first-class toyu. The residue is brined and sunned again to obtain succeeding lower grades of toyo. The practice of admixing molasses is widespread. Of the 21 samples analyzed, 12 contained reducing sugars analyzing about 10%.

Toyo is not as widely used in the Philippines as it is in other Oriental countries because in the Philippines there is a counterpart of toyo, the native *patis* (a Tagalog word), which is a high protein extract from brine-fermented small fish and shrimps. But "with the growing consciousness of the real nutritive value of the soy bean as a human food, the increasing popularity of the properly made toyo is assured."

Table 4 gives the physical characteristics and chemical composition of each of the 21 samples tested. The average specific gravity at 28ºC is 1.2624. Total solids: 37.31%. Proteins: 4.56% (N x 6.25). Sucrose: 0.59%. Sodium chloride: 19.90%. Address: Labs. of Agricultural Chemistry, Bureau of Plant Industry, Manila.

595. Castagnol, E.M. 1934. Étude sur la fabrication du lait de soja [Study on the production of soymilk]. *Bulletin Economique de l'Indochine (Hanoi)* 37:982-94. Sept/Oct. [Fre]

• ***Summary:*** About milk fermenting or spoiling. Address: Ingenieur Agronome, Chef de la Division de Chemie de la Section Nord, Institut des Recherches Agronomiques de l'Indochine.

596. *Verslagen van Veldproeven. A, Variteitenproeven (Landbouwkundige Institut).* 1934. Varieteitenproeven met kedelee [Variety trials with soybeans]. A 204-13, A 293-94, A 313-19, A 375-77, A 397-409. [Dut]*

597. Woodhead, Henry George Wandesforde. ed. 1934. China year book. Shanghai, China: North China Daily News & Herald. xxvi + 854 p. Vol. 16. Index. 22 cm.

• ***Summary:*** In Chinese, the title of this book is *Chung-hua nien-chien.* In chapter III, "Soy-beans and bean products are discussed on pages 41-42.

A table (p. 55) shows exports of vegetable oils from China in 1931. In descending order of weight (thousand piculs) they are: [Soy] bean oil 1,463. Wood oil 865. Groundnut oil 814. Unclassified 36. Tea [seed] oil 21. Castor oil 14. Sesamum seed oil 3.

The three most valuable oils in descending order of value (1,000 H. Taels) are: Wood oil 20,416. [Soy] bean oil 16,991. Groundnut oil 12,734.

In Chapter 5, a multi-paged table titled "Principal exports, 1932 and 1933," shows (p. 129): Exports of yellow [soy] beans to Egypt (incl. Anglo-Egyptian Sudan), Formosa, Germany, Great Britain, Hongkong, Italy, Japan, Korea, Netherlands, Netherlands India [Dutch East Indies; Dutch: *Nederlands-Indië],* Philippine Islands, Straits Settlements and F.M.S. [Federated Malay States], U.S.S.R. (Russia) Asiatic Routes, Other countries. The five leading importers of yellow [soy] beans, in descending order of weight imported (in million piculs), are: U.S.S.R. (Russia) 4.479. Japan 3.331. Germany 3.222. Korea 0.759. Netherlands India 0.555. Total: 17.269.

On the same page are exports of beancake to Japan, Korea, Norway, USA, U.S.S.R. (Russia) Asiatic Routes, Other countries. The three leading importers, in descending order of weight imported (in million piculs) are: Japan 5.854. U.S.S.R. (Russia) 2.119. Other countries 1.979.

In Chapter 7, a table (p. 153) shows the foreign and domestic trade at seven major Manchurian ports: Aigun, Harbin, Hunchun, Lung-Chingtsun, Antung, Dairen, Newchwang. Dairen does by far the largest volume of trade, followed by Harbin, then Newchwang.

On page 153 a table shows the quantity (piculs) of [soya] beans, bean oil, and beancake exported from (1) China including Manchuria, and (2) Manchuria alone. For each of the three products and two categories the amount sent to Japan, Europe, and Other countries is given. Europe imports almost all of the bean oil. Other countries get the largest amount of the beans and the beancake.

Also discusses Mongolia: Religious organization (Chapter 4, p. 70-71), including Lamaist Buddhism and "Living Buddhas." Also discusses Tibet (Chapter 4, p. 88-91). This section begins: "Geography: Tibet, sometimes called the 'Roof of the World,' consists of (1) the Lama kingdom of Tibet with its provinces and dependencies; (2) the semi-independent native states of Kam, under Chinese protection; and (3) the Kokonor [Koko-nor / Koko Nur] Territory, under the control of the Chinese Amban [a Manchu word meaning "high official"] residing at Hsi Ling, in Kansu. Note: Wikipedia states (June 2008): "The Qing Emperor appointed the amban in Tibet, who represented Qing suzerainty over the Buddhist theocracy of Tibet, and commanded over 2,000 troops stationed in Lhasa. The chief amban was aided by an assistant amban (Bangbàn Dàchén) and both of them reported to the Qing Court of Colonial Affairs. Their duties included acting as intermediary between China and the Hindu kingdom of Nepal (Ghorkhas Country); a secretary (Yíqíng zhangjing) dealt with native affairs. Three Chinese commissioners (liángtái), of the class of sub-prefects, were stationed at Lhasa, Tashilumbo and Ngari.

"The Qing imperial resident in Tibet was introduced in 1727 and most ambasa [high officials; A Manchu word, plural of amban] were appointed from the Manchu Eight Banners, a few were Han Chinese or Mongol. The Emperors used ambasa to influence Tibetan politics, and the Qianlong, Jiaqing and Daoguang Emperors each decreed that the Dalai Lama and Panchen Lama were bound to follow the leadership or guidance of the ambasa in carrying out the administration of Tibet."

A brief biography of Li Yu-ying (Courtesy name: Shih-tseng) appears on p. 693. Address: 1. B.A., formerly editor of the "North-China Daily News"; 2. M.J.I., Editor of the "Peking and Tientsin Times".

598. Vries, E. de. 1935. Het spoorvervoer van kedelee op Java in de jaren 1931, 1932 en 1933 [The railway transport of soybeans in Java in the years 1931, 1932, and 1933]. *Economisch Weekblad voor Nederlandsch-Indie* 4(7):218-20. Feb. 15. [Dut]
Address: Jakarta, Java, Indonesia.

599. Monnier, Emile. 1935. Les préparations à base de graines de soja dans l'alimentation des Annamites [Preparations based on soybeans in the diet of the Annamites (of Central Vietnam)]. *Bulletin Economique de l'Indochine (Hanoi)* 38:66-86. Jan/Feb. Also in Annales de Medecine et de Pharmacie Coloniales (1935) 33. p. 34-57. [11 ref. Fre]

Address: Chef du Laboratoire de Chimie de l'Institut Pasteur, Hanoi.

600. MacConkey, C.A. 1935. Soybeans. Ottawa, Canada: Div. of Research Information, National Research Council, Ottawa. 93 p. March. 28 cm. [152 ref]

• ***Summary:*** A very important and interesting book. In 1932 the first two sections of this report were prepared; in 1934 the third section was added in order to bring it up to date. Contents: Summary of Part I. Summary of Part II. Summary of Part III. Part I (p. 14): Cultivation, utilization and trade. Introduction. Cultivation: Varieties, differences, maturity, hardiness, color of bean, climate, soil, seeding, harvesting. Production of oil and cake. Applications: Introduction, the plant (forage, hay, pasturage, silage, soilage, straw, soil improvement and fertilizer), the bean (grain, flour, soy sauce, bean curd [tofu], vegetable beans, other uses), the cake (cattle feed, flour, fertilizer, other uses), the oil (general, the soap industry, the paint and varnish industry, the food industry). The soybean industry in the United States: Importance of the crop, history and development (incl. Henry Ford who is said to have 10,000 acres under cultivation), standards (classes of soybeans), production of oil and cake, consumption of soybean oil, export trade in soybeans. Statistics of world trade: Beans (production, exports, imports [statistics, pre-war average {1909-13} + 1926-1931 for Germany, Japan, Denmark, UK and British Empire countries, Dutch East Indies, Sweden, Italy, Formosa, and Holland], consumption [net imports], prices), oil (production, exports, imports, consumption, prices), cake (production, exports and imports). Statistics of the German oil seed industry: Oil seeds in Germany [by far the world's largest soybean importing country and largest European producer of soybean oil] (imports and exports), vegetable oils (production, consumption and value), oil cake and meal (production, imports, exports, consumption and relative values), soybean experiment stations in Germany.

Part II (p. 56): Development in Canada. The difference between growing soybeans for forage and for seed. Present status of soybean cultivation in Canada. The future for soybeans on the Prairies. Extent of Canadian Experimentation. Varieties suitable for Canada. The climates of Manchuria and Canada. Planning the development of soybeans in Canada. Consumption of vegetable oils in Canada by industries. Consumption of oil cakes in Canada. Firms engaged in the soybean industry in Canada. Casein in Canada.

Part III (p. 69): Survey of the Literature, 1931-34. Cultivation. Green manure. Breeding. Germination of seeds. Diseases and parasites. Soil. Manufacture of oil cake. Composition of the soybean. Properties and composition of soybean oil. Feedstuffs. Edible products. Detection in food (e.g. detection of soybeans in wheat flour, pasta, meat products, etc.). Inedible products. Economics. Table (p. 79-80)–Imports of soy products into Canada: Soy sauces (1931-1933), edible peanut and soyabean oil, peanut and soyabean oil for the manufacture of soap and peanut oil for canning fish, soybeans, soyabean cake and soyabean meal for use exclusively in the manufacture of cattle food and of fertilizers. References (102). Other references (Nos. 103-117). References not consulted (35).

The section titled "Development in Canada" (p. 56-62) states: "Soybeans are at present being grown for seed on a commercial scale in southern Ontario, chiefly in Kent and Essex Counties [the Niagara Peninsula]. Prior to 1931 the acreage under soybeans was about 1000 or 1500. The efforts of persons interested in establishing oil mills increased this to about 5000 in 1931 and to 6000 or 7000 in 1932. The average yield of seed has been about 23 bushels per acre, which is quite equal to yields in the U.S., while another variety, the A.K., has yielded at the rate of nearly 40 bushels per acre during a six-year test at Harrow, Ontario."

"T.B. Macaulay, President of the Sun Life Assurance Company of Canada has been experimenting for a number of years on the growing of soybeans in the hopes of being able to make the western farmer more free from his dependence on wheat, and believes that he is near to discovering suitable varieties...

"A statement appearing in the *Montreal Financial Times* (Nov. 18, 1932) reports that a number of varieties introduced from Urbana [Illinois] and tried in various parts of Alberta made an excellent growth of forage...

"The work being carried out at T.B. Macaulay's experiment farm at Hudson Heights, Quebec, is particularly worthy of mention. Here the testing of varieties has been in progress for 8 years. Mr. Macaulay's method of approaching the problem consists in obtaining samples of hitherto untried varieties from the most northerly regions where soybeans grow and the earliest varieties from Asia and elsewhere... Mr. Macaulay has a new variety which he calls Toyanaga. It matures 5 days to a week earlier than the variety called Manchu, which is being grown to a small extent in southern Ontario."

"Varieties suitable for Canada: Besides O.A.C. 211 which is the one outstanding variety that has shown itself suitable for cultivation in Canada albeit only in southern Ontario, a number of other varieties have been tried and experimented with such as Mandarin, Manchu, Wisconsin Black, Quebec 92, Quebec 537, Early Yellow, Early Brown, and Manitoba Brown, but none of these have been very satisfactory."

Table 29 (p. 60) gives a summary of current (1932) Canadian experiments with soybeans: Ontario Agricultural College (Guelph), grown for 39 years (i.e. since 1893), tested 125 varieties. Dominion Experimental Farms (Ottawa and Harrow, Ontario), 9 years, 100 varieties. Macdonald College (Quebec), 20 years, 16 varieties. Manitoba Agricultural College (Winnipeg), 10 years, 12 varieties.

University of Alberta, Edmonton, 3 years, 7 varieties. Brooks (Canadian Pacific Railway Irrigation Experimental Station, Alberta), unknown number of years and varieties. Pointe Platin (Quebec, by J. deLothinière [deLothiniere]), unknown number of years and varieties. Hudson Heights (Quebec, by T.B. Macaulay), 8 years, 100 varieties. University of Saskatchewan, 10 years, 25 varieties.

Page 65 lists "Firms Engaged in the Soybean Industry in Canada." The Soy Bean Oil and Meal Co-operative Company of Canada, Ltd., Chatham, Ontario; Canadian Soyabeans Ltd., Milton, Ontario; The Vitone Co., Hamilton, Ontario; Dominion Soya Industries, 355, Place Royale, Montreal, Quebec.

Note 1. This is the earliest document seen (Jan. 2010) that mentions Dominion Soya Industry, Ltd. (Montreal, Quebec, Canada) in connection with soybeans.

Table 33 (p. 67) gives "Consumption of oilseed cake and meal in Canada" for the calendar years 1926 to 1931. Figures (taken from *Trade in Canada)* are given for cottonseed, linseed, palm nut, soya and total. Consumption of soya cake and meal (in tons) were: 200 in 1926 (0.6% of total); 680 in 1927; 560 in 1928; 1,560 in 1929 (5.0% of the total); 1,190 in 1930; and 2,500 in 1931. The value in dollars role from $8,000 in 1926 to about $50,000 in 1931. Apparently all of this soyabean cake and meal was imported.

Note 2. This is the earliest English-language document seen (Dec. 2005) that uses the term "soyabean meal" to refer to ground, defatted soybeans. Address: Div. of Research Information, National Research Council, Canada.

601. Bolhuis, G.G. 1935. Afwijkende planten in kedelee "Moeara" [Deviant or abnormal plants in the soybean variety "Moeara"]. *Landbouw (Buitenzorg, Java)* 10(10):402-03. April. [Dut]
Address: Algemees Proefstation voor den Landbouw te Buitenzorg, Java.

602. Gay, H. 1935. La culture et les usages du soja [The cultivation and uses of the soybean]. *Revue de Botanique Appliquee & d'Agriculture Tropicale* 15(165):309-24. May; 15(166):447-53. June. [15 ref. Fre]
• ***Summary:*** Contents: Introduction. Geographical area and climatic requirements. The plant and its varieties: Taxonomy, anatomy, physiology. Soybean cultivation: Place in the crop rotation, preparation of the soil, manure and fertilizer, sowing (the seeds, time of sowing, details of sowing), vegetation and the points of [crop] maintenance / management, harvest (of seeds, of forage), grain storage, yields (of seeds in kg/ha {3,500 in Manchuria, 2,700 in China, 1,700 in France, 1,200 in Japan}, of forage in quintals/ha {in America they range from 163 to 168}), enemies. Note: 1 quintal = 100 kg.

Technology of soya: Soymilk (production, properties, uses), soy cheeses *(Fromages de soja,* called "tofu" in Asia), soy oil and cake, soy flour and products made from it (bread, rusks *{biscottes}*, cakes, and pancakes *{galettes})*. Soya as livestock feed: Soya forage, soya hay, soymilk for calves, soybeans seeds and cake.

Economic data: Hectares planted to soya in 1929-30: Northern China and Manchuria (11,800,000), USA (500,000), Japan and Korea (400,000), Russia (300,000), Sunda or Soenda Isles (100,000 ha);

Note: The *Iles de la Sonde* are the islands of the Malay Archipelago divided into two groups: (1) Greater Sunda Islands, comprising Java, Sumatra, Borneo, Celebes, and adjacent islands; (2) Lesser Sunda Islands, comprising the chain of islands east of Bali to and including Alor and Timor, but not Wetar.

Exports of soya from China in 1929-30 (in tons): To Japan 1,700,000, to Europe 1,500,000, to southern China 600,000, to the Netherlands Indies [Indonesia] 100,000, to other countries 100,000. Address: France.

603. Bailey, L.H.; Capen, R.G.; LeClerc, J.A. 1935. The composition and characteristics of soybeans, soybean flour, and soybean bread. *Cereal Chemistry* 12(5):441-472. Sept. Condensed in Soybean Digest. Dec. 1940. p. 4-5. [75 ref]
• ***Summary:*** Contents: Introduction. Acreage, production, and price of soybeans in the United States (Table II shows production in Manchukuo, Chosen [Korea], Japan, and the Dutch East Indies from 1929-1934). Uses for soybeans (incl. in ice cream, ice cream cones, candies, puddings, salad dressings, sausage filler). Chemical composition of soybeans. Processes for the removal of the bitter taste from soybeans. Extraction of soybean oil (by hydraulic pressure, Anderson expeller, or new European solvent process). Yield of oil and meal from soybeans. The method of analysis of soybean flour. Chemical composition of soybean flours: Soybean flour output in the United States, minerals, carbohydrates, quality of the protein, vitamins, lecithin and fats in soybean flour. Soybean flour in the diet: Cost of protein and fat, calcium, and carbohydrates in soybean flour. The use of soybean flour in baking. Effect of enzymes of soy flour on bread: Digestibility of soybean bread, increased absorption claimed for soybean flour, cost of soybean bread. Conclusions.

"The most expensive food constituents are minerals, vitamins, proteins, and fats. Soybeans flour is rich in all of these food constituents and yet relatively cheap. The moderate cost of soybean flour makes it possible for people of small incomes to obtain the maximum of these essential nutritional constituents required by the body which in the form of other foods might be beyond their reach."

"The first successful attempt to prepare a soybean flour which would be free from the disagreeable beany taste, which would remain fresh almost indefinitely (that is, not

develop rancidity), and which would retain, practically unchanged, the original composition of the bean is described in the Berczeller patent (1924). This process consists in subjecting the cleaned soybeans to the action of saturated steam for 10 to 15 minutes. The beans are then dried, cracked in order to remove the hulls, and ground into flour. Such flour has a sweet, pleasant, nut-like taste (a characteristic of most flours obtained from soybeans which have been subjected to a special beany-taste removing treatment) and may be kept for many months without spoilage due to the development of rancidity. A later patent (1932) issued to this inventor consisted in subjecting soybeans (dry or soaked) to steam distillation (see also Berczeller, 1933). In making soybean flour by this process in this country, the beans used, generally the yellow variety, are first treated to destroy insects and insect eggs. The beans are then cleaned or freed from impurities, washed to remove the dirt, and subjected to the patented process. The beans are then dried and passed through cutting machines and the hulls are removed by aspirators and bolting machines. The cut beans are then aerated with warm air and ground in a special air-cooled mill, the fine flour being bolted through a special bolting machine" (p. 446).

Soybean oil mills in ten U.S. states now have a total annual crushing capacity of about 10 million bushels (p. 448).

Tables show: (1) Acreage, production, and average price per bushel of soybeans (1932-33, for 10 leading states and the USA total). (2) Annual soybean production, in bushels, in 5 countries (USA, Manchukuo, Chosen [Korea], Japan, Dutch East Indies, 1929-34). (3) Chemical composition of soybeans (minimum, maximum, and average). (4) Fat and protein content of soybeans grown in 15 different U.S. localities. (5) Mineral content of various legumes and grains (air-dry basis). (6) Composition of the component parts of soybeans (cotyledons, embryo, seed coat). (7) Composition of many soybean flours. (8) Composition of high fat, press cake, and solvent-extracted soybean flours. (9) Composition of solvent-extracted soybean flour and other legume flours (bean, pea, lentil). (10) Mineral content of selected foods, incl. soybean flour. (11) Composition of the mineral portion of grains and other seeds. (12) The composition and the mineral and vitamin content of selected foods. (13) Composition of selected foodstuffs. (14) Retail cost of foods and their components [soybean flour is by far the least expensive source of protein and calcium]. Formula and method for making soybean bread (using 20% soybean flour). Formula and method for making whole wheat bread. (15) Composition of representative flours. (16) Composition of representative types of bread. (17) Correlation of loaf volume and urease content of soybean flour used in making bread. Address: Food Research Div., Bureau of Chemistry and Soils, USDA.

604. *Economisch Weekblad voor Nederlandsch-Indie.* 1935. Kedelee-cultuur en sojabereiding in Atjeh [Soybean cultivation and soy sauce preparation in Atjeh]. 4(42):1650. Oct. 18. [Dut]
• ***Summary:*** Note: Atjeh (also called Achin, Acheen, or Atchin) is a province of Indonesia in northern Sumatra. Its capital is Banda Atjeh. Address: Jakarta, Java, Indonesia.

605. *Bulletin Economique de l'Indochine (Hanoi).* 1935. L'extraction des dérives du haricot "Soya" [The extraction of soybean derivatives]. 38:823-24. July/Oct. [Fre]
• ***Summary:*** From the monthly communication of the French commercial attache in Tokyo. Address: D'apres la chronique mensuelle de l'Attache commercial de France a Tokio.

606. Takeda, Yoshito. 1935. Rhizopus-zoku shijô-kin no kenkyû. III. Nanyô-san Rhizopus-zoku mo bunri gakuteki kenkyû oyobı saidai tôka-ryoku kin no kensaku [A study on filamentous molds of the genus *Rhizopus:* III. Research on classification of *Rhizopus* species from tropical regions and investigation of the microorganisms possessing maximum saccharification capability]. *Nihon Nogei Kagakkai Shi (J. of the Agricultural Chemical Society of Japan)* 11(10):845-920. Oct. [26 ref. Jap]
• ***Summary:*** Contains extensive information on tempeh and onchom. In April and May 1926, samples of tempeh were gathered at Semarang and Medan, shoyu koji and ketjap koji were gathered at Buitenzorg, and ragi was gathered at many places in Indonesia. The tempeh, shoyu koji, and ketjap koji were all found to have *Rhizopus* as the dominant microorganism. But a shoyu koji collected at Semarang was found to have *Aspergillus* as the main microorganism. Address: Taiwan Sôtoku-fu Chûô Kenkyû-jo Hakkô Kôgyô-ka (Central Research Inst., Taiwan Governor General's Office).

607. Associated Press (AP). 1935. Drink soya bean milk. *Detroit News.* Nov. 3. Section I. p. 2, col. 6.
• ***Summary:*** "Singapore. Nov. 2. Asiatic families in Malaya, too poor to buy natural or tinned milk, have invented a palatable beverage made by grinding soya beans to a fine powder and mixing it with sugar and eggs."

608. *Economisch Weekblad voor Nederlandsch-Indie.* 1935. Invoer van sojaboonen, soja en taotjo [Import of soybeans, soy sauce and taotjo (Indonesian-style miso)]. 4(28):1082. [Dut]

609. Merrill, E.D. 1935. A commentary on Loureiro's "Flora Cochinchinensis." *Transactions of the American Philosophical Society* 24(Part II):1-445. See p. 208 (Glycine soja). [9 ref]

• ***Summary:*** "Loureiro clearly described the soy bean. *Cadelium* Rumph (Herb. Amb. 5:388. *pl. 140)* is correctly placed as a synonym. A specimen from Loureiro is preserved in the herbarium of the British Museum. Piper claims that the specific *max* is the oldest valid one for the species whether considered under *Glycine* or *Soja.* However it has only page priority which is not recognized by the International Code of Botanical Nomenclature." Merrill suggests why he uses an artificial device to keep the soybean in the genus Glycine, where it has been for the past 150 years. In 1917 Merrill suggested the name *Glycine max* for the soybean.

610. Rodrigo, P.A. 1935. Soybean culture in the Philippines. *Farmers' Circular (Philippines)* No. 12. *

611. *Verslagen van Veldproeven. A, Variteitenproeven (Landbouwkundige Institut).*1935. Varieteitenproeven met kedelee [Variety trials with soybeans]. Am. 73-98, A. 499-507, A. 528-72. [Dut]*

612. *Verslagen van Veldproeven. B, Bemestingsproeven (Landbouwkundige Institut).*1935. Bemestingsproef met kedelee [Fertilizer experiments with soybeans]. B. 711-712, B. 782-783, B. 922-923, B. 970. [Dut]*

613. *Verslagen van Veldproeven. C, Gruenbemestingsproeven (Landbouwkundige Institut).*1935. Groenbemestingsproeven met kedelee [Trials using soybeans as green manure]. C. [Dut]*

614. *Verslagen van Veldproeven. D, Cultuurmethode- en andere proeven (Landbouwkundige Institut).*1935. Cultuurmethodeproeven met kedelee 1929 t/m 1934 [Cultural trials with soybeans, 1929-1934]. Dienstnota p. 29-39 (niet in de handel). [Dut]*

615. **Product Name:** [Light House brand Soy Sauce, Soybean Jiang, Fermented Tofu].
**Foreign Name:** Jiang-you, Dou-jiang, Furu.
**Manufacturer's Name:** Yeo Hiap Seng.
**Manufacturer's Address:** 410 Outram Road, Singapore 3, Singapore.
**Date of Introduction:** 1935.
**How Stored:** Shelf stable.
**New Product–Documentation:** Letter from Alan Yeo of Yeo Hiap Seng. 1982. April; YHS news release 1990. Oct.; Letter from Charles Yeo of Yeo Hiap Seng. 1984 and 1991. Yeo Hiap Seng started in China in 1900. In 1935, during the Japanese invasion of China, when life was difficult and unsettled in Fukien [Fujian] province, Yeo Keng Lian sent his eldest son, Yeo Thian In, to Singapore to investigate possibilities there. The son founded the Yeo Hiap Seng Sauce Factory at 410 Outram Road, Singapore 3. He was joined shortly by the rest of the family. The company continued to make the same three fermented soy products that it had made since 1900 in China. In 1947 the growing business was moved into larger quarters at 950 Dunearn Road, its present location. The move out of China was a wise one, for in 1949 the three Yeo Hiap Seng plants in Fukien were taken over by the Chinese Communists. By the mid-1940s, Yeo's quality soy sauce was a common sight in Singapore.

Note: This is the earliest known commercial soy product made in Singapore, or in Southeast Asia.

616. Burkill, I.H. 1935. A dictionary of the economic products of the Malay Peninsula. 2 vols. Published for the Malay Government by Crown Agents, London. 2,400 p. See p. 1080-86.
• ***Summary:*** These two densely-written volumes might be described as updates to the works of Sir George Watt. In the Malay peninsula, the soy bean is generally known as *Kachang bulu rimau* or *Kachang jepun* [the Japan bean]. In Java it is called *Kachang kedele, Dele, Gadele, Dekeman,* or *Dekenan;* in Sundanese, *Kachang bulu, Kachang jepun,* or *Kedele;* in Sumatra, *Kachang rimau* or *Kachang ramang;* and in Siam, *Tua luang* or *Tua praluang* [accents are included by Burkill].

"The word 'soy' came from a Japanese name for this plant, through the Dutch, who made it [the word 'soy'] known to Europeans. The first account was a result of the residence of their embassy surgeon, Kaempfer, in Japan, in 1691 and 1692; the second of the long service of their merchant, his contemporary, Rumpf, in Amboina."

The soy bean "is frequently cultivated in Siam, and seems to be a familiar plant in Kelantan [a state of Malaysia bounded on the north by Thailand]. Repeated experiments have been made with it elsewhere in Malaya; the Chinese, indeed, continually make them, usually without success, their failure being conspicuous when any available seed is used, instead of seed of races known to stand more or less tropical conditions. In 1918 advantage was taken of experiments in the Philippine Islands, to try, in Singapore, races which succeeded there and grew well. Races from the warmer parts of the United States were on trial in Selangor [Malaysia] in 1922. In 1924 a Chinese race was successfully grown by settlers in villages in the southern parts of Pahang [a state of Malaysia, bounded on the north by Kelantan and Trengganu].

"The soy bean has long been cultivated in Java, and in recent times this cultivation has become almost universal except at the western end of the island, where the climate is most uniformly humid. Probably it came to Java from India, for the name by which it is most known is Tamil and the seed is flattened as are North Indian races, while the Manchurian races have round seeds. In Java a soy crop immediately follows rice, and this was the rotation

apparently which Spring found the Chinese to use in Pahang."

The seed of the soy bean is rich source of nutrients. It "replaces meat very largely among the Chinese; and as rations for Japanese troops has played a large part." Because the ripe seed contains little or no starch, it is widely used in diabetic diets. "A kind of artificial milk can be made from the seed, and is in common use in Japan and China... This milk has only three-quarters of the full food-value of cow's milk." Soy-bean coffee, made from roasted soy beans, "is sold regularly in Japan, and into the coffee can be put soy-bean milk. The Chinese germinate the beans and eat the seedlings.

Legumin, or vegetable casein is best made commercially from defatted soy beans. The casein is precipitated from the milky fluid [soymilk] by calcium sulphate. "The liquor is strained through muslin, and the precipitate treated with soda lye, which dissolves the casein; filtering gets rid of the impurities and acetic acid precipitates the casein from the filtrate in a more or less pure state. This casein is fit for use in all the industrial processes for which casein from cow's milk is used."

Soy beans can also be fermented to make témpé or "flavourings used in small quantities to make uninteresting dishes appetizing... Témpé is a food product made in Java from soy beans. It occupies a very important place in the diets of those who live in central and east Java." Detailed descriptions are given of two methods of preparation. (1) Initially, the seeds are parboiled then left soaking in water for 2-3 days. The "mush" [sic, cooked beans] is spread upon frames in flat cakes and inoculated with the fungus *Aspergillus oryzae* by the addition of some of the previous preparation. The cakes are wrapped in banana leaves; (2) This method requires greater care and time. "Meanwhile, a preparation of the fungus has been made in a somewhat elaborate manner, as follows: a portion of an older preparation is wrapped in a rather young teak leaf freely punctured with holes; this preparation is allowed to dry for two days, during which the fungus spreads to the teak leaf. Next, the soy-kernel mush [sic, the cooked soybeans] being ready, the teak leaf is emptied of its contents and sprinkled over the mush in order to convey the fungus. The mush is now put up in packets in banana leaves, heaped together, and covered up for twenty-four hours, after which it is exposed again to the air and cooled; the packets are then ready for sale." Note: This is the second English-language work to contain information about tempeh.

"The Chinese, throughout their own country and those domiciled in Malaysia, make a yet greater variety of preparations. Chief among these is teou-fu [tofu, usually precipitated with imported calcium sulphate]. "The 'teo-fu' does not keep well in a moist state, but can be treated for preservation. First, the cakes are colored yellow by a solution of turmeric or Gardenia flowers, then they are wrapped in cotton cloth and submitted to pressure. Thus made drier, they keep better. The use of this preparation is spreading."

The Chinese also make tao-cho and soy kechap (each fermented with an *Aspergillus* mould). K. Heyne describes how kechap is made in Java using black soy beans, hibiscus leaves, and *Aspergillus oryzae* mold. Finally the sauce is boiled with Arenga sugar, star anise, and other flavourings until the solution is so thick that the salt begins to crystallize.

Large amounts of soy-bean oil ("kachang oil" [perhaps soy sauce]) are imported to Malaya. "In the East [East Asia] it is used chiefly as food, but has other uses such as lubricating, varnish-making, making printer's inks, waterproof goods (Chinese umbrellas and lamps) and also for illumination. A process was patented 20 years ago for making artificial rubber, starting with soy oil. Note: Burkill was a British authority on the flora of southern and southeastern Asia.

"Criminal use: The hairs on the pods seem to be capable of causing a certain amount of irritation within the digestive tract. Gimlette (Malay Poisons, ed. of 1929 p. 169) records a case of administration of them with food in a criminal attempt to poison. He calls them a substitute for bamboo hairs in such circumstances.

"Joss-sticks: Ash of the stem, mixed with resin of *Canarium,* is said to make joss-sticks in Indo-China (Crevost and Lemarié, Cat. Prod. Indochine, 1917 p. 106)."

617. van Veen, A.G. 1935. Het B-1 gehalte van voedingsmiddelen [The vitamin B-1 content of foods]. *Geneeskundig Tijdschrift voor Nederlandsch Indie* 75(25):2050-64. [25 ref. Dut; eng]

• ***Summary:*** The vitamin B-1 (anti beri-beri) content in International Units of soybeans *(sojaboonen* or *katjang kedelee;* high), soy tempeh *(tempe kedelee* "prepared by means of fungi from soy-beans;" moderate), and tofu *(tahoe;* low) is given. Address: Geneeskundig Laboratorium, Batavia (Jakarta, Indonesia).

618. Platt, B.S. 1936. An approach to the problems of infant nutrition in China. *Chinese Medical Journal* 50(4):410-24. April.

• ***Summary:*** "Whilst from our information it is found that soya bean milk is very rarely used [for feeding infants in China], much attention has been given to its preparation in various countries in recent years. It was introduced into paediatrics by Rührah in 1909 as a substitute for animal milk in allergic conditions and is still recommended for this purpose. Chinese and American workers have reported satisfactory results in clinical work. In the Dutch Indies good results are claimed using a mixture one part soya bean flour with seven parts of wheat flour. There are preparations marketed in various countries, including one in China at the

present time, in the form of a powder from which by adding water the milk can be reconstituted. A freshly prepared milk can be bought in the local market; and attempts have been made to furnish a daily supply in bottles as is customary with cows' milk. Scepticism was found on a recent visit to exist in the minds of various workers in Malaya and Java as to the value of soya bean milk as a routine infant feed... The Chinese mother is found often to be aware of the property of soya bean milk of causing diarrhoea; whether this is the result of the introduction of bacteria with the milk or to some cathartic action of the soya bean oil still remains to be studied." Address: Dep. of Medicine, Div. of Clinical Research, Henry Lester Inst. of Medical Research, Shanghai, China.

619. Kaltenbach, D.; Legros, J. 1936. Soya: Selection, classification of varieties, varieties cultivated in various countries: Latin America (Document part). *Monthly Bulletin of Science and Practical Agriculture (International Institute of Agriculture, Rome)* 27(5):187T-89T. May.

• ***Summary:*** "14. British Guiana [Guyana]. Soya growing was introduced in 1927. Trials in acclimatisation were carried out by the Agricultural Experiment Stations. There is no cultivation on a commercial scale. Only introduced varieties are grown, the best being Caracas White [perhaps from Venezuela?]. Efforts have been directed towards finding a variety adapted both to forage and seed production. Soya is grown in places where the soil is light. The yields in seeds vary from 1,500 to 2,500 lb per acre.

"15. Dutch Guiana [Suriname]. Soya is grown here solely by farmers from Java. It is not a commercial product and is generally consumed by the producers. The variety grown is one with black seeds which was imported in 1905 by Mr. Van Hall. It is grown in light, sandy soils. An average yield is obtained of 6 to 12 quintals of seed per hectare. Note: 1 quintal = 100 kg.

"The Experiment Station of Paramaribo imported, several years ago, numerous varieties from the United States and Java. The trials in cultivation carried out in the Experiment Garden have shown that none of these varieties give as good results as the variety imported in 1905.

Note 1. This document contains the earliest date seen (March 2001) for soybeans in Suriname, or the cultivation of soybeans in Suriname (1905). The source of these soybeans is unknown, but it may well have been Java.

Note 2. This is the earliest document seen (March 2001) concerning the work of Indonesians (farmers from Java) with soybeans overseas.

"16. Mexico. The first trials in soya growing date back to 1925. Investigations in acclimatisation are now carried out by the Direction of Agriculture in the states of Vera Cruz and Mexico, at the Agricultural School of Ciudad Juarez and in the region of Tuxtepec, State of Caxaca [sic, Oaxaca, in southeast Mexico]." The following varieties have been introduced to Mexico: Virginia, Laredo, Hollybrook, and Mammoth. The first two have given the best results.

Note 3. This is the earliest document seen (Feb. 2009) concerning the cultivation of soybeans in Mexico (one of two documents). This document contains the third earliest date seen for soybean in Mexico (1925), and the second earliest date seen for the cultivation of soybeans in Mexico (1925). The source of these soybeans is unknown.

"17. Peru. Trials in acclimatising soya were first started in Peru in 1928, and have not yet passed the experimental stage. These trials are carried out chiefly by the Experiment Stations of Moquega, Ancash, Piura, Lambayeque and La Molina, at Lima.

Note 4. This is the earliest document seen (May 2009) concerning soybeans in Peru, or the cultivation of soybeans in Peru. This document contains the earliest date seen for soybeans in Peru, or the cultivation of soybeans in Peru (1928). The source of these soybeans is unknown.

"18. Porto Rico [Puerto Rico]. An attempt was made to introduce soya growing into Porto Rico in 1912. Different trials were carried out for establishing this crop, but without success as farmers were not interested in this plant.

"19. Salvador [El Salvador]. In 1932, the government of Salvador imported soya seeds from Brazil for the purpose of acclimatisation. Up to the present the results have not been sufficiently definite for any deductions to be made. In fact, these results are sometimes positive and sometimes negative, without discovering any reason for the lack of success. interesting commercial information on the soybean.

Note 5. This is the earliest document seen (Feb. 2009) concerning soybeans in El Salvador, or the cultivation of soybeans in El Salvador. This document contains the earliest date seen for soybeans in El Salvador, or the cultivation of soybeans in El Salvador (1932). The source of these soybeans was Brazil.

"20. Uruguay. On account of the economic importance soya might have for this country, the Industrial and Forage Plants Section, from the date of its foundation in 1929, undertook an extensive study of this plant. As a point of departure, abundant material was assembled for the purpose of study from all parts of the world. The first trials in cultivation were made with two varieties, Biloxi, which originated from trials carried out in 1925-1926; and a yellow variety of soya which was subsequently recognised to be the variety Mammoth. The Section received, in November, 1929, a large collection from the Plant Production Institute of Leningrad, including 66 varieties. This collection was afterward completed by other varieties from North America and other parts of the world, so that at present the Section has 233 varieties available. In the spring of 1929, the section undertook trials in cultivation and adaptation,... in 1933-1934 of the 233 varieties cultivated, only 28 were retained, so that up to the present, 205 varieties have been eliminated. Of the varieties retained,

only 10 appear to be very promising;... all the soya from seed obtained from Brillmayr [Brillmayer] in Austria and large quantities from the Industrial Plants Institute at Leningrad and from Germany, proved to be quite unsuitable for cultivation in Uruguay. All this shows the fundamental importance of the biological problem of adaptation.

"It may be said that, at present, the varieties of soya best adapted to cultivation in Uruguay are the following: (1) *Varieties cultivated for industrial purposes.*–These are almost all varieties with light coloured seeds, with the exception of 3 varieties in which the colour of the seeds is entirely different from that required by industry, namely, the varieties Biloxi, with brown seed; Hispida Moench Baird with brown seed; Hispida Moench Ednce, with black seed [Note 6. Is this Edna, which had black seed?]. (2) *Varieties suitable only for forage production.*–Laredo and Otootan. Generally speaking, it may be said that according to the investigations carried out by Professor Henry, Chief of the Industrial and Forage Plant Section of Estanzuela, the 4 most important varieties of soya best adapted to environmental conditions in Uruguay, are as follows: Mammoth, Laredo, Linea genetica 4-a, Japonesa." Address: Rome, Italy.

620. Monnier, Emile. 1936. La graine de soja: Les préparations à base de graines de soja dans l'alimentation des Annamites [The soybean seed: Preparations based on soybeans in the diet of the Annamites (of Central Vietnam)]. Marseille, France: Imprimerie Ant. Ged. 106 p. 24 cm. [91 ref. Fre]

• ***Summary:*** The title pages states that tbis is the published version of the author's PhD thesis at the Mixed Faculty of General and Colonial Medicine, and of Pharmacy at Marseille. The thesis was presented and defended before the Faculty of Medicine of Marseille on 10 July 1936 to obtain the degree of Doctor of Pharmacy. The author was born on 19 Nov. 1905, at Sarzeau (Morbihan); he is a *Licencié ès Sciences, Pharmacien-Capitaine des Troupes Coloniales.*

Contents: 1. Introduction. 2. The soybean: Historical summary and overview. Soybean botany, the production of soya; its cultivation in Indochina, soybean commerce and trade, chemical composition of the soybean seed (analysis of soybeans from Tonkin), the chemical constituents of the soybean seed, soy oil, food use of soya in Europe, industrial uses of soya, soya in therapeutics and dietetics. 3. Soy-based food preparations from Indochina: Soymilk, the fermentation and preservation of soymilk, tofu *(dâu-phù),* soy sauce, yuba (La crème de soja, *dâu-phù-chuc).* 4. Conclusion.

621. Kaltenbach, D.; Legros, J. 1936. Soya: Selection, classification of varieties, varieties cultivated in various countries. *Monthly Bulletin of Science and Practical Agriculture (International Institute of Agriculture, Rome)* 27(8):281T-97T. Aug.

• ***Summary:*** Contents: Part 4. C. Asia. IV. Varieties cultivated in various countries (concluded). 1. Ceylon. 2. China and Manchuria. 3. Federated Malay States. 4. India: Punjab, Bihar and Orissa, Burma, Berar, Presidency of Madras, Presidency of Bombay, Bengal and Neighbouring Indian States, Assam, North West Frontier Province, United Provinces. 5. Netherlands Indies. 6. Indo-China (incl. Tonkin, Annam, Laos, Cambodia, and Cochinchine). 7. Palestine.

D. Africa. 1. French West Africa [only Mali]. 2. Algeria. 3. Belgian Congo. 4. Egypt. 5. Morocco. 6. Rhodesia. 7. Anglo-Egyptian Sudan. 8. Tripolitania [later part of Libya]. 9. Tunisia. 10. Union of South Africa.

E. Oceania. 1. Commonwealth of Australia: Southern Australia, New South Wales, Queensland, Victoria. 2. Hawaii. 3. New Caledonia.

"7. Palestine. Soya cultivation is not practised in this country though trials have been made at the Mikweh Israel School at Jaffa, but with very little success. A few variety trials were made in 1935 at the Experiment Station of the Department of Agriculture, but no satisfactory results were obtained."

"2. Hawaii–Soya growing was introduced in 1908 at the Experiment Station of Honolulu. It is grown at present only on a very small scale. Trials in adapting varieties are carried out by the Agronomical Division of the Experiment Station of the University of Hawaii, Honolulu.

"No native varieties are grown. The foreign varieties came from the United States, tbe principal being: Biloxi, Mammoth Yellow, Tokio and a few varieties utilised for green vegetables... The yields vary between 600 and 1200 lbs. of seed per acre."

Note 1. This is the earliest document seen (Dec. 2007) concerning soybeans in Israel (though it was not named Israel until 1948), and Palestine, or the cultivation of soybeans in Israel, or Palestine.

Note 2. This document contains the earliest date seen (Dec. 2007) for soybeans in Palestine / Israel, or the cultivation of soybeans in Palestine / Israel (1935; one of two documents). The source of these soybeans is unknown. Address: Rome, Italy.

622. Kaltenbach, D.; Legros, J. 1936. Soya: Selection, classification of varieties, varieties cultivated in various countries: Burma (Document part). *Monthly Bulletin of Science and Practical Agriculture (International Institute of Agriculture, Rome)* 27(8):284T-85T. Aug.

• ***Summary:*** "4c–Burma. The soya plant is very well known, but is not cultivated on a large scale. The variety grown in the plains of Pe-Ngapi tend to be forked and to resemble the wild form. The varieties cultivated in the hill regions (Shan States) have an erect growth habit and

resemble the types grown in China. Soya is grown in Burma only for local consumption.

"The Experiment Station of Mandalay-carried out work in pure line breeding from 1915 to 1919 and from 1924 to 1928 and similar work is now in progress at the Agricultural Station of Tatkon. Samples of the varieties Pekyat-pyin, Behrum and Santonauk, analysed at the Imperial Institute, London, had the following characteristics: these soyas resemble commercial soyas in respect of composition; they have a very high protein content; Pe-kyat-pyin and Santonauk contain less oil than the Chinese and Japanese varieties; Bechrum is the variety resembling most closely the standard commercial types.

"Regions of cultivation.–This plant is grown on the river banks and islands after the subsidence of the floods, also on sandy up-land soils and in the hill regions and sometimes in rice nurseries after the young rice plants have been removed. Trials in introducing foreign varieties have not been successful. There are three principal native varieties, namely:

"(1) A variety with yellow seed shading to brown in the region of the hilum, round or oval. The unripe seed is greenish. This variety includes 3 sub-varieties; one large, one medium and one small. (2) A variety with greenish yellow seeds shading to brown in the region of the hilum. Green seeds are generally unripe. (3) A variety with dark brown or olive brown seeds shading to black in the region of the hilum.

"Cultivation.–In Burma no crop rotation exists in which soya is included though it is sometimes grown in biennial rotation instead of Mat-pe (Phaseolus Mungo) or Pe-yin (Phaseolus calcaratus Roxb. [Roxburgh]). The seed is generally sown broadcast from July to December when climatic conditions are favourable. After sowing, very little attention is given to the crop. When the young plants are 10 to 15 cm high the soil is hoed in two directions to remove weeds and clear the crop. On inundated land no manure is applied; on other land farm manure is sometimes used. The harvest is cut with the sickle 90 to 100 days after sowing, the seed is trodden out by cattle, the yields are from 200 to 670 lb per acre.

"East central region of Burma.–This region includes, *inter alia,* the Southern Shan States where soya is extensively grown. The area cultivated in 1935 amounted to about 50,000 acres.

"Varieties.–There are two distinct varieties; an early variety called Hto-nang and a late variety called Hto-nao. Both varieties have small seeds, yellow and brown. Varieties from China, Manchuria and India are now being introduced.

"Cultivation.–No precise crop rotation is practised and manure is rarely used. The entire plant is harvested and threshed immediately afterwards. The average yield in the Southern Shan States is about 1000 lb per acre. In the plain of Burma it is 850 lb.

"Circle of Myingyam (Province of Burma).–The cultivation of soya is of no importance and no work of investigation has been undertaken up to the present. Soya is grown chiefly on the banks of the Irrawaddy and Chindwin rivers. The only cultivated variety is a native one, greenish yellow in colour. It occupies no definite place in crop rotation. The seed is sown broadcast on land which has been dug and sometimes harrowed. The yields are about 200 to 250 lb of seed per acre and 1500 to 2000 of forage." Address: Rome, Italy.

623. Kaltenbach, D.; Legros, J. 1936. Soya: Selection, classification of varieties, varieties cultivated in various countries: Netherlands Indies (Document part). *Monthly Bulletin of Science and Practical Agriculture (International Institute of Agriculture, Rome)* 27(8):288T-89T. Aug.
• ***Summary:*** "In Java, the black varieties of soya are predominant; those with light coloured seeds are of importance only in a few districts, namely Tegal, Brebes, Demak, Koedoes, Loemadjang. The majority of native varieties bave black seeds and mature, on an average, in 80 to 90 days.

"It appears that the predominance of black seeded varieties is due to the nature of the soil and extent of the rainfall; the varieties with light coloured seed require more water and therefore are generally found in regions with considerable rainfall, or in irrigated zones. In addition, trade is an important factor in the distribution of varieties.

"Since 1915 seeds of Buitenzorg have been selected in the Selection Garden, and native varieties have been improved. Their distribution throughout the island, from West to East, is as follows:

"Only black seeded varieties are grown in the Regency of Banojemas, Regency of Zuid-Bagelen, Regency of Salatia, Government of Djokjakarta, Government of Soerakarta, Regencies of Madioen and Ponorogo, Regencies of Ngandjoek and Kediri. Attempts are being made to introduce white seeded varieties into the last two sets of regencies. Mostly black seeded varieties are grown in the Regencies of Pati, Grobogan, and Blora (Mentik, black, is the most widely grown variety), and in the Regencies of Bangil and Pasoeroean. Both black and white seeded varieties are grown in the Regency of Pekalongan, the Regencies of Djombang, Madjokerto, and Sidoardjo, and the Regency of Djember. Most of the native varieties have white or light colored seeds in the Regency of Loemadjang (Lumadjang; in East Java), and the Regencies of Demak and Koedoes.

"Improvement trials with native varieties not having been satisfactory, trials were carried out with varieties imported from other countries and particularly from Japan, Formosa, and the United States. On the other hand, the Formosa varieties have been successful, and it is from these varieties that the selected varieties No. 27 with black seeds,

No. 29 with white seeds were obtained. As has already been said, these varieties are now grown throughout the whole island.

"In 1928, the Selection Station again undertook breeding work with native varieties. With the help of experts, 82 samples of soya seed have been collected from various centres of cultivation; 52 being black, 38 white, and 2 green. Comparative trials in cultivating these varieties are being carried out at present at Buitenzorg.

"Table XXVII indicates the characteristics of the 5 principal improved varieties, bred from varieties introduced from Formosa.

"In the course of trials all the selected varieties have proved to be superior to the native varieties. Varieties No. 27 and No. 29 are superior to No. 16 and No. 17. The black seeded variety No. 27 is the best of all.

"In other parts of the Netherlands Indies, native varieties with black or white seeds and either early or late are generally grown: but in certain districts selected varieties are being increasingly cultivated, No. 27 in particular. It gives a yield higher by 3 to 5 quintals than those of native varieties, unfortunately it is not early (growth period: 90 to 95 days). The cultivation of Nos. 17-28-29 is also increasing, chiefly No. 29. These varieties give high yields, but the seeds are considered too small." Note: 1 quintal = 100 kg. Address: Rome, Italy.

624. Kaltenbach, D.; Legros, J. 1936. Soya: Selection, classification of varieties, varieties cultivated in various countries: Indo-China (Document part). *Monthly Bulletin of Science and Practical Agriculture (International Institute of Agriculture, Rome)* 27(8):289T-91T. Aug.

• ***Summary:*** "Soya growing has been practiced in Indo-China from a very long period. The date of introduction is unknown. Though fairly widespread, this crop rarely occupies large areas and is grown by small farmers.

"Principal regions of cultivation: Tonkin.–Soya growing extends over the whole delta and a part of the mountain region, particularly in the province of Langson. The area occupied by soya may be estimated approximately at 15,000 to 20,000 hectares.

"Annam.–Grown chiefly in the north in the province of Thanh-Hoa and Nghe-an, Hatinh, where it occupies an area of about 750 hectares. In the Centre and South, it is not extensively grown (about 170 hectares).

"Laos.–Grown on a small scale in almost all the provinces. The area under cultivation cannot be ascertained.

"Cambodia.–Cultivated in the provinces of Kanda, on the banks of the Mekong over an area of about 500 hectares.

"Cochin-China.–Of little importance. Soya is grown in the provinces of Baria, Thudaumot and Chaudoc. Information on the area is unobtainable.

"Varieties of soya cultivated in Indo-China.–There is a strong resemblance between native varieties, all have small oval seeds, sometimes white, and sometimes darkened round the hilum. Not all local types have yet been distinguished. The Langson type, however, has acquired a special reputation. As to foreign varieties, several have been introduced recently from Russia, Japan, America, and China. Various breeds from Manchuria had been tried previously, but they have not supplanted the local breeds.

"Work on soya is carried out in the following experiment stations: Institute of Agronomical Research.–Northern section: Hanoi. Southern section: Station of Ong-Yem. Agricultural Services of Tonkin.–Practical School of Tuyen-Quang. Agricultural Services of Cambodia.–Station of Petit-Takeo.

"The qualities required in the new varieties are as follows: high yield, larger seeds, while maintaining the yield in oil and the content in nitrogenous substances, which are fairly high in the local breeds, regularity of production." Address: Rome, Italy.

625. Kaltenbach, D.; Legros, J. 1936. Soya: Selection, classification of varieties, varieties cultivated in various countries: India–Berar, Presidency of Madras, Presidency of Bombay, Bengal and neighbouring Indian States, Assam, North West Frontier Province, and United Provinces (Document part). *Monthly Bulletin of Science and Practical Agriculture (International Institute of Agriculture, Rome)* 27(8):283T-85T. Aug.

• ***Summary:*** "4. India. 4d. Berar: Studies on soya cultivation were undertaken in 1927 and are still in the experimental stage. These investigations are made by the Government Farm of Nagpur. Soya is grown in certain places in the districts of Napgpur and Akola. The areas cultivated are not known. There are no native varieties. The foreign varieties are: Nos. 49-53-57-59. In respect of forage production, the plant must be early and prolific to compete with other leguminous crops. Soya does not yet enter into crop rotation, but it might do well in a rotation including cotton. The yields are about 1200 lbs of forage and 500 lbs of seed per acre.

"4e. Presidency of Madras: Soya growing has been studied at the Agricultural Research Stations of Adurai, Maruteru, Hagari and Nandyal, Samalkota.

"Research work at Adurai.–Started in 1932. Cultivation is still in the experiment stage and has not developed greatly on account of the fact that the market is not organised though numerous varieties grow extremely well in the soils of the Tanjore delta. Studies at present are limited to variety trials. There are no native varieties, but 25 varieties have been introduced 17 of which have flourished. The growth period is from 3 to 6 months. The land utilised at the Adurai Station is rice land formed of alluvial deposits from the river Cauvery. Soya is now being tried in crop rotation with rice and it is proposed also to cultivate early soyas as a first crop from June to September in rice land before planting

rice in September-October. The seed is sown broadcast on land which has been dug and is afterwards turned under either with the harrow or a light wooden plough. From 10 to 20 lbs of seed is sown per acre. Harvesting takes place when the plants have begun to lose their leaves and the ripe pods are yellow or yellowish-brown. The yields are from 1500 to 2000 lbs per acre.

"Research work at Maruteru.–Soya cultivation was introduced in 1932. As far as is known there are no native varieties. The varieties introduced are: Burma, Pe-Ngapi, Kachin, Behrum."

"Research work at Hagari and Nandyal.–Soya growing was introduced into this region in 1932-33. Cultivation trials carried out by the Research Station were not very successful."

"Research work at Samalkota.–Soya was introduced at the Samalkota Experiment Station in 1932. 5 American and 2 Burmese varieties are being tested. The best results have been obtained with the varieties Pe-Ngapi and Behrum (Kachin). Up to 1935, this crop hardly existed outside the limits if the experimental farm. In 1936 a few seeds were distributed for trial in the district... In rich irrigable soils, soya may yield from 1000 to 1500 lbs. per acre."

"4f. Presidency of Bombay. This leguminous plant was introduced for the first time in 1932 by the Stock-breeding Expert, but for the purpose of replacing animal proteins in poultry feeds. Soya is now on trial on about 50 acres in the districts of Poona, Nagar, Satara, Sholapur and Ratnagiri with a view to determining the yields in these localities. Trials are made also at the Northcote Stock-breeding Farm at Charodi (district of Ahmadabad), the Poultry-breeding Farm of Kirkee (district of Poona) and the Government Stock-breeding Farm of Bankapur (district of Dharwar). Trials are made with 6 varieties bought from Calcutta.

"4g. Bengal and neighbouring Indian States. It is believed that soya was introduced by the Chinese in remote times. It does not receive any particular attention, the only investigations known have been carried out at Sabour. At the Government Farm at Kalimpong variety trials have been made with 9 or 10 distinct varieties only the majority of which have now disappeared.

"The principal regions of cultivation are: Nepal, Bhutan, Sikkim and the north of Bengal (district of Darjeeling [in India]). In the Darjeeling district, as in the three independent States mentioned above, the areas cultivated amount to about 20,000 acres. The following are the 5 principal varieties: small pale yellow, medium white, large brown, small brown, green... The varieties with large seeds are always preferred." Note: This is the earliest document seen (July 2006) concerning soybeans in Bhutan, or the cultivation of soybeans in Bhutan. This document contains the earliest date seen for soybeans in Bhutan, or the cultivation of soybeans in Bhutan (June 1936; one of two documents). The source of these soybeans is unknown.

"4h. Assam. Soya was introduced in 1913, but so far no research has been effected. It is grown on about 5 acres at the Government Experiment Farm at Upper Shillong, near Shillong, also in the districts of Khasi and Jaintia Hills, but no information is available on the areas cultivated.

"4i. North West Frontier Province. None of the trials carried out for introducing soya into this province have been successful. The crop is invariable attacked by *Rhizoctonia Solani* Kuhn and no efficacious remedy has been found. Note: This is the earliest document seen (July 2006) that clearly refers to soybeans in Pakistan, or the cultivation of soybeans in Pakistan–though the cultivation was not successful.

"4j. United Provinces. Soya is hardly cultivated at all and is confined to a few districts situated at the foot of the mountains. It is found in the Almora hill regions up to an altitude of 5,500 feet. It is a crop that should be grown in the rainy season on very poor soils. The forage, harvested in November-December before complete maturity, is excellent for all farm animals."

Note: Each of these places were former provinces of British India. Berar in west India has been part of Maharashtra state since 1960. Presidency of Madras in southeast India on the Coromandel Coast is now the state of Tamil Nadu. Presidency of Bombay in west India was divided in 1960 into Gujarat and Maharashtra states. Bengal in northeast India is now a region encompassing West Bengal (India) and Bangladesh. Assam in far eastern India is now a state. North-West Frontier Province became a province of Pakistan in 1947. United Provinces (of Agra and Oudh) became the Indian state of Uttar Pradesh. Note: Madhya Pradesh was formerly named Central Provinces and Berar. Address: Rome, Italy.

626. Kaltenbach, D.; Legros, J. 1936. Soya: Selection, classification of varieties, varieties cultivated in various countries: Africa (Document part). *Monthly Bulletin of Science and Practical Agriculture (International Institute of Agriculture, Rome)* 27(8):291T-95T. Aug.

• ***Summary:*** "1. French West Africa: Trials were carried out in 1923 and 1926 at the Experiment Station of Soninkoura [probably Soninnkoura in the Segou region of Mali] with very little success; hence soya growing is not extensively practised. In 1935, trials were started again at the Banankoro Station (probably in Mali), but the results are not yet known. The only variety cultivated is Soja Hispida, the crops being used as green manure for the rice fields and for fuel oil production." Note: This document contains the earliest date seen for soybeans in Mali, or the cultivation of soybeans in Mali (1923; one of two documents). The source of these soybeans is unknown.

"2. Algeria: Soya is not cultivated in this country though a few trials were carried out which showed that it would be possible to grow this crop in easily worked soils if

kept sufficiently cool in spring. Following large scale trials at the Agricultural Institute of Algeria, near Algiers, it was noted that only small harvests were obtained in a dry year. This plant cannot be grown on the coast where similar crops, such as haricot beans, chick peas and lentils are grown. A few soya plants may be found in the collections of the Botanical Garden, the Botanical Station and the Agricultural Institute. In the future soya may perhaps be grown to a certain extent among the irrigated crops of the Chelif.

"3. Belgian Congo: Observed about 30 years ago [i.e. about 1906] at Stanleyville by Commandant Lemaire, soya is found in the collections of the Eala Botanical Garden and was the object of experiments made at Sankuru in 1914-1915. It may appear strange that the cultivation of this leguminous plant has not developed to a greater extent in the Belgian Congo, all the more in that it has been introduced into West Africa, especially into Southern Nigeria, the Gold Coast [later Ghana] and Sierra-Leone.

"The oil content is as follows: Nigeria: 19.62%–Gold-Coast: 21.29%–Sierra Leone: 23.2%–Gambia: 17.5%.

"Among varieties grown in the Eala Botanical Garden mention may be made of a yellow variety, a purple, and the variety Otootan. Analysis has shown that they are as rich in total nitrogenous substances and oil as the soyas of West Africa and Cambodia. Note 1. This document contains the earliest date seen for soybeans in the Belgian Congo (renamed Zaire in 1971), or the cultivation of soybeans in the Belgian Congo (about 1906). It is not absolutely certain that the soybeans were being cultivated at Stanleyville. The source of these soybeans is unknown.

"4. Egypt: Soya growing was introduced into Egypt in 1910. This plant is cultivated at present only on a small scale and chiefly for experimental purposes. Trials have been made of different varieties principally at the Higher School of Agriculture and Agronomical Sections of the Ministry of Agriculture. Cultivation is confined to a small district of the province of Giza.

"There are no native varieties. Among introduced varieties, the following have given certain positive results: Mammoth Yellow, Virginia, Manchu, Biloxi, Tokio and Hispida. Note 2. This document contains the second earliest date seen (April 2004) for soybeans in Egypt, or the cultivation of soybeans in Egypt (1910). However Egyptian documents from 1912 and 1913 state clearly that soybeans were cultivated in Egypt in June 1911.

"Soya is a summer crop. When grown for forage it is cut in August when flowering has begun; when grown for seed, harvesting takes place in September or October. The average yields obtained per acre are: 6 tons of green forage and 400 to 600 kg. of seed. Note 3. This document contains the earliest reference seen for the cultivation of soybeans in Egypt.

Madagascar: Soybean culture was introduced in 1911 and various trials have been carried out. Note 4. This document contains the earliest date seen for soybeans in Madagascar, or the cultivation of soybeans in Madagascar (1911) (one of two documents). The source of these soybeans is unknown.

"5. Morocco: Soya growing is still in the experimental stage in Morocco where trials have been carried out for about 15 years [i.e., from about 1921]. Cultivating has not developed owing to the low yields obtained and also to a tendency to shedding shown by the majority of varieties so far tried out–a tendency which appears to be somewhat increased by the climatic conditions of Morocco.

"Trials in acclimatisation with new varieties have been carried out in Morocco by the Agricultural Service, the Central Station of Rabat and other Experiment Stations of the Protectorate.

"There are no native varieties. The foreign varieties were obtained chiefly from Canada and Manchuria. Qualities required are: (1) pods which do not shed the seed; (2) adequate productivity." Note 5. This is the earliest document seen (Aug. 2009) concerning soybeans in Morocco, or the cultivation of soybeans in Morocco (one of two documents). This document contains the earliest date seen for soybeans in Morocco, or the cultivation of soybeans in Morocco (about 1921). The source of these soybeans was chiefly Canada and Manchuria.

"6. Rhodesia: Trials in acclimatisation have been carried out for a certain number of years at the Experiment Station of Salisbury and all the best known varieties have been tested. Several of these varieties, such as Otootan, Otoxi and Bilton [sic, Biltan], give excellent results as forage crops. The two best lines have been obtained by breeding from Otootan. They are rather more productive than their parent, but, on account of their black seeds, are not suitable for industrial purposes. The only variety recommended for export is Hermann, with yellow seeds.

"Several crossings have been made between lines with pods which do not shed but which are otherwise inferior in quality, with a view to obtaining varieties suitable for Southern Rhodesia where, owing to drought or reasons yet unknown, the pods have a marked tendency to open." Continued. Address: Rome, Italy.

627. Kaltenbach, D.; Legros, J. 1936. Soya: Selection, classification of varieties, varieties cultivated in various countries: South Asia (Document part). *Monthly Bulletin of Science and Practical Agriculture (International Institute of Agriculture, Rome)* 27(8):281T-83T. Aug.

• ***Summary:*** 1. Ceylon. "The various Experiment Stations have made trials in soya cultivation in several parts of the island. The results not having been satisfactory, no further attempts have been made to introduce this crop."

3. Federated Malay States. "The area devoted to soya growing is very small, is entirely in the hands of the Chinese and is situated in the most isolated districts. Experiments in acclimatisation have been carried out from 1926 to 1932 by the Department of Agriculture with various varieties introduced from Burmah [sic, Burma], Siam, the United States, Japan and the Philippine Islands, also with a local Chinese type. Good lines have been bred from the local type, though the highest yields and the best lines have been obtained by breeding from the variety introduced from Siam.

"High yields have only been obtained by intensive cultivation, and the cultivation of local soya cannot compete with that of more remunerative leguminous plants."

Note: *Webster's New Geographical Dictionary* (1988) defines the Federated Malay States as a former federation of the states of Pahang, Perak, Selangor, and Negri Sembilan at the southern extremity of the Malay Peninsula. Capital: Kuala Lumpur. Federated 1895. Joined Federation of Malaya 1948; joined Malaysia 1963. Address: Rome, Italy.

628. Kaltenbach, D.; Legros, J. 1936. Soya: Selection, classification of varieties, varieties cultivated in various countries: Punjab, Bihar and Orissa, India (Document part). *Monthly Bulletin of Science and Practical Agriculture (International Institute of Agriculture, Rome)* 27(8):283T. Aug.

• ***Summary:*** "4. India. 4a. Punjab. Soya is practically unknown as a crop though, in the course of the last few years a certain number of farmers have given it a trial with the result that it has been introduced into the Punjab on a very small scale. It does not appear that it will ever be of any importance here. No work of experimentation or research has yet been carried out with the exception of a few variety trials made by certain experiment farms during the last few years. The Botanical Experiment Station of Lyallpur and the Sub-Station of Ludhiana have also carried out a certain amount of botanical research. There are no native varieties; the two varieties recently introduced are 'Yellow' and 'Chocolate.'

"4b. Bihar and Orissa. Soya is cultivated on only a very small scale on the plains of Bihar and Orissa, though trials carried out since 1918 have shown that it might be satisfactory on the plateau of Chota Nagpur. This crop has not yet been adopted by farmers in the Province, though efforts have been made to encourage its diffusion; hence it is grown only in the Government farms. There is only one native variety: Mirjanhat. The variety introduced is Black Mottled Java which grows well in the alluvial soils of the Indus-Ganges plain. Crop rotation as practised at the Experiment Farm of Kanke is as follows... Black Mottled Java is an early variety, ready for harvesting at the end of August. The variety Mirjanhat is late and cannot be cut before November. The yields are about 100 *maunds* of green forage and 12 *maunds* of seed per acre.

Note: Each of these places were former provinces of British India. Punjab in northwest India was divided in Aug. 1947 into East Punjab (with 1/3 the area and ½ the population of the original region) which became a province of India (capital, Chandigarh), and West Punjab, which became a province of Pakistan (capital, Lahore). Lyallpur (later renamed Faisalabad) was in Punjab, Pakistan, after 1947. Ludhiana was also in Punjab, but in northwest India near the Sutlej River.

Bihar and Orissa in west India was divided in 1936 into two provinces. Address: Rome, Italy.

629. Kaltenbach, D.; Legros, J. 1936. Soya: Selection, classification of varieties, varieties cultivated in various countries: Africa (Continued–Document part II). *Monthly Bulletin of Science and Practical Agriculture (International Institute of Agriculture, Rome)* 27(8):293T-95T. Aug.

• ***Summary:*** Continued from page 293T. "7. Anglo-Egyptian Sudan: Trials in acclimatisation are carried out chiefly at the Experiment Station of Gezira and by the Agricultural Research Service of Wad-Medani.

"Trials carried out at Gezira: Soya growing was first introduced at the Gezira Station in 1931-1932. No native varieties are grown, all have been introduced either from the United States, the Union of South Africa or India...

"In general, the following observations may be made: The Indian types of soya grow better than the American or South African. The variety Poona Black is the best, followed by Kalimpong Brown Small. The variety Barberton showed very poor growth. Among American varieties Otootan was the best, then Biloxi and Virginia. The varieties Mammoth Yellow, Mammoth Brown, Illini and Haberlandt gave fairly good results. Mansoy and Easycook 17 failed completely. The others gave very mediocre results.

"Trials carried out by the Agricultural Research Service of Wad-Medani [a city located in East Central Sudan on the Blue Nile River, as of Aug. 2009]: Trials carried out since 1912 have shown that the climate of the central region of the Anglo Egyptian Sudan is completely unfavourable to soya cultivation.

"The following varieties were introduced during the course of trials: In 1912 varieties were introduced from India and South Africa... In 1916 varieties were introduced from the United States:... In 1931 varieties were again obtained from America:... As has already been said, all the trials showed that this region was not at all suitable for soya cultivation.

Note 1. This document contains the earliest date seen for the cultivation of soybeans in the Sudan (1912). The source of these soybeans was India and South Africa.

"8. Tripolitania [later part of Libya]: Soya growing has not yet emerged from the experimental stage. Investigations

have been made at the Royal Experimental Agricultural Institute of Sidi Mesri. It may be said, however, that soya growing for seed production will not be practised generally, as this is only possible in irrigated regions involving high costs." Note 2. This is the second earliest document seen (Aug. 2009) concerning soybeans in Libya, or the cultivation of soybeans in Libya. The earliest is by Vivenza (1928).

"9. Tunisia: Trials with varieties of soya have only been made with a view to cultivation for forage. At present soya growing is of no practical importance in Tunisia.

"10. Union of South Africa: The various Agricultural Experiment Stations in the Union of South Africa have tested about 50 varieties of soya introduced from the East and United States. The differences between these varieties lie chiefly in the following characters: Colour of the seed coat, colour of the flower, existence or absence of pubescence, colour of the cotyledons, shape of the seeds, size and colour of the hilum, characters of the pods, duration of growth period (varying from 100 to 150 days), height and growth habit of the plant, size and shape of leaves.

"It was observed that two varieties gave entirely different results and that, consequently, there was a possibility of obtaining a variety adapted to the particular climatic conditions and to the utilisation required. Table XXVIII, taken from the publication of F.M. Du Toit, on soya growing in the Union of South Africa *(Soy Beans in the Union,* Pretoria, 1932) gives the characteristics of the 8 most important varieties in the Union." Address: Rome, Italy.

630. Morse, W.J. 1936. Soybeans in the United States: In relation to world production and trade. *Proceedings of the American Soybean Association* p. 55-64. 16th annual meeting. Held 14-16 Sept. in Iowa. [2 ref]

• ***Summary:*** The slow advance of soybean "cultivation in Western Countries was undoubtedly due to the lack of adapted varieties for various soil and climatic conditions. Increase of acreage and production in the United States is closely correlated with the introduction of varieties from the Orient. In less than thirty years the acreage of soybeans in the United States has increased a hundred fold–from about 50,000 acres in 1907 to nearly 5½ million acres in 1935. During this period the United States Department of Agriculture has brought about 10,000 introductions of soybeans from the soybean regions of the Far East and the culture of the crop has spread from a few states in the early days to twenty-seven states at the present time.

"In Manchuria, often called 'the land of beans,' the soybean is grown to a greater extent than in any other country. It occupies about 25 per cent of the cultivated area and is relied on by the Manchurian farmer as a cash crop. With its rise as an international trade commodity, it is truly the 'Wealth of Manchuria.' Chosen [Korea] and Japan are large producers and southward from China the soybean is cultivated to some extent in India, Siam [later renamed Thailand], the Philippines, Cochin China, and during the past decade the production has nearly doubled in the Dutch East Indies. In Siberia extensive experiments have been under way to extend the cultivation of the crop but progress has been slow and Siberian beans have not yet been a factor in international trade.

"The production of soybeans in the Western World is concentrated largely in the Corn Belt States of the United States. Beginning with the experiments of Haberlandt in Austria in 1877, the soybean has been grown experimentally in most of the European countries but in general the climatic conditions are not well suited to its culture with the possible exception of certain regions, such as the Ukraine in the U.S.S.R. Varying degrees of success have been obtained in different regions of Africa, especially South Africa where yields of 25 to 35 bushels per acre have been obtained. Experiments in nearly all South American countries and Mexico have shown some successful results [as] in Argentina and Cuba but acreage is not extensive. In Canada, considerable interest had been shown in the crop but its culture–about 15,000 acres–is confined chiefly at present to the Province of Ontario. The future trend of the crop for commercial purposes undoubtedly will be concentrated largely in the United States, Canada, and certain regions of the U.S.S.R."

A table (p. 56) shows the increase in production of soybeans (in million bushels) during the 10-year period from 1925 to 1935 in the world's top five producing countries: Manchuria 92.67 -> 140.4. United States 5.190 -> 39.64. Chosen (Korea) 18.72 -> 21.96. Japan 18.31 -> 13.31 (1933). Netherland India [later Indonesia] 3.536 -> 6.676 (1934).

"Bean trade was an ancient and flourishing institution when the ports of China were first opened to tbe commerce of the Western World. In 1835, Newchwang (Yingkow, Yingkou), in South Manchuria, was an important port of shipment for the great coastal trade in beans, bean cake, and bean oil to the ports of southern Chinese provinces and other oriental regions. Manchuria is still the chief source of world trade in soybeans and from here the beans and bean products oil and cake move principally to other provinces of China, Japan, the Philippines, the East Indies, and to other countries of Northwest Europe. In 1908, about 7,000,000 bushels of beans were shipped out through the port of Dairen, chiefly to Chinese and Japanese ports. For the period 1925-1929, the average annual shipments to China, Japan, and European countries were 62,353,566 bushels. The first successful shipment from Manchuria to Europe was made to an English oil mill in 1907, and as an important source of vegetable oil and animal feed the beans soon found a market not only in English oil mills but in

other European countries and America. Since 1931, when American-grown soybeans were first exported to European markets, chiefly to the oil mills of Germany, there has been an open European market to the American farmer. With economical methods of production and high quality beans, America is in a position to compete for the 50,000,000-bushel trade in European markets."

Two tables (p. 58) show international imports and exports of soybeans by major trading countries for an average 5-year period (1925-29) and for 1934. The leading importers in 1934 (preliminary, with imports in million bushels) are: Germany 33.57. Japan 20.29. Denmark 9.910. United Kingdom 6.615. Netherlands 4.695. Sweden 3.426. Italy 0.739. United States 0.006. The leading exporters in 1934 are: Manchuria 44.21 (down from 62.35 in 1925-29). Japan 0.025. Netherlands 0.0009.

"In recent years, the oil milling industry of Manchuria has declined quite markedly. During the height of processing beans for oil and cake, more than 90 mills were in operation, while late in 1930 not more than 25 mills were crushing beans. The decline in this industry has been due chiefly to a decreased demand for bean cake as fertilizer, the low price of silver, and almost the entire suspension of bean oil export due to the development of the oil extraction industry in Europe. In European countries it has become more profitable to import soybeans than to import bean oil."

Two tables (p. 59) show international imports and exports of soybean oil by major trading countries for an average 5-year period (1925-29) and for 1934. The leading importers in 1934 (preliminary, with imports in million lb) are: Netherlands 44.00. Belgium 27.60. United Kingdom 24.13. Austria 22.07. Morocco 20.28. Sweden 12.55. Also listed are: Norway 8.701. Algeria 0.004. The leading exporters of soybeans in 1934 (preliminary, with imports in million lb) are: Manchuria 122.6. Denmark 41.80. Netherlands 26.05. Germany 24.99. Sweden 8.98. Japan 7.95 United States 2.040.

"Practically all exports of soybean cake and meal have originated in Manchuria and average about 1,375,000 tons for the five-year period 1926-31. About 70 per cent of this exportation went mainly to Japan, Chosen, and China. Cake and meal shipments to European countries went chiefly to Germany, although considerable quantities were exported to Denmark, Sweden, the Netherlands, and Finland. The average importation of soybean meal and cake into the United States for the five-year period 1930-1935 was 31,726 tons."

"Tbe rise of the soybean to a crop of special importance in the world's commerce and in the industry of the United States is one of the most remarkable agricultural developments of recent times." Address: Bureau of Plant Industry, USDA, Washington, DC.

631. Hermano, A.J. 1936. Soybeans a national food for Filipinos. *Agricultural Life (Exponent of Philippine Agriculture and Allied Industries)* 3(9-10):21-23. Sept/Oct.
• ***Summary:*** Rice is the chief staple food of the Filipinos. But the local diet would be improved by the addition of soybeans and their products. In April 1934 the Nutrition Research Laboratory, Bureau of Science, began to manufacture soybean milk. The method is described, the milk was used with good results in experiments with school children in Paco. Presently 8 liters/day of soybean milk are prepared for the Tondo and San Nicolas Community Health Social Centers.

The article concludes: "Various soybean products, like 'tokua' [tofu], 'toyo' or sauce, 'tahore' 'toho' 'tohu' and other products made by the Chinese are prepared in rather simple ways and could be easily made by the Filipinos."

Note: This is the earliest English-language document seen (Feb. 2007) that contains the word "tahore" which probably refers to fermented tofu. Address: Chief, Nutrition Research Lab., Bureau of Science [Manila, Philippines].

632. *Nature's Path to Health (Melbourne, Australia).* 1936. Remarkable dietary properties of the soybean. Nov. 15. p. 8.
• ***Summary:*** Gives a brief history of the soybean and an overview of its nutritional benefits. "For 5,000 years the Soy Bean has replaced meat, eggs, and milk in the diet of millions of vegetarian Chinese. It has also been used for food in Japan, Indo-China, Siam and India. The Chinese make practically no use of dairy products, and use very little meat, yet they have lived for centuries in a state of prolific vigor on what appears to be a remarkably well-balanced diet by the use of the Soy Bean." Mentions soy bean flour and soy bean curd.

"Dresden, Germany–Dr. Ragnar Berg, famed city hospital food scientist, who wrote the Dictionary of Foods, recently conducted fundamental researches on protein requirements and found that Soy Beans are a splendid source of protein."

"Due to its content of lecithin and phosphorus, the Soy Bean is a nerve and brain food which is especially valuable in cases of neurasthenia for increasing nerve and brain energy."

633. International Institute of Agriculture (IIA). 1936. Use of leguminous plants in tropical countries as green manure, as cover and as shade. Villa Umberto I, Rome: IIA. 262 p. See p. 124-25, 130-31, 209-10. Index. 24 cm. [50+* ref]
• ***Summary:*** In the Belgian Congo, Lupins and *Soja hispida* are practically the only plants used in Kivu as soil improvers in coffee plantations. *"Soja hispida* was introduced in 1931, it gives very good results in the coffee plantations as green manure. This plant yields 25,000 kg. of green material per hectare, and sows itself in such a degree

as to ensure the establishment of the crop. It gives results even in districts where the lupin will not grow" (p. 124-25).

Page 131 notes, in the chapter on "Tea," that in about 1905, on the suggestion of Dr. H.H. Mann, the first Scientific Officer employed by the India Tea Association, Mr. Claud Bald of Tukvar Tea Estate, Darjeeling [as of 1994 in West Bengal, India], introduced *Glycine soja* as a green crop in the hill districts. It is listed as one of the leguminous plants (ground crops) now commonly used for shade and green manure in tea cultivation.

Pages 209-10 describe the use of *Glycine max* Merr. in 10 tropical countries: "India: In Assam, it is grown as a garden crop in the hills, has been tried as a green manure for sugarcane in limed soil with success. It is used as a rotation crop with sugarcane, and also as a green manure in Bihar. In Patna, it is cultivated as a fodder crop and green manure plant, grown in rotation with spring cereals. In the United Provinces, it is sparingly cultivated for its pods which are used as green vegetable. Introduced within comparatively recent times into Bombay; not used as a green manure, established in an acclimatisation station, but has not got beyond that stage of introduction. Only sparingly cultivated in Punjab for its fruit, not used in any other way. Grown only for seed in Burma, never as a cover or green manure plant, date of introduction unknown, probably indigenous. Used for green manuring of tea in the Darjeeling districts. At Tocklai, the plant was found to do best in shady places; it is considered very effective in keeping down weeds and preventing soil erosion.

"Ceylon: A white-seeded variety is reported to have made good growth at Peradeniya, but on another occasion, the crop was completely destroyed by Kalutara snails.

"Netherlands Indies: Has long been cultivated in Java, and is now almost universally grown in the drier parts of the island. It is to be recommended as a green manure for rubber and also for perennial plants. Experiments are being carried out on its use as a green manure for irrigated rice at high altitudes, where other green manure plants *(Crotalaria juncea, C. anagyroides, Tephrosia candida)* have not such a vigorous growth. It is too soon to obtain any results.

"Philippines: It has long been grown in the Batangas Province and is of considerable local value as a food. Its use as a green manure and as a temporary cover crop is of recent date. When grown on rich soils, covers spacings of 60 cm. The crop was found very productive in Bukidnon and Lanao, below 700 metres altitude.

"Mauritius: Introduced many years ago, but not much grown in the island; not utilized as a green manure.

"Nyasaland: Used as a rotation crop with tobacco and cereals, and also in various other ways; good results are obtained.

"Sierra Leone: It was introduced from Russia in 1913 and from England in 1928, but without success. Note: This document contains the earliest clear date seen for soybeans in Sierra Leone, or for cultivation of soybeans in Sierra Leone (1913) (one of three documents). The source of these soybeans was Russia.

"Belgian Congo: Introduced into Kivu in 1931; gives very good results when utilized as a green manure for coffee. It furnishes about 25 tons of green material per hectare; it is self-sowing; results are obtained where even the lupin will not grow. At Uele, it was found to be of little value, being too susceptible to disease and it is also a host plant for *Helopeltis*.

"Trinidad: Occasionally cultivated as pulse, but is not used at all for other purposes.

"Peru: Experiments are now being carried out for the acclimatisation of this species."

At the end of this book is an excellent "Index of leguminous plants" with scientific names only listed alphabetically. Includes: *Arachis hypogea* Linn, p. 155, 178. *Psophocarpus tetragonolobus* D.C., 237. *Pueraria Thunbergiana* Benth, see *P. hirsuta* Schneider. p. 238. Address: Rome, Italy.

634. Bailey, Ethel Zoe. 1936-1980. Soja hispida–Foreign sources. Ithaca, New York: L.H. Bailey Hortorium. 2 cards. Unpublished.

• ***Summary:*** *Soja hispida* is an early scientific name for the soybean given by Konrad Moench in 1794; it was superseded / replaced by the current scientific name *Glycine max* (L.) Merrill in 1917.

These two hand-written index cards are in the Bailey Hortorium's index system of nursery catalogs and/or botanic garden seed lists developed by Ethel Zoe Bailey. In this index system, there are eleven major cards and eight minor cards related to the soybean. On each card are two-part coded entries referring to botanic gardens or nurseries.

Part 1 is the code for the name of the botanic garden, and part 2 is the last two letters of the earliest year in which the plant for that card appeared in this garden's catalog. For example "Gen. 36" refers to the 1936 catalog of the Botanical Garden in Geneva, Switzerland. [LR 1982] means that a list of seeds and plants (whether or not it contained soy) was "Last Received" from that source [Geneva] in 1982. There are 38 listings for *Soja hispida* from foreign sources. As of Nov. 1997 most of the catalogs and seed lists mentioned below are available in the Bailey Hortorium, located in Mann Library, Cornell University, Ithaca, New York.

(1) Gen. 36–Conservatoire et Jardin Botaniques de la Ville Geneve, Case postale 60, CH. 1292 Chambesy / Geneva, Switzerland, 1936 [LR 1981]. (2) Alger 36–Jardin Botanique, Universite d'Alger, Algiers, Algeria, 1936 [LR 1956]. (3) Stain. 37–Jul. Stainer, Wiener-Neustadt, Austria, 1937 [LR 1967]. (4) Wien 1937–Botanischer Garten der Universitaet Wien, Rennweg 14, Wien III, Austria, 1937

[LR 1976]. (5) Co. 39–Hortus Botanicus Conimbrigensis, Coimbra, Portugal, 1939 [LR 1982].

(6) Tez. 48–Tezier Freres, Valence sur Rhone, France, 1948 [LR 1948]. (7) Zem. 48–Federal Institute for Plant Breeding and Plant Introduction, Zemun, Yugoslavia, 1948 [LR 1948; called Semlin in German; as of 1997 located in the Vojvodina autonomous region of Serbia in northern Yugoslavia]. (8) Ans. 54–Arturo Ansaloni, Bologna, Italy, 1954 [LR 1963]. (9) Wars. 54–Hortus Botanicus Universitatis Varsaviensis, Warsaw, Poland, 1954 [LR 1981]. (10) Rabat 56–Institut National de la Recherche Agronomique, B.P. 415, Rabat, Morocco, 1956 [LR 1971; Formerly: 99 Avenue de Temara].

(11) Dijon 57–Hortus Botanicus Divionensis, Jardin Botanique, 1 Avenue Albert-Premier, 21000 Dijon, France, 1957 [LR 1981]. (12) Fi. 57–Hortus Botanicus Florentinus, Via Lamarmora n. 4, Firenze [Florence], Italy, 1957 [LR 1981]. (13) Pavia 57–Hortus Botanicus Universitatis Papiensis (Ticinensis), Botanical Institute and Garden of the University, P.O. Box 165, Pavia, Italy, 1957 [LR 1974]. (14) Lyon 57–Jardin Botanique de la Ville de Lyon au Parch de la Tete-d'Or, Lyon, France, 1957 [LR 1973]. (15) Roma 58–Istituto e Orto Botanico, Universita di Roma, Rome, Italy, 1958 [LR 1977].

(16) Liege 58–Jardin & Institut de Botanique de l'Universite de Liege, 3 Rue Fusch, Liege, Belgium, 1958 [LR 1975]. (17) Montpl. 59–Jardin des Plantes, Universite de Montpellier, Faubourg St. Jaumes, Montpellier, France, 1959 [LR 1978]. (18) Poznan 58–Hortus Botanicus Universitatis Posnaniensis, Dabrowskiego 165, Poznan, Poland, 1958 [LR 1961]. (19) Caen. 59–Jardin Botanique de la Ville et de l'Universite, 5 Place Blot, Caen (Calvados), France, 1959 [LR 1979]. (20) Kiev 61–Hortus Botanicus Centralis Academiae Scientiarum UCR, Via Timirjasevska 1, Kiev 14, Ukraine, USSR, 1961 [LR 1979].

(21) Rouen 63–Jardin Botanique de la Ville de Rouen, 7 Rue de Trianon, Rouen, France, 1963 [LR 1981]. (22) Komen. 62–Botanicka Zahrada Univerzity Komensheko, Bratislava, Czechoslovakia, 1962 [LR 1965; Bratislava has been the capital of Slovakia since 1992]. (23) Ferr. 62–Hortus Botanicus Ferrariensis, Istituto ed Orto Botanico dell'Universita di Ferrara, Ferrara, Italy, 1962 [LR 1976]. (24) Nijm. 62–Hortus Botanicus Universitatis Noviomagensis, University of Nijmengen, Dreihuizerweg 200, Nijmegen, Netherlands, 1962 [LR 1981]. (25) Ans. 63–See (8) Ans. 54 (Arturo Ansaloni, Bologna, Italy).

(26) Koln 64–Botanischer Garten und Arboretum der Stadt Koeln [Cologne], Ave. Botanischen Garten, 5000 Koeln 60, Germany, 1964 [LR 1981; Formerly at Amsterdammer Strasse 36]. (27) Saig 64–Hortus Botanicus Saigonensis, Saigon, Vietnam, 1964 [LR 1964]. (28) Kassel 64–Botanischer Garten der Stadg Kassel, Bosestrasse 15 (Park Schonfelf), Kassel, Germany, 1964 [LR 1965]. (29) Mort. 66–La Mortola (Giardino Botanico Hanbury), Ventimiglia 18036, Italy, 1966 [LR 1975]. (30) Padova 66–Istituto Botanico dell'Universita, Via Orto Botanico 15, Padova [Padua], Italy, 1966 [LR 1980].

(31) Koln 67–See (26) Koln 64 (Koeln, Germany). (32) Nancy 63–Jardin Botanique de la Ville Nancy, 100 Rue du Jardin Botanique, 54600 Villers-les-Nancy, Nancy, France, 1963 [LR 1981]. (33) St. A. 71–University Botanic Gardens, St. Andrews, Scotland, UK, 1971 [LR 1982]. (34) Howell 73–Major V.F. Howell, Fire Thorn, 6 Oxshott Way, Cobham, Surrey, England, UK, 1973 [LR 1983]. (35) Bord. 74–Hortus Botanicus Burdigalensis, Jardin Botanique de la Ville de Bordeaux, 33000 Bordeaux, France, 1974 [LR 1974].

(36) Graz 75–Botanischer Garten der Universitaet Graz, Holtei-Gasse 6, A-8010 Graz, Austria, 1975 [LR 1982]. (37) Nantes 77–Service des Plantations de la Ville de Nantes, Nantes, France, 1977 [LR 1977]. (38) M.F. 79–Hortus Botanicus Massiliensis, 48 Avenue Clot-Bey, Marseilles, France, 1979 [LR 1981]. (39) Urb. 80–Hortus Botanicus Universitatis Urbinatis, Via Bramante 28, Urbino, Italy, 1980 [LR 1981]. (40) Kosice 80–Botanicka zahrada University P.J. Safarika, Kosice, Slovakia, 1980 [LR 1981].

Eight cards, all listing only foreign (European) sources, contain the supposedly scientific names (listed here alphabetically) of the following subspecies or varieties of *Soja hispida;* none of these names, however, appear in the SoyaScan database (May 1997).

(1) *Soja hispida alba* (1 source; Fi. 57–Hortus Botanicus Florentinus, Via Lamarmora n. 4, Firenze [Florence], Italy, 1957). (2) *Soja hispida brunnea* (1 source; Tubin. 64–Botanischer Garten der Universitaet Tuebingen, Tubingen, Germany).

(3) *Soja hispida Dickmana* (1 source; Ferr. 60–Hortus Botanicus Ferrariensis, Istituto ed Orto Botanico dell'Universita di Ferrara, Ferrara, Italy, 1960). (4) *Soja hispida japonica* (2 sources; (1) Deb. 39–Horto Botanico Universitatis Debreceniensis, Debrecen, Hungary, 1939; (2) Kosice 80–Botanicka zahrada University P.J. Safarika, Kosice, Slovakia, 1980).

(5) *Soja hispida lutea* (3 sources; (1) Heid. 1936–Botanischer Garten der Universitaet, D-6900 Heidelberg, Germany, 1936; (2) Ferr. 61–Ferrara, Italy, 1961 (See above); (3) Tubin. 64–Tubingen, Germany, 1964 (See above)). (6) *Soja hispida nigra* (4 sources; (1) Heid. 1936–Heidelberg, Germany, 1936 (See above); (2) Fi. 57–Firenze [Florence], Italy, 1957 (See above); (3) Ferr. 58–Ferrara, Italy, 1958 (See above); (4) Tubin. 64–Tubingen, Germany, 1964 (See above)).

(7) *Soja hispida ochroleuca* (1 source; Deb. 39–Debrecen, Hungary, 1939 (See above)). (8) *Soja hispida vilnensis* (2 sources; (1) Wars. 58–Hortus Botanicus Universitatis Varsaviensis, Warsaw, Poland, 1958; (2) Ferr. 60–Ferrara, Italy, 1960 (See above)). Address: L.H. Bailey Hortorium, 462 Mann Library, Cornell Univ., Ithaca, New

York 14853-4301. Phone: 607-255-7981. Fax: 607-255-7979.

635. *Orgaan van den Nederlandsch-Indischen Plantersbond.* 1936. De zegetocht der sojaboon [The triumphal march of the soybean]. 223. p. 5183-85. [Dut]*

636. *Orgaan van den Nederlandsch-Indischen Plantersbond.* 1936. Hoe plant men kedelee [How does one plant soybeans?]. 226. p. 5251. [Dut]*

637. *Verslagen van het Veldproeven. A, Variteitenproeven (Landbouwkundige Institut).* 1936. Varieteitenproeven met kedelee [Variety trials with soybeans]. A 654-59. [Dut]*

638. Heiser, Victor. 1936. An American doctor's Odyssey: Adventures in forty-five countries. New York, NY: W.W. Norton & Co., Inc. viii + 544 p. Illust. (portrait). Index. 25 cm.

• ***Summary:*** In the Philippines, Dr. Heiser found that poor nutrition was the major cause of the high infant mortality. "The use of milk on a large scale was practically unknown in the Philippines, as well as in many other tropical countries." Whatever milk the poorer classes consumed came almost entirely from the caraballa, or female water buffalo (the male is the carabao)–a dirty animal whose habits tend to contaminate its milk.

Ultimately Dr. Heiser discovered several "substitute's for fresh cow's milk." It was discovered at the Peiping Hospital that a substitute for milk could be made from the soya bean. "With the addition of cod-liver oil and calcium, it closely resembled natural milk." Children fed on this milk from the time they were 3 weeks old, were found "to be healthy and normal in every way." Children "who had never had any other food loved this soya bean milk," but "to an adult it was one of the worst-tasting decoctions that could be imagined."

"A Filapina graduate student in chemistry from Columbia University then made her contribution. She found that extract of banana added to the soya bean mixture made it taste like fresh milk. The Filapina housewife can now make this milk in her own kitchen, using a little handpress for the bean and adding other ingredients according to the prescribed directions.

"The soya bean has proved of inestimable value to the East and promises to enlarge the dietary. I once attended a delicious full course lunch in the Bureau of Science Laboratory in Manila where everything from soup to cake was made from this bean."

Note: Heiser, a physician, was born in 1873. Address: M.D.

639. Institut International d'Agriculture (International Institute of Agriculture). 1936. Le soja dans le monde [The soybean in the world]. Rome, Italy: Imprimerie de la Chambre des Deputes, Charles Colombo. viii + 282 p. Bibliography, p. 276-82. No index. 25 cm. [90 ref. Fre]

• ***Summary:*** A superb early work, containing extensive original information, looking at developments with soybeans and soyfoods country by country, worldwide. Contents. Preface (p. 1). A. Culture of soy *(soja;* p. 4): 1. Botanical description, selection, classification of the varieties. 2. Culture properly said. 3. Enemies and illnesses.

4. Culture in the various countries: 4a. The Americas (p. 38): Antigua, Argentina, Bermuda, Brazil, Canada, Chile, Colombia, Costa Rica, Cuba, Dominican Republic, Ecuador, USA (gives details on all varieties grown, and describes production, history, varieties, and cultural practices in North Carolina, Illinois, Indiana, Iowa, Maryland, Massachusetts, Mississippi, Missouri, New York, Ohio, West Virginia, Wisconsin, Conclusion), Guadeloupe, Guatemala, British Guiana, Dutch Guiana, British Honduras [Belize], Jamaica, Barbados, Martinique, Mexico, Montserrat, Peru, Puerto Rico, El Salvador, Trinidad and Tobago, Uruguay.

4b. Europe (p. 101): Germany, the Danubian countries, Austria, Spain, France, Great Britain, Hungary, Italy, Netherlands, Poland, Romania, Switzerland, Czechoslovakia, Turkey, USSR.

4c. Asia (p. 128): Ceylon, China and Manchuria, Cyprus, Federated States of Malaysia, British India (incl. Punjab, Bihar and Orissa, Burma, Berar, Madras Presidency, Bombay Presidency, Bengal (incl. Nepal, Bhutan, Sikkim, and the district of Darjeeling), Assam, North-West Frontier Province, United Provinces), Netherlands Indies, Indochina (incl. Tonkin, Annam, Laos, Cambodia, and Cochinchine), Japan, Palestine, Siam.

4d. Africa (p. 146): French West Africa, Algeria, Belgian Congo, Cyrenaica, Egypt, Eritrea, Madagascar, Morocco, Mauritius (Ile Maurice), Reunion (Réunion), Rhodesia, Anglo-Egyptian Sudan, Tripolitania, Tunisia, Union of South Africa.

4e. Oceania (p. 153): Australia, Fiji Islands, Hawaii, New Caledonia, New Zealand, Philippines.

B. Utilization of soya (p. 158): 1. The soybean in human nutrition and in industry: Whole soybeans, chart of the uses of whole soybeans, use of soya in the green state (green vegetable soybeans), soy sauce *(dau-tuong* of the Annamites, or *toyo,* named shoyu by the Japanese, or *chau-yau* or *chiang yoo* by the Chinese), condiments and sauces based on soya in the Netherlands Indies *(tempe, ontjom, tempemori* and *tempe kedele* [various types of tempeh and onchom, p. 168-70]), *tao tjo* [Indonesian-style miso], *tao dji* [soy nuggets], *ketjap, ketiap benteng* [Indonesian-style soy sauce], soymilk *(le lait de soja),* yuba *(crème de lait de soja),* tofu *(le fromage de soja)* and fermented tofu *(des fromages fermentés,* made by Li Yu-ying near Paris), soymilk casein *(caséine du lait de soja,* for industrial use,

including vegetable albumin, or galalithe [galalith]" [isolated soy protein], and artificial wool), soy lecithin *(lécithine de soja)*, soy flour *(la farine de soja*, incl. soy bread, soy pastries, and soy cocoa).

2. Soy oil (p. 194): Food uses, industrial uses (including soaps, products resembling petroleum, paints, varnishes, linoleum, and artificial rubber), extraction, directory of U.S. manufacturers of materials and equipment for soybean processing, directory of U.S. and Canadian manufacturers of food products based on soya *(produits alimentaires à base de soja*, p. 205-06), directory of U.S. manufacturers of industrial soy products (p. 206-07).

3. Soybean in the feeding of domestic animals (p. 207): Forage, hay, silage, pasture, soybean seeds, the minerals in soybeans, soya as a feed for dairy cows, cattle, buffaloes, sheep, hogs, horses and mules, poultry.

4. Use of soya as fertilizer (p. 257). C. The trade of soya and of its by-products (p. 363): Production of soybeans in the principal countries, economic importance of soybean culture in the USA, soybean trade/commerce including tables of the major importers and exporters, and amounts traded annually in 1931-1934, price of soybeans, cost of production.

List by region and country of people and organizations that responded to a questionnaire sent by IIA (p. 273-76). Bibliography of main publications consulted, listed by region and country of publication.

Reunion *(Ile de la Réunion):* "The soybean (Le Soja) is only cultivated as an experimental crop, on a few square meters at the agronomic station" (p. 148).

Fiji *(Iles Fidji):* Soybean cultivation is not yet practiced in this colony; however soybean seeds are currently being imported in order to conduct a trial.

New Caledonia: In 1928 soybean cultivation was introduced to New Caledonia.

Note 1. This is the earliest document seen (Dec. 2007) concerning soybeans in Bhutan, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Israel, Jamaica, Madagascar, Morocco, New Caledonia, Palestine, Peru, or Réunion, or the cultivation of soybeans in Bhutan, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Israel, Jamaica, Madagascar, Mexico, the Middle East. Morocco, New Caledonia, Palestine, Peru, or Réunion. It is also the earliest document seen (Dec. 2007) concerning soybeans in connection with (but not yet in) Cyprus; it is stated that soybeans are not grown on the island of Cyprus. Soybean culture is not practiced in the Italian colonies of Eritrea (Erythrée, now part of Ethiopia) or Cyrenaica (Cyrénaïque, now part of Libya).

Note 2. This document contains the earliest date seen (June 2007) for soybeans in Bhutan, New Caledonia, or Réunion, or the cultivation of soybeans in New Caledonia (1928), or Bhutan or Réunion (1936) (One of two documents).

Note 3. This is the earliest French-language document seen (Jun. 2000) that mentions tempeh, which it calls "tempe" (p. 168). It notes that, in general, the indigenous people of the Netherlands Indies use soybeans mainly to make *tempe*, a product which, throughout central and eastern Java, takes the place reserved for *ontjom* in western Java. Tempeh is found in two forms: either in large flat cakes which are cut at the time of sale into small square morsels, or wrapped in folded banana leaves. A detailed description of the preparation of each of these two types of tempeh is given as well as another type of tempe, called *tempemori*, which is made with soybeans and coconut presscake.

Soybean culture is not known to be practiced in the following countries or colonies: Antigua, Barbados, British Honduras (renamed Belize in about 1975), Trinidad and Tobago. Address: Rome, Italy.

640. Rouest, Leon; Guerpel, Henry de. 1936. Le soja français et ses applications agricoles et industrielles [The French soybean: Its agricultural and industrial applications]. Chateauroux, France: G. Langlois. xxiii + 99 p. 28 cm. [42 ref. Fre]

• ***Summary:*** Contents: Preface, by L Brétignière (Prof. at Grignon, Member of the Academy of Agriculture). Preface to the first edition, by Louis Forest (1921). Introduction to this new edition: Soviet Russia and the soybean *(le Soja;* includes the story of Rouest's stay in the Northern Caucasus, Russia, from 1930 to 1933), Germany and Poland take up the soya question, the canons [guns] of Germany versus the Manchurian soybean, a secret contract to provide the weapons of war, organization of a Polish bank in Manchuria, Germany cultivates soybeans in Romania and Bulgaria in preparation for the war, France and the cultivation of soybeans.

1. What is soja? 2. History of the propagation of soja: Introduction of the soybean into France and Europe, the soybean is cultivated in central Europe, in Austria, in 1875, in France the soybean is the object of numerous trials from 1876 to 1881, its cultivation worldwide, the study and acclimatization of soya become generalized.

3. Botanical characters of the soybean: And the varieties of soybeans. 4. Chinese varieties: The soybean in China, the production of soya in China in 1916 and 1917, production of soya in the Far East during the year 1928, exportation of soya from the Far East to Europe.

5. Japanese varieties: The soybean in Japan, varieties of soya from Indochina and from other Asian countries. 6. The soybean in America: American varieties, cultivation of soybeans in Ohio, selection of soya using pure lines in Connecticut.

7. The soybean in Europe: Italy, Russia, France, French climatic zones for the cultivation of Soja hispida, the Atlantic zone, the continental zone, the Mediterranean zone

and climate, can the soybean cultivated in all the French climates including those in the north, northeast, and northwest, speedy production of soybeans in view of agricultural production and of the creation of early varieties for the regions in north and northeast France.

8. Instruction for growing soja in France. 9. Soja in Manchuria. 10. Soja seeds. 11. Selection of soja. 12. Varieties of soja. 13. Different ways of planting soya seeds. 14. Soy yield. 15. Nitrogen fixation in soya seeds. 16. Tilling and preparing the earth. 17. Soja fodder. 18. Soja, striking and improving. 19. Harvesting soja grain. 20. Soja oil. 21. Soja oil-cake for animal feeding. 22. Vegetable milk, soja milk and industrial casein.

23. Soja in human food: Soy flour and its applications, soy bread with wheat, nutritional composition of soja compared to dry legumes, soy viewed as a dry legume to replace meat, comparative production of nutritive elements among the various legumes used for human food, comparative value in calories of the usual foods and of soja, preparation of soy soups and meals in compressed tubes, what varieties of soy can serve the special needs of human nutrition, Sojenta, potatoes stuffed with soy, force meat balls *(boulettes)* of rice and soy, bread of rice and soy, pudding of soy and rice, soy sprouts and their food value, fresh soy sprouts in a salad, soy sprouts with vegetables, soy preserves and confections, soy chocolate, soy coffee, soybeans conserved in containers, soy with smoked fish, soup with soy vegetable meat, soymilk soup, omelet with smoked soy vegetable ham, green soy sprouts, soy cake, soy force-meat fritters.

24. The utilization of soja in the Far East: Vegetable cheese (tofu), soy-based condiments, Japanese natto (2 types), Japanese miso, Chinese miso, soy sauce *(soyou* or *schoziou),* making soy sauce in Kwantung, China, making soy sauce in Japan, koji or molded rice.

25. The culture of soja in North Africa (Rouest has varieties that would grow and yield well in the French colonies of Tunisia, Algeria, and Morocco). 26. Opinions of some authors on soja. Conclusions. Bibliography on soja.

A small photo on the "Dedication" page shows Léon Rouest (born in Paris on 11 Nov. 1872).

Concerning soy in Russia (USSR) (p. 52-53): In Russia, the soybean has been known for quite a long time, specially in the Ukraine and Bessarabia, but it was never grown over a large area, and was given a back seat (low priority) in agriculture until after the revolution of 1917. It was not until 1926-27 that cultural trials were conducted on farms in the state of Northern Caucasus *(d'Etat du Caucase du Nord).* In the regions of Rostov-on-Don *(Rostow-sur-Don; Rostov-na-Donu),* Eisk (near Krasnodar), Stavropol, Prim-Koumsk, Yessentuki / Essentuki in the Kuban and Kuban River area of the North Caucasus region of southern Russia, the yields were 11 to 16 quintals.

In 1927 there were 600 ha planted to soybeans, increasing to 17,000 in 1928, in the *kolkhoz* (collective) farms or the *sovkhoz* (state owned) farms.

In 1929-1930 and until 1932-1933 there were very laudable / praiseworthy efforts to propagate soybeans in favorable regions, especially in the North Caucasus, but the soils of this region, although they are very rich and well suited to soybeans are also very rich in bad weeds and the results obtained up to the present do not seem favorable. As I said earlier, the soybean is a technical plant of the intensive type which is well suited to the soil and climate of Russia, but is much less suited to the indolent character of peoples who are accustomed to cultivating only small areas. In spite of the remarkable efforts at mechanization, the peasants who submit to collectivization and who do not yet understand it very well, the cultivation of soybeans does not assume the importance hoped for. Address: France.

641. Sampson, Hugh Charles. 1936. Cultivated crop plants of the British Empire and the Anglo-Egyptian Sudan (topical and sub-tropical): Based on information which has been supplied by the Departments of Agriculture concerned. *Kew Bulletin of Miscellaneous Information, Additional Series* XII. vii + 251 p. See p. 85, 201. (London: H.M. Stationery Office). [5 ref]

• ***Summary:*** "The information furnished in this Inventory of Cultivated Crop Plants, which was asked for by the Conference of Colonial Directors of Agriculture held in 1931, is based on the replies to a questionnaire issued by the Director of the Royal Botanic Gardens, Kew, and forwarded by the several Departments of State concerned to all Tropical and Sub- Tropical countries of the British Empire and to the Anglo-Egyptian Sudan. A copy of this questionnaire, together with the explanatory notes and covering letter, is printed as Appendix B to this publication. The information thus furnished has of necessity had to be condensed. There may be, and probably are, numerous errors. The officers who have made these returns may not in some cases have had the necessary facilities to enable them definitely to determine the species of the plant referred to, nor have they always the knowledge requisite for the task."

"Where the actual date of an introduction, and the country from which the plant was introduced are known, these are shown in brackets after the name of the country concerned."

A major part of the book is titled "List of Cultivated Crop Plants," arranged by Genus name. Pages 85-86 discuss Glycine Linn. Leguminosae.

*Glycine javanica* Linn. Tropical Africa and Asia. 'Rhodesian Kudzu Vine.' A fodder plant. An indigenous or early introduction in Southern Rhodesia. Note 1. This is the earliest document seen (Aug. 2003) that uses the name "Rhodesian Kudzu Vine."

*Glycine max* (Linn.) Merr. Known as "Gari kalai" in Bengal, "Pe-ngapi" in Burma, "Vilayati Chowra" in Sind, and "Kachang sapon" in Malay. "There appear to be two types; the northern type whose seeds are rounded in shape and often light colored and which grow on an erect plant, and the more tropical type which has a flattened seed, often dark colored, on a plant with a definite trailing habit.

(a) Indigenous or an early introduction in Burma, Sarawak [joined Malaysia in 1963], and the United Provinces [became a state of India, Uttar Pradesh, in 1947].

(b) Successfully introduced in Assam, Bahamas, Bengal (many varieties), Bihar & Orissa, Fiji, Hyderabad, North-West Frontier [became part of Pakistan in 1947], Queensland, South Africa, Southern Rhodesia, S.S. & F.M.S. [Straits Settlements & Federated Malay States; later Singapore and Malaysia] (by Chinese), Uganda (occasionally), W. Australia (occasionally). Note 2. This is the earliest document seen (Jan. 2000) that clearly refers to soybeans in Southern Rhodesia or the cultivation of soybeans in Southern Rhodesia.

Note 3. This is the earliest document seen (March 2010) that clearly refers to soybeans in Fiji or the cultivation of soybeans in Fiji.

(c) Still under trial or established on an acclimatisation station in Baroda [India], Bermuda (as a green manure), Bombay, British Guiana [later renamed Guyana] (1905; Venezuela, 1913; Trinidad, 1927), Central Provinces [India], Cyprus, Grenada, Kenya, Madras, Mauritius, Mysore (2 varieties from Java are promising), New Guinea (black and white seeded kinds), Nigeria (from U.S.A. and Fiji), Northern Rhodesia, Nyasaland, Punjab, St. Kitts, St. Lucia (Trinidad, 1925), St. Vincent, Seychelles, Sind [became part of Pakistan in Aug. 1947; capital is Karachi], Anglo-Egyptian Sudan, Tanganyika Territory, Trinidad.

Note 4. The meaning of "St. Lucia (Trinidad, 1925)" is unclear. As of 2009, St. Lucia is an island nation, one of the Windward Islands, in the eastern Caribbean Sea. About 250 miles to its south is Trinidad and Tobago, a completely different, separate, and much larger island nation. Moreover, there is no city or town named "St. Lucia" on Trinidad and Tobago.

(d) Introduced, but the cultivation has subsequently disappeared or has been abandoned, in Basutoland (abandoned as the seed shatters badly), Ceylon, Dominica.

(e) Introduced but has failed to become established in Antigua, Gambia, Gold Coast [Ghana] (Russia, 1929), Montserrat, North Borneo, Palestine, Sierra Leone (S. Russia, 1913; Botanic Garden, Regent's Park, England, 1928).

Pages 201-04 give a detailed description of Glycine max including: Introduction, plant habit, leaves, flowers and fertilisation, fruit, seeds, conclusion.

Note 5. This is the earliest document seen (Aug. 2009) concerning soybeans in The Bahamas, Basutoland (later renamed Lesotho), Palestine, the Seychelles, or Saint Vincent and the Grenadines, or the cultivation of soybeans in The Bahamas, Basutoland, Palestine, the Seychelles, or Saint Vincent and the Grenadines. This document contains the earliest date seen for soybeans in the Bahamas, Basutoland, the Seychelles, or Saint Vincent and the Grenadines, or the cultivation of soybeans in The Bahamas, Basutoland, the Seychelles, or Saint Vincent and the Grenadines (1936 or before). The source of these soybeans is unknown.

Note 6. This is the earliest document seen (Dec. 2007) concerning soybeans in Cyprus, or the cultivation of soybeans in Cyprus. This document contains the earliest date seen for soybeans in Cyprus, or the cultivation of soybeans in Cyprus (1936). The source of these soybeans is unknown. However another document published the same year contradicts this claim: Institut International d'Agriculture (International Institute of Agriculture). 1936. Le soja dans le monde [The soybean in the world] (which see). Unfortunately, Sampson gives no details about the soybeans said to be cultivated in each country.

Note 7. This document contains the earliest date seen for soybeans in Guyana, or the cultivation of soybeans in Guyana (1905). The source of these soybeans is unknown.

Note 8. This is the earliest document seen (March 2010) concerning soybeans in New Guinea, or the cultivation of soybeans in New Guinea. This document contains the earliest date seen for soybeans in New Guinea, or the cultivation of soybeans in New Guinea (1936 or before). However New Guinea is an island (the second largest in the world, after Greenland), which (as of 2007) is administratively divided into Western New Guinea, a province of Indonesia (formerly known as Irian Jaya and formerly part of the Dutch East Indies) on the West and the independent country of Papua New Guinea (formerly British New Guinea) on the east. Since this is an article about plants of the British Empire, the soybeans were almost certainly grown in what is today Papua New Guinea.

Note 9. This document contains the earliest clear date seen for soybeans in Sierra Leone, or the cultivation of soybeans in Sierra Leone (1913) (one of three documents). The source of these soybeans was probably South Russia via Great Britain.

Note 10. This is the earliest document seen (March 2006) that clearly refers to soybeans in Northern Rhodesia (later Zambia), or the cultivation of soybeans in Northern Rhodesia. This document contains the earliest clear date seen for soybeans in Northern Rhodesia, or the cultivation of soybeans in Northern Rhodesia (1936 or before). The source of these soybeans is unknown.

Note 11. This document contains the earliest date seen for soybeans in Venezuela, or the cultivation of soybeans in Venezuela (1913). The source of these soybeans is unknown. Soybeans were probably being cultivated in

Venezuela in 1913, but we cannot be certain from this document.

In 1905, Jos. Burtt-Davy, government agrostologist and botanist in Transvaal, South Africa, notes (p. 261): "On January 1st Mr. H.C. Sampson, B.Sc., was transferred from the Education Department to be my assistant for Seed and Plant Introduction." Address: Economic Botanist, Royal Botanic Gardens, Kew; Indian Agricultural Service, Retired.

642. Toxopeus, Hendrik Jannes. 1936. Over physiologische specialisatie bij knolletjes-bacteriën van kedelee op Java [On physiological specialization by soybean root nodule bacteria in Java]. In: Verslag van de 16e Vergadering van de Vereeniging van Proefstation-Personeel. See p. 53-62. [Dut]*
Address: Plantkundig Laboratorium van het Algemeen Proefstation voor den Landbouw te Buitenzorg, Java.

643. Fermin, Fausto H. 1937. An acclimatization test of nine newly introduced varieties of soybean in the College of Agriculture. Abstract by Aquilino V. Platon. *Philippine Agriculturist* 25(4):797-99. Feb. Based on his 1935 BSc thesis, College of Agriculture, Los Banos, Philippines.
• ***Summary:*** "The author worked on three objects: (a) To determine the adaptability of nine newly introduced varieties of soybean in the College of Agriculture; (b) to determine the best season for planting; and (C) to determine the yield and age at maturity of each variety.

"The soybean seeds were obtained from the College of Agriculture, National University, Nanking, China. The varieties studied were: Yue Yin September Yellow; American Small Black; Yue Yin Goat's Eye; Szechwan Bar District Red; Peiping Green and Peiping Brown; Fenglein White Eyebrow; Head Green; and variety No. 19924. (Variety name was not given by sender). The Ami soybean was used as a Philippine standard variety for comparison." Address: Los Baños, Philippines.

644. Banzon, Julian. 1937. Coconut oil. I. Pyrolysis. *Philippine Agriculturist* 25(10):817-32. March. [17 ref]
• ***Summary:*** Germany has done much to develop the chemistry of coal. Lately scientists have begun to develop to develop industrial products from crop plants, "which have the advantage over coal that they can be grown from year to year. Chemicals from corn, oats, and "soybean are now available on a commercial scale" (p. 817).

In a "Review of the literature," Banzon cites three papers which mention that soybeans can be used to produce liquid fuels resembling petroleum.

The main purpose of this study is to determine the behavior of coconut oil when subjected to simple heat treatments such as prolonged heating [pyrolysis], distillation without and with metal catalysts. Address: Dep. of Agricultural Chemistry [Philippines].

645. Lanzing, J.C.; van Veen, A.G. 1937. Sojamelk [Soymilk]. *Mededeelingen van den Dienst der Volksgezondheid in Nederlandsch-Indie* 26(1&2):60-74. [9 ref. Dut]
• ***Summary:*** This is the earliest Dutch-language document seen (Oct. 2003) that uses the term *sojamelk* to refer to soymilk. As of Oct. 2003 *sojamelk* is the modern Dutch word for soymilk. Address: Both: Dr., Geneeskundig Laboratorium, Batavia.

646. League of Nations Health Organization–Bandoeng Conference. 1937. Report of the Intergovernmental Conference of Far-Eastern Countries on Rural Hygiene. *International Conference of Far Eastern Countries on Rural Hygiene (Preparatory Papers)* Vol. 3, page 74-76. Held 3-13 Aug. 1937 at Bandoeng, Java. Published 8 Sept. 1937. Official No. C.H. 1235.
• ***Summary:*** In Chapter 4, titled "Nutrition," section I discusses "Composition of food and methods of its preparation." The soya bean and its uses in French Indo-China (today's Vietnam) are discussed on pages 75-76.
"Apart from rice an maize, one of the most important food crops in that Far East is the soya bean *(Glycine hispida).* This bean is rich in proteins and fatty matter, but has a very low carbohydrate content. Eaten in its natural state as a vegetable, or better still, in the form of a variety of appetising preparations in which the casein is partly disintegrated, the soya bean makes good the deficiency of fatty and nitrogenous matter in the native diet, which consists almost entirely of the rice carbohydrates.

"Its chief derivatives are nuoc-dâu, or soya milk; dâu-phu, a fresh soya cheese obtained by precipitating the casein of soya milk; dâu-tuong, or soya sauce, which is often used instead of nuoc-mam, especially in Tongking; and dâu-phu-chuc, or soya cream [yuba].

"Soya milk is a yellowish-white liquid with a slight smell of burnt bread and a peculiar flavor greatly appreciated by the Annamites. It is prepared by peeling the beans, pounding them in water, straining, and boiling up the resulting liquid.

"Soya cheese [tofu] appears in trade in the form of faintly yellowish-white rectangular cakes, weighing about 150 grammes each. Ten kg. of soya beans will produce 100 liters of milk, which in turn yield 300 cakes, or 45 kg., of cheese. This very cheap product, of which several thousand kilogrammes are sold every day in the Hanoi market alone, is eaten either raw with salad, or stewed with vegetables, or fried in oil.

"Soya sauce, or dâu-tuong, is a preparation obtained by fermenting a mixture of glutinous rice *[Oryzae sativa glutinosa,* called 'nêp' by the Annamites] and roasted soya beans. It is a condiment both salty and sweet, which

frequently replaces nuoc-mam, a relatively dear food, especially in regions distant from the sea.

"Dâu-tuong is commonly found in commerce in the form of a heterogeneous mixture, consisting of a liquid (nuoc-tuong) in which floats a somewhat coarse paste called tuong-cai, made of incompletely powdered soya beans.

"Dâu-phu-chuc is prepared by drying the skin that forms on the surface of soya milk after prolonged heating. It is sold in shiny, pale yellow, crinkly sheets, and smells like cow's milk. It is a food rich in proteins and fatty matter, and is consumed by the Annamites in small pieces, either in soup, or in pork, beef, or chicken stew."

Note: This is the earliest English-language document seen that uses the term "Roasted soya beans" to refer to soynuts. Address: Geneva, Switzerland.

647. League of Nations Health Organization. 1937. Report of the Intergovernmental Conference of Far-Eastern Countries on Rural Hygiene. *International Conference of Far Eastern Countries on Rural Hygiene* 3:65, 74-77. Held 3-13 Aug. 1937 at Bandoeng, Java. Published 8 Sept. 1937. Official No. A.19.1937.III.

• ***Summary:*** Chapter 4, titled "Nutrition" has a section on "Recommendations About Diet" (p. 74-77). It encourages the inclusion of some animal protein in the diet, praises "under-milled rice" over highly-milled rice for its greater content of vitamin B-1, protein, and mineral salts, and praises the nutritional value of fish, eggs, milk, pulses, and soya bean. "Soya bean contains a high percentage of protein and fat, and preparations of soya bean are an important dietary ingredient in Eastern countries. While soya bean is a valuable food, it does not make good all the deficiencies of diets based on rice. Soya bean "milk" has little in common with mammalian milk beyond a white colour. Suitably supplemented–e.g., by egg yolk, malted sugar, and mineral salts–soya bean "milk" may be useful in infant feeding." Address: Geneva, Switzerland.

648. Morse, W.J. 1937. Soybean variety studies of the United States Department of Agriculture. *Proceedings of the American Soybean Association* p. 16-18. 17th annual meeting. Held 14-16 Sept. at Urbana, Illinois.

• ***Summary:*** "One of the outstanding results of soybean improvement work in the United States has been, the realization of the importance of varietal adaptation... Varietal adaptation is obviously the reason why practically every locality in the soybean regions of the Orient has its own local varieties... Of the large number of introductions obtained from Asia, the same variety rarely has been secured a second time unless introduced from the same locality... Before numerous introductions were made by the Department, beginning in 1898, there were not more than eight varieties of soybeans grown in this country, and the culture of these varieties was confined to limited areas in a few states... Seed samples were obtained through consuls, missionaries, seedsmen, government agencies, and foreign explorers until by 1909 we had 175 varieties; by 1913, 427 varieties; by 1919, 629 varieties, by 1925, 1133 varieties, and at the present time more than 2,500 distinct types. Since 1989 the Department of Agriculture has made more than 10,000 introductions of soybeans from China, Manchuria, Japan, Chosen [Korea], Java, Sumatra, Siberia, and India. This large collection, ranging in time of maturity from 75 to 200 or more days, has show wide differences in adaptation to soil and climatic conditions..."

After preliminary testing at Arlington Farm, Virginia, the introductions are sent to various experiment stations for cooperative studies...

"The soybean has been used chiefly as a forage crop in the United States and for many years breeding work tended largely toward the development of varieties for hay, silage, and pasture. With the rapid development during the past few years of the soybean for oil, food and industrial purposes, acreage for bean production has increased greatly. The improvement and development of varieties adapted to a wide range of conditions and uses undoubtedly has been one of the most important factors in increased acreage and seed production."

"Extensive cooperative investigations with more than 3,000 introductions and selections of soybeans have been carried on during the last three or four years with experiment stations and special cooperators in 44 states and the insular possessions, Hawaii and Puerto Rico. Many of these selections gave outstanding results when compared with standard varieties in different sections and are being increased for more extensive field tests. Several of the varieties in different sections were found especially suitable for use as green shelled beans, dry edible beans, or beans of high oil and protein content, as commercial beans.

"In 1936, more than 5,000 individual soybean plant selections from introductions and natural hybrids were under test at Arlington Farm. Although improvement work at Arlington has been largely plant selection, some hybridization work has been started, especially with the wild soybean and the most promising cultivated types. Oil and protein studies have been conducted along with the breeding work, analyses being made of introductions grown in the same and under different environmental conditions. An extensive series of varieties, introductions and selections at Arlington Farm ranged from 12 to 26 per cent oil and from 28 to 50 per cent protein... In view of the interest in soybean oil for paint purposes, studies were conducted to show the range in iodine number. The results of these investigations showed a range from 118 to 143 for domestic varieties and 155 for the wild soybean.

"The increasing use of soybeans for food has resulted in a demand for varieties especially suited for various food purposes. Extensive cooperative cooking experiments with

the Bureau of Home Economics of the Department of Agriculture and with several state experiment stations have shown considerable variation in flavor and cooking quality in both the green and dry beans of edible varieties from the Orient. The most promising of these have been named and distributed to special cooperators by several state experiment stations. Some of these varieties are especially valuable as green shelled beans, flour, dry edible beans, roasted salted beans [soynuts], bean curd, bean milk, and bean sprouts." Address: Bureau of Plant Industry, USDA, Washington, DC.

649. Rozul, J.B. 1937. Cost of production of soy bean *(Glycine hispida)*. Abstract by Felix J. Madrid. *Philippine Agriculturist* 26(5):475-76. Oct.
• ***Summary:*** This abstract of Rozul's 1937 thesis, presented for the degree of Bachelor of Agriculture no. 675, analyzes the cost (in pesos) of production under Los Baños conditions, in both the wet and dry seasons. The cost of production was 86.90 pesos/hectare for the wet-season culture and 62.39 pesos/ha for the dry season. The cost of production per cavan of soy bean seeds was 5.19 pesos for the wet-season crop and 15.07 for the dry season. Yields per hectare were as follows: 16.73 cavans of seeds and 2,900 kg of straw from the wet-season crop, and 4.14 cavans of seeds and 270.5 kg of straw from the dry-season crop.

650. Salgues, René. 1937. Étude agronomique et chimique de quelques variétés de Soja, cultivées en France [Agronomic and chemical studies on some varieties of soybeans grown in France]. *Revue de Botanique Appliquee & d'Agriculture Tropicale* 17(194):724-37. Oct. [1 ref. Fre]
• ***Summary:*** The author has conducted soybean trials with various varieties since 1921 in the region of Brignoles, France. Some of the best studies on soya in France have been written by Mlle. Marie-Thérese François, Professor at the Faculty at Nancy, France. They appeared during 1935-36 in the *Actes et Compte-rendus de l'Association Colonies Sciences*. A table gives statistics for the world's principal countries importing and exporting soybeans and soy oil, during 1925-29, 1932, 1933, and 1934.

Details are given on soybean trials conducted in the region of Brignoles. Eleven varieties were grown, obtained from various locations. For each variety is given: Variety names or numbers. Germination percentage. Density. Weight of 100 seeds. Plant habit. Flowering (usually none). The date obtained, varietal names, and seed weights, when given, are shown in parentheses. The locations are: 1. Botanical Garden of Eala, Belgian Congo (3 numbered varieties; 100 seeds weigh 28.6, 27.9, and 31.4 gm). 2. Botanic Gardens, Peradeniya, Ceylon (23.5 gm). 3. State Botanical Garden, Buitenzorg, Java (2 numbered varieties; 29.1 and 15.5 gm). 4. Botanic Gardens, Singapore, Straits Settlements [incl. Malaya] (22.3 gm). 5. Botanic Gardens, Sibpur, Calcutta, British India (22.3 gm). 6. Agricultural Service, Beirut, Lebanon (Service de l'Agriculture, Beyrouth; Etat du Grand Liban) (1924; 35.6 gm). 7. Botanical Garden, Tabor, Czechoslovakia (1924; 18.4 gm). 8. Technische Hoogeschool Culturtuin voor Technische Gewassen, Delft, Netherlands (4 varieties–alba 34.3 gm, nigra 26.5 gm, ochroleuca 23.8 gm, Sangora 21.2 gm). 9. Bureau of Plant Industry, USDA, Washington, DC, USA (2 varieties–alba 27.8 gm, nigra 24.3 gm). 10. College of Agriculture, Univ. of Wisconsin, Madison, Wisconsin, USA (3 varieties–Mandarin 54 23.6 gm, Manchu Ped. 3 19.6 gm, Ito San 57 27.3 gm). 11. Dr. Trabut, then Pr. Maire, Direction du Service Botanique, Algers, Algeria (4 or 5 varieties–Haberlandt 1929 19.8 gm, Black No. 6 (black eye) 23.7 gm, Précoce 1 1922 23.9 gm, Mamouth [Mammoth] 26.7 gm.).

An analysis of the chemical composition of the seeds of most of these varieties is given on p. 722, and a detailed analysis of the oil of six varieties is given on p. 733.

Details on large scale cultivation of 11 other varieties of soybeans at Vaucluse are also given (p. 734-36). The variety names (in French) are: *Jaune de Pologne, Soja brun, Soja saumon, Mandarin, Hato tacheté noir, Vert monstre, Hato noir, Tokyo noir, Sun Yat Sen, Mandchou [Manchu], 206 vert*. For each is given: Color of the seeds, color of the pods, density, yield in 100 liters per hectare, yield in kg/ha (ranged from a high of 2,870 for *Hato tacheté noir* to a low of 1,530 for *Soja brun)*. weight of 1000 seeds in grams, number of seeds per kg, seeding rate (kg/ha), number of times the seeds were harvested.

A final section on soymilk gives the composition of soymilk made by the author from 5 varieties of soybeans.

Note: This is the earliest document seen (Dec. 2007) concerning soybeans in Lebanon, and (probably) the cultivation of soybeans in Lebanon. This document contains the earliest date seen for soybeans in Lebanon, or the cultivation of soybeans in Lebanon (1924, probably). The source of these soybeans is unknown. Large green soybean seeds were sent from Beirut to France in 1924. Address: Fondation Salgues de Brignoles (France) pour le developpement des sciences biologiques.

651. Scheltema, A.M.P.A. 1937. De uitbreiding van de kedelee-cultuur op Java en Madoera [The expansion of soybean culture in Java and Madura]. *Economisch-Statistiche Berichten* 22(1141):832-33. Nov. 10. [3 ref. Dut]

652. Gutierrez, Marciano. 1937. Soybean milk, the poor man's milk: A close approximation to natural milk can be easily prepared from soybeans. *Agricultural and Industrial Monthly (Manila)* 5(3):3, 17, 37. Dec. [Eng]
• ***Summary:*** Contents: Introduction. Food value. How to prepare soybean "milk." Extensively used in China and Japan. Composition.

"That milk can be made from beans seems incredible. It sounds like one of Ripley's 'believe-it-or-nots.' But it is true. From the soybean an artificial 'milk' which is a close approximation of natural milk can be easily prepared and at very little cost.

"It seems that in the Philippines very little is known about the soybean, aptly called by some the 'wonder bean,' when for centuries it has played an important part in the diet of the teeming millions of China."

Dr. Roxas, chief of the technical staff of the National Development Company, states that the soybean can be grown in all parts of the Philippines." As an added incentive, one should consider that annual importation of soybeans to the Philippines far exceeds domestic production.

Photos show: (1) Trays of soybeans, ground soaked beans, bean residue [okara]. (2) All implements used in the preparation of soybean "milk" at the U.P. School of Hygiene and Public Health in Manila, plus a bottle filled with soybean "milk" to the left of the hand-turned stone mill. Address: Ph.C., M.D., School of Hygiene and Public Health, Univ. of the Philippines.

653. *Orgaan van den Nederlandsch-Indischen Plantersbond.* 1937. Plantkundige gegevens over de sojaboon [Botanical data on the soybean]. 260. p. 6064. [Dut]*

654. Vittoz, -. 1937. Soja annamite: Dan-Xanh [Soybeans of Annam: Dan-Xanh]. *Revue de Zootechnie* p. 413. [Fre]*

655. Bordas, Jean. 1937. Le soja et son rôle alimentaire [The soybean and its role as a food]. Paris: Hermann & Cie. 36 p. 24 cm. Series: Actualités Scientifiques et Industrielles, No. 557. [24 ref. Fre]
• ***Summary:*** Contents: Introduction. 1. Botanical characteristics and principal varieties. 2. Chemical composition of soya. 3. Alimentary physiology and the nutritional uses of soya: Seeds (energy value, protein, vitamins, use as a milk substitute), forage. 4. Different uses of soya: Agricultural, industrial (oil, casein, sterol), as human food (sprouts, tofu, fermented tofu, shoyu, miso, tuong of Annam, roasted soy coffee, soy bread for diabetics, the future of soya). 5. The economics of soya: Production, imports, exports. Conclusions. Address: Director, Station d'Agronomie et de Pathologie vegetale d'Avignon, France.

656. Descartes de Garcia Paula, Ruben. 1937. A soja como materia prima para industria [The soybean as a raw material for industry]. Rio de Janeiro, Brazil: Instituto Nacional de Technologia (Ministerio do Trabalho, Industria e Commercio). 21 p. 24 cm. [4 ref. Por; fre]
• ***Summary:*** Contents: Introduction. Names of the soybean in different languages. Table showing production of soybeans in leading countries: Manchuria, China, Japan and Korea, United States, Russia, Netherlands Indies. Chemical composition of soybeans in China and Japan, Russia, Hungary, England, and USA (tables {p. 9-11} showing chemical composition, based on research in USA and Brazil); for each variety is given the percentage composition of water, oil, protein *(proteinas),* carbohydrates, cellulose, and ash. Analyses of 7 soybean varieties (made in the USA by USDA): Austin, Ito San, Kingston, Mammoth, Guelph, Medium Yellow, Samarow. Analysis of 11 varieties grown in Sao Paulo, Brazil: Peking, Wilson Five, Minsoy, Dunfield, Mandarin, Haberlandt, Virginia, Habaro, Dixie, Mammoth Yellow. Analysis of 6 varieties grown in Parana (Aksarben, Edano, Hermann, Mammoth Yellow, Mammoth Brown). Brief studies of the chief soybean products: oil *(oleo),* cake *(torta),* flour *(farinha de soja),* lecithin *(lecithina),* and casein *(caseina de soja).* List of potential industrial products. List of food products. French summary.

Highlights the importance of the soybean in the general economy and especially as a raw material for industry. The possibilities of the crop for Brazil are considered.

Note 1. This is the earliest Portuguese-language document seen (Sept. 2006) that mentions soy oil, which it calls *oleo.*

Note 2. This is the earliest Portuguese-language document seen (Aug. 2003) that uses the term *caseina de soja* or *proteinas* to refer to protein in connection with soybeans. Address: Rio de Janeiro, Brazil.

657. Kale, F.S. 1937. Soya bean: Its value in dietetics, cultivation and uses. With 300 recipes. 2nd ed. Baroda State, India: Baroda State Press. xxx + 375 p. Illust. (35 leaves of plates, described in a separate record). Index. 22 cm. 2nd ed. 1937. [66 ref]
• ***Summary:*** Contents: 1. Deficiencies in the Indian diet and soya bean as a means to rectify them. 2. History of the origin and growth of soya bean: Derivation of the word soya bean, origin of soya bean, literature, primitive man and soya bean, name of the plant, home of soya bean and its expansion, varieties of soya bean, the culture of soya bean is very remote (It "has been the chief article of diet in China for over 7,000 years."), reference of soya bean in old Chinese records, how and when soya bean became known to Europeans, soya bean in England (from 1890; J.L. North and Henry Ford), soya bean in France (from 1739), soya bean in Italy, soya bean in other countries of Europe, soya bean in United States of America, India and soya bean.

3. The use of soya bean: Importance of soya bean, dietetic importance, industrial importance, agricultural importance (Russia, Mussolini in Italy), medical importance, soya bean is alkalising in its effect ("Soya bean milk as well as its flour is used in foods for invalids and infants, like Nestle's food"), longevity and soya bean.

4. World trade in soya bean: Imports to Europe, production of soya bean in Manchuria (58% in North Manchuria), exports from Manchuria, oil and cake industry in Manchuria, soya bean production in Japan, in America, in Africa, in Australia, in Europe, in Java, in India, in other British possessions, estimate of world production of the soya bean, the desirability of the expansion of soya bean cultivation, imports and exports of soybeans, soya bean oil, and soya cake–1913-1927: Denmark, Holland, United States, Great Britain, Japan, France, Russia, China, Germany, Norway, Korea. Source: International Institute of Agriculture, Bureau of Statistics, 1921, p. 420-21. A table (p. 38) shows statistics for world production of soybeans "as estimated by the leading firm of London soya bean dealers" for various years from 1923 to 1929. This includes individual statistics each year for China [incl. Manchuria], Japan, and USA. The world totals in tons are: 3,095,000 (for 1923-25). 3,397,000 (for 1926). 4,325,000 (for 1927). 6,000,000 (for 1928), and 6,570,000 (for 1929; incl, China 5,250,000; Japan 550,000; USA 250,000; Java & Dutch East Indies 120,000; Other Asiatic countries & Africa 400,000).

5. Botany of the soya bean plant. 6. Classification of soya bean. 7. Cultivation of soya bean. 8. Diseases and pests of soya bean. 9. Cultivation of soya bean in India. 10. The constituents of soya bean. 11. Soya bean milk. 12. Soya bean flour. 13. Industrial uses of soya bean. 14. Enriching soil by addition of nitrogen and use of soya bean as fodder. 15. Food requirement of the human body. 16. European and American soya bean recipes. 17. Diabetic dishes, Mahatma Gandhi's experiments at Magan Wadi and opinion of scientists on soya bean. 18. Chinese and Japanese soya bean dishes: Toffu [tofu] or soya bean curd: Digestibility, utilization, toffu khan, toffu nao, tze toffu (fried bean curd), chien chang toffu (thousand folds), hsiang khan, kori toffu (frozen toffu), preservation of toffu. Natto. Tokio natto and Kyoto natto etc. Hamanan natto [Hamanatto]. Yuba. Misso [miso]. Soya sauce. Soya bean confectionery. Roasted beans (Chinese).

19. Indian soya bean dishes: Hindustani dishes, Moglai dishes, Gujarati dishes, Maharashtrian dishes, Bengali dishes, Goa dishes, Tanjore dishes. Appendixes. 1. Acreage of soya bean in Manchuria during the last 5 years. 2. Total figures of export during last 5 years. 3. Bibliography. 4. Some opinions about the first edition of this book.

The preface begins: "This little book is written in response to innumerable inquiries I have had from time to time after the inauguration of the plantation ceremony of Soya Beans at the State Agricultural Experimental Station by H.H. the Maharaja Gaekwar of Baroda in November 1933.

"A few months after this a food exhibition was held in Baroda where many Soya Bean dishes–Indian, European and Chinese–were exhibited. The leading papers and journals all over the country spoke in very glowing terms about the Soya Bean dishes that were exhibited... Later on at the request of Messrs. Mitsui Bussan Kaisha Ltd., a leading Japanese Firm in Bombay, a Soya Bean Exhibition and Restaurant were run in the Japanese village at the H.O.H. fete. So keen was the interest and enthusiasm evinced by the cosmopolitan public of Bombay that seats in the restaurant had to be reserved in advance. The presence of H.E. the Governor and Lady Brabourne and many Indian princes was an additional evidence of the ever growing popularity of the tasty Soya Bean dishes served there.

"At the closing of the H.O.H. fete many prominent people of Bombay requested me to continue the restaurant at a convenient place in the city, and asked me to open soya-bean milk centres for the children of the poor who could not afford to buy cow's milk. Many were ready to finance any scheme that I would propose, but unfortunately my time was not my own as I had to attend to my duties in the State and could not take advantage of their generous offer.

"The Departments of Agriculture of the various provinces of India as well as many Indian States asked me to supply them witb literature regarding the cultivation and the uses of this most useful bean. The Department of Commerce and Industry of the Government of Bombay inquired if I could furnish them with information about the machinery for the extraction of Soya-bean milk. Letters of inquiries from private individuals kept pouring in daily from all parts of India. All this has induced me to undertake the preparation and the publication of this book...

"From the number of experiments carried on in the Baroda territories and outside it, I feel sure that the Indian soil is most suitable for the cultivation of soya bean...

"The leading thought of the day in India is, 'Village uplift,' and 'Rural reconstruction.'

"Baroda, 7th January 1936, F.S.K.

"Preface to the Second Edition: I feel grateful to the public for having given such a hearty reception to the first edition of my book. It is running into a second edition within a year...

"Now, Soya Bean Bakeries and Restaurants have been started in the city of Bombay and in many other towns in India, and Soya Bean products are exhibited in almost all the exhibitions...

"I feel highly thankful to His Highness the Maharaja of Baroda who gave me an opportunity last year of visiting Russia, where I have seen that seven to ten per cent. of Soya Bean flour was being added to the wheat flour in order to enhance the nutritive value of the bread. The Soya Research Institute at Moscow is making researches into the nutritive, industrial and economical values of Soya Bean. I have seen there the actual working of the Soya-bean milk extracting plant. They make casein out of Soya-bean milk. Soya-bean cream is sold in the market.

"I visited the dietetic clinics in England, France, Germany, Austria and other European countries, where doctors prescribe Soya Bean bread for diabetic patients. In Russia, rickets and consumption are treated by Soyolk extracted out of Soya Bean...

"France is growing Soya Bean on côlt de jura [sic, Côte d'Azur, on the Mediterranean?]. In England, through the efforts of Mr. J.L. North, Soya Bean is realised as a field crop for the last two years.

"Paris, 3rd April 1937 (p. ix)." Address: Food Survey Officer, Baroda State, India.

658. Morse, W.J.; Cartter, J.L. 1937. Improvement in soybeans. *Yearbook of Agriculture (USDA)* p. 1154-89. For the year 1937. [67 ref]

• ***Summary:*** Contents: History of the soybean. World distribution and production. Utilization of the soybean (with chart). Improvement of soybean varieties. Methods in breeding: Natural and artificial crossing, mutations. Inheritance studies and cytology: Plant characters (flower, stem, pubescence, and foliage; height of plant and maturity; pod-bearing habit and pod characters; sterility, growth habit), seed characters (color of seed coat, hilum, and cotyledon; other seed characters), yield of seed. Disease resistance. Identification of genes and chromosomes. Selected references on genetics of the soybean. Appendix: 1. Workers identified with soybean improvement: United, States, foreign countries. 2. List of soybean genes (table). 3. Linkage of soybean characters (table). 4. Soybean varieties: Origin and varietal characteristics (table listing 101 named soybean varieties; for each is given the place and date of introduction or origin, days to mature, flower color, pubescence color, and seed characters {coat color, germ color, hilum color, seeds per pod, seeds per pound}, uses {dry-edible beans, forage, green-vegetable beans, grain}).

The section titled "History of the Soybean" states: "The early history of the soybean is lost in obscurity. Ancient Chinese literature, however, reveals, that it was extensively cultivated and highly valued as a food for centuries before written records were kept. It was one of the grains planted by Hou Tsi, a god of agriculture. The first record of the plant is contained in a materia medica describing the plants of China, written by Emperor Sheng Nung [sic, Shen Nung] in 2838 B.C. The crop is repeatedly mentioned in later records and it was considered the most important cultivated legume and one of the five sacred grains essential to the existence of Chinese civilization. Seed of the plant was sown yearly with great ceremony by the Emperors of China, and poets extolled its virtues. The records of methods of culture, varieties for different purposes, and numerous uses indicate that the soybean was perhaps one of the oldest crops grown by man."

Note 1. This is the earliest English-language document seen (June 2003) which states that: (1) The soybean was one of the "five sacred grains." (2) "The early history of the soybean is lost in obscurity." (3) The soybean was planted at an early date by "Hou Tsi, a god of agriculture." (4) The "soybean was perhaps one of the oldest crops grown by man." It is also the earliest document seen (June 209) in which William Morse mentions the mythical Chinese emperor "Sheng Nung" in connection with soybeans.

More broadly, this entire story linking Shen Nung with the earliest written record of the soybean, is completely incorrect. Yet because the story was written by Morse (highly regarded as America's leading authority on the soybean) in a USDA publication, it has unfortunately been repeated, and this source cited, again and again down to the present day (see Hymowitz 1970; Hymowitz and Shurtleff 2005).

Note 2. This is the earliest document seen (June 2003) in which the emperor's name is spelled "Sheng Nung."

Note 3. This is the earliest document seen (July 2007) in which William Morse tries to write an early history of the soybean in China. Unfortunately, he does not cite his sources.

The section titled "Improvement of soybean varieties" states: "In the United States, more than 50 percent of the acreage devoted to soybeans is used for forage and pasture; breeding work, therefore, has tended largely toward the development of varieties for hay, silage, and pasture. The development of such varieties as Virginia, Laredo, Otootan, Wisconsin Black, Manchu, Wilson-Five, Kingwa, Peking, and Ebony by selection from introductions has been the principal factor in the increased use and acreage.

"Beginning with 1929, the use of soybean seed by oil mills has led to a demand for yellow-seeded varieties of high oil content. Agronomists and plant breeders have attempted to meet this demand by making large numbers of selections from foreign introductions and locally grown varieties and by analyzing these for oil content. This has brought about the development of several superior oil varieties and has resulted in a large increase in production of beans for milling purposes. The most popular of these varieties are Illini, Dunfield, Mukden, Mandell, Scioto, Mansoy, Manchu, Mamredo, Delsta, and Mandarin. Results of analyses with more than 1,000 selections and varieties have shown a range of from 12 to 26 percent in oil content. From studies of the oil content of varieties grown in a given locality, it seems possible, from the breeding standpoint, to produce varieties high or low in oil, at least within the known ranges of variation exhibited by common varieties." (p. 1161-62).

Soybean varieties that have excellent flavor and become soft in less than 2 hours of cooking include Easycook, Bansei, Rokusun, Jogun, Chusei, and Sousei. These are "now in the hands of growers and seedsmen. Experiments by commercial firms have shown that these varieties are superior to commercial varieties for the

manufacture of food products, such as bean flour, roasted beans, bean milk, and bean curd [tofu].

"In Japan, certain varieties of soybeans were found that were used solely as green shelled beans. Ranging in maturity from 75 to 170 days, many of these introductions, and selections from them, have been found especially promising for the various sections of the United States. The vegetable soybean offers an excellent food of high nutritional value, especially in the fall when other green beans are lacking and in sections where the Mexican bean beetle prohibits the growing of garden beans. As a result of selection, cooking tests, and adaptation studies, eight green vegetable varieties–Hahto, Kura, Kanro, Hokkaido, Higan, Chusei, Sousei, and Jogun–have been introduced in various sections of the country" (p. 1163).

Photos show: (1) "The late Charles Vancouver Piper, agronomist, United States Department of Agriculture, 1902-26. Pioneer in the introduction and development of soybean varieties for United States conditions." (2) "Storage yard of a Chinese grain merchant near Kungchuling, Manchuria. More than 80 osier bins, each holding four cartloads of soybeans, were in this yard." (3) A Manchurian farmer and how he harvests, threshes and cleans soybeans by methods learned from his ancestors; comparison with modern U.S. machine harvesting. (4) "Millions of soybean oil cakes are stored in warehouses in Manchuria awaiting shipment to Japan, Chosen, China, and the East Indies, where they are used for fertilizing purposes and for cattle feed." A person looks up at the towering stacks. (5) Coolies loading large sacks of soybeans on a freighter for shipment to the oil mills of Europe. One man has hoisted a huge sack onto his back. (6) Five Manchurian farmers who have been awarded certificates and prizes for producing high-quality soybeans. (7) Twenty seeds of a natural soybean hybrid showing peculiar types of coloration. (8) Illustration (line drawing) of a soybean flower and its parts enlarged. Front view, side view, parts of the corolla (standard, wing, one of the keel petals), stamens, pistil. (9) A. Stems and pods of fasciated soybean plants; B. Determinate pod-bearing type; C. Indeterminate pod-bearing type. 10. Chromosome chart showing four groups of linked genes in soybeans.

A table (p. 1157) shows: "Increase in production of soybeans over an 11-year period, 1924-25 to 1935-36, inclusive, in the principal producing countries of the world" (Manchuria, Chosen [Korea], Japan, United States, Netherland India).

Soybean seed size (p. 1177): "The range in size of soybean seed varies according to the variety, each variety having its own typical seed size. Varieties and introductions tested at the Arlington Experiment Farm ranged in average weight of 100 seeds from about 4 grams for the smallest to about 40 grams for the largest." Address: 1. Senior Agronomist; 2. Assoc. Agronomist. Both: Div. of Forage Crops and Diseases, Bureau of Plant Industry [USDA, Washington, DC].

659. Morse, W.J.; Cartter, J.L. 1937. Improvement in soybeans: World distribution and production (Document part). *Yearbook of Agriculture (USDA)* p. 1154-89. For the year 1937. See p. 1156-57.

• ***Summary:*** "One of most striking agricultural developments in the United States in recent times is the rapid rise of the soybean. In 1907 there were 50,000 acres; in 1935, nearly 5,500,000."

"The soybean is grown to a greater extent in Manchuria, often called 'The Land of Beans,' than in any other country in the world (fig. 2). It occupies about 25 percent of the total cultivated area and is the cash crop of the Manchurian farmer (fig. 3). Chosen [Korea] and Japan are large producers, and south of China the soybean is cultivated more or less in the Philippines, Siam [Thailand], Cochin China [southern Vietnam], India and the East Indies.

"In the central part of the Union of Soviet Socialist Republics the districts of the Don and the southwest are said to be especially suited to the culture of this crop." Note: The Don is one of the major rivers of Russia. It rises southeast of Moscow, and flows for a distance of about 1,950 kilometres (1,220 mi) to the Sea of Azov, which is just north of the Black Sea and which borders on southeastern Ukraine. The main city on the river is Rostov on Don, and its main tributary is the Donets.

In 1935 in Czechoslovakia soybeans were produced commercially on a small scale. Address: 1. Senior Agronomist; 2. Assoc. Agronomist. Both: Div. of Forage Crops and Diseases, Bureau of Plant Industry [USDA, Washington, DC].

660. Schaefer, Victor A. 1937. Aperçu des bibliographies courantes concernant l'agriculture et les sciences connexes [A survey of current bibliographies on agriculture and allied subjects]. Rome, Italy: International Institute of Agriculture. 84 p. Index. 24 cm. Imprimerie de la Chambre des députés. [Fre; Eng]

• ***Summary:*** This book, written equally in French and English, won the Oberly Award for Bibliography in Agricultural Sciences in 1937. The author was born in 1906. The bibliographies are arranged by country, and within country alphabetically by title. Each work cited is accompanied by a summary/abstract, 3-17 lines long, in both French and English. The countries represented are listed alphabetically in French: Allemagne–Germany (52 citations), Argentina (2), Austria (1), Belgium (3), Bulgaria (1), Canada (1), China (1), Denmark (2), Egypt (2), Etats-Unis–United States (24), Finland (1), France and Colonies (24), Great Britain and Colonies (26), Hungary (2), India (2), Italy (8), Lithuania (1), Norway (1), Pays-Bas et Colonies–Netherlands and Colonies (6), Peru (1), Poland

(4), Romania (3), Sweden (5), Tchécoslovaquie–Czechoslovakia (5), U.S.S.R. (15), Yugoslavia (2), International Institutions (16).

The top 6 countries in terms of the number of citations listed are: Germany 52, Great Britain and colonies 26, France and colonies 24, United States 24, International institutions 16, USSR 15. Address: USA.

661. Woertge, Karl Heinz. 1937. Entwicklung und weltwirtschaftliche Bedeutung der Sojabohnenerzeugung und -verarbeitung [Development and international economic significance of soybean production and processing]. Thesis, Friedrich Alexander University, Erlangen, Coburg, Germany. 119 p. 28 cm. [112 ref. Ger]
• ***Summary:*** Contents: Foreword. Part I: History and culture of the soybean. 1. History, natural requirements and technology of soybean production; chemical composition of the soybean. 2. Occurrence of the soybean and methods of production in various countries: Asia (Manchuria and China, Japan, Korea, Formosa, Dutch East Indies, other Asian countries incl. British India, Cochin China, Ceylon), America, Europe (Southeast Europe, Austria, USSR, France, Italy, England, Poland, Switzerland, Czechoslovakia, Germany), Africa and Australia.

Part II. Scale and global economic significance of soybean production in the main producing areas. 1. General overview of world soybean production: Production for seeds, for fodders. 2. Scale of soybean production in the main producing areas: Asia (Manchuria, Japan, Korea, Formosa, Dutch East Indies [Java and Madura/Madoera]), America, Europe (Southeast Europe, USSR).

Part III. Development and global economic significance of soybean processing. 1. Soybean processing possibilities: A. Processing soybeans to make foods: Asia (general, methods used in China and Japan to make vegetable-type soybeans and salads, koji, soymilk, shoyu [soy sauce], miso, natto, tofu, methods used in the Dutch East Indies), Europe (general overview, preparation of soybean meal, soymilk, coffee- and chocolate substitutes). B. The soybean as an oilseed: General, methods of obtaining the oil (in Asia, Europe, USA), use of soy oil (as human food, other). C. Obtaining lecithin from the soybean. D. Use of soybean press-cake for livestock feed. E. Use of the soybean meal for fertilizer. 2. World trade in soybeans, soy oil and soybean cake/meal *(Sojakuchen/Sojaschrot):* World trade in soybeans (Manchuria, Asia, Europe, USA), world trade in soy oil, world trade in soybean meal.

Closing remarks: The state of the world soybean market with special consideration for the current German conditions. Appendixes and tables. Address: Nuerenberg, Germany.

662. Toxopeus, H.J. 1938. Over het voorkomen van de knolletjesbacteriën van kedelee (sojaboon) in verband met de wenschelijkheid van enten van het zaaizaad [The frequency of *Rhizobium japonicum* (the of root nodule bacteria of the soybean) in the soils of the Netherlands East Indies and the desirability of inoculation of the seeds]. *Landbouw (Buitenzorg, Java)* 14(4):197-215. April. [5 ref. Dut; eng]
• ***Summary:*** "*Rhizobium japonicum* could not be found in soils on which soybeans had never before been grown. On all commercial seed the organism was found and it must be these bacteria that cause the formation of the few nodules on the roots of some plants in soils, where soybeans are grown for the first time." Address: Plantkundig Laboratorium van het Algemeen Proefstation voor den Landbouw te Buitenzorg, Java.

663. United Press (UP). 1938. Chinese dump Japan soy beans in water. *Los Angeles Times.* July 5. p. 3.
• ***Summary:*** "Penang (Straits Settlements) July 4." The Chinese are having a soy bean party, their equivalent of the Boston Tea Party in the British colonies of North America.

"While a crowd of cheering Chinese lined a wharf here today, demonstrators seized a cargo of Japanese soy beans and dumped it into the harbor as a protest against the Japanese invasion of China."

Note: Penang, an island near Singapore, was the first British settlement in Malaya, acquired in 1786 by the East India Company from the sultan of Kedah. In 1826 the British combined Penang, Melaka and Singapore to form Straits Settlements.

664. *Times (London).*1938. Rioting at Penang: Bonfires of Japanese goods. July 7. p. 15, col. 1.
• ***Summary:*** From a correspondent in Singapore. Two days of anti-Japanese rioting at Penang have left a British policeman wounded. "The trouble began in a shop which was suspected of dealing in Japanese soya beans." A Chinese mob ransacked many shops and burned the Japanese goods.

Note: Penang is in today's (2005) Malaysia. It was later occupied by Japanese during World War II. The Chinese were angry because Japanese troops had already invaded Manchuria and China. The Japanese rape of Nanking, China, was in Dec. 1937. Address: [London].

665. Capinpin, Aurelia M. 1938. A preliminary study on the preparation of sprouts of different kinds of field beans and their possible use for culinary purposes. *Philippine Agriculturist* 27(2):96-111. July. Summarized in Dutch by J.A. Nijholt in Landbouw 15:95-96 (1939). [9 ref]
• ***Summary:*** In there Philippines many kinds of field beans are produced, but only mung beans *(mungo, Phaseolus aureus* Roxb.) are used to make sprouts on a large scale; these sprouts are called *togue.* This study was undertaken for three main reasons: (1) To compare two methods of

preparing bean sprouts. (2) To find out if other kinds of field beans could be used to make sprouts. (3) To find out if the sprouts made from the various field legumes are palatable and at what stage they should be harvested and are ready for cooking.

In this study the following field beans were used: (1) Green and yellow varieties of mungo *(Phaseolus aureus* Roxb.). (2) Five varieties of cowpeas, namely, New Era, Black, Red, Kibal, and Gray. (3) Two varieties of patani *(Phaseolus lunatus* L.)–the small white-seeded variety and the big purple-seeded variety. (4) The white variety of tapilan *(Phaseolus calcaratus* L.). (5) Green and yellow strains of the Ami soybean variety. (6) Brown cadios *(Cajanus cajan* Sprengel). (7) The winged bean *(Psophocarpus tetragonolobus* [L.] DC).

The method found to be most efficient and effective in growing bean sprouts was: Soak the seeds in water over night. Place them in a container (such as an earthenware pot) with perforations in the bottom; if the perforations are large, cover them with straw to prevent the beans from falling through. Place the container (with the soaked beans in it) in the dark.

The growth of sprouts can be divided into four different stages; as sprouts grow, they become more fibrous. All were found to be most palatable after the emergence of the radicle (the sprout) and plumule but before the emergence of the first leaves; they are best after 2-6 days. All seven species and 14 varieties of field beans tested grew into sprouts that are acceptable for the table. most Address: Dep. of Agronomy, Univ. of the Philippines, College of Agriculture.

666. Rodrigo, P.A. 1938. Acclimatization of soybean in the Philippines. I. *Philippine J. of Agriculture* 9(3):223-52. July/Sept. Plus 6 plates on unnumbered pages at end. [13 ref]

• ***Summary:*** "Work on the acclimatization of the soybean, *Glycine max M.,* was started by the then Bureau of Agriculture (now Bureau of Plant Industry) in 1911, and as early as 1915 by the College of Agriculture in Los Baños. From 1911 to 1932, about 100 varieties from various countries have been introduced and tested by the former institution. The present work, however, the results of which are being presented in this paper, was begun in May, 1935, and is still in progress."

When the Bureau of Plant Industry first launched its drive on crop diversification in about 1931, the soybean was chosen as one of the crops to study, in part because the Philippines imports over 500,000 pesos worth of soybeans and soy products each year. "The successful production of soybean in the Philippines would not only prove agriculturally beneficial, it would also bring a decided improvement in the diet of our people, the soybean being considered one of the 'most complete and natural foods known to the human race.'"

"The soybean is not really a new crop in the Philippines, although it is practically unknown to the farming public. Some even advance the theory that it is indigenous to the Philippines, but the more common belief is that it must have been introduced here during the early Spanish times, perhaps, by Chinese immigrants. This belief is strengthened by the lack of any wild species or form of soybean in the Islands and by the existence of only a single naturalized variety, the Ami, which is claimed to have been grown in the province of Batangas from time immemorial...

"The data presented in this article include results obtained from cultures started in May, 1933 to June, 1937. All the tests were conducted in plot cultures at the Central Experiment Station, Malate, Manila."

The plates show different soybean varieties growing in the Philippines. The first five show soybean plants; the last shows soybean seeds, with their relative sizes and shapes. The names of the varieties that produced these seeds are: American Black, Ami, Cayuga, Chinese, Dunfield, Furisode, Hakubi, Head Green, Illini, Kachin, Kingwa, Macoupin, Manchu, Manchuria, Manchuria Type 13-177, Mandarin, Mandell, Mamloxi, Mamredo, Midwest, Mis 2 Behrum, Miss 28 E.B. Str. 3910, Miss 33 Dixi, Nanking, Nanksoy, Otama-ao, Otama-ao Str. 2, Otama-ao Str. 3, Penagype, Scioto, Seaweed, Type 117, Type 65379, Yellow Biloxi Hybrid, Yellow Biloxi Small.

A French-language translation appeared in *Revue Internationale du Soja* 1(1):35-37 (1941). Address: Horticulture Section, Bureau of Plant Industry, Manila.

667. Koolhaas, D.R. 1938. Keuring en sorteering van sojaboonen in Amerika [Inspection and sorting of soybeans in America]. *Landbouw (Buitenzorg, Java)* 14(10):656-57. Oct. [Dut]

• ***Summary:*** About soybean standards in the USA. Describes the 4 different U.S. soybean grades, and "sample grade." Address: Hoofd van het Laboratorium voor Scheikundig Onderzoek.

668. *Landbouw (Buitenzorg, Java).*1938. De situatie van kedelee (sojaboonen) in Nederlandsch Indie en de beoordeeling van het product in Nederland [The soybean situation in the Netherlands Indies and its reception in the Netherlands]. 14(10):643-56. Oct. [5 ref. Dut]

669. *Economisch Weekblad voor Nederlandsch-Indie.*1938. De situatie van kedelee (sojaboonen) in Nederlandsch-Indie en de beoordeeling van het product in Nederland [The situation with soybeans in the Netherlands Indies (Indonesia) and a review of the product in the Netherlands]. 7(47):2165-70. Nov. 23. [6 ref. Dut]

Address: Samengesteld door de Afdeeling Handelsmuseum, Kolonial Inst., A'dam, den Dienst van den Landbouw, Batavia-Centrum en het Laboratorium voor Scheikundig Onderzoek, Buitenzorg.

670. *Indische Mercuur (De) (Amsterdam).* 1938. De situatie van kedelee (sojaboonen) in Nederlandsch Indie en de beoordeeling van het product in Nederland [The soybean situation in the Netherlands Indies and the evaluation of the product in the Netherlands]. 61(48):685-87. Nov. 30. Berichten van de Afdeeling Handelsmuseum van de Kon. Ver. "Koloniaal Instituut." No. 132. [5 ref. Dut]
Address: Afdeeling Handelsmuseum van het Koloniaal Instituut, Amsterdam.

671. Bulatao, Emilio. 1938. Statistical note on the effect of supplementary feeding of powdered milk, soya bean milk, cod liver oil, and tomato juice on height-weight of children. *Natural and Applied Science Bulletin (Univ. of the Philippines)* 6(4):357-76. Dec. [2 ref]
• ***Summary:*** Conclusions: "4. Whichever and whenever one of two groups was given milk as a dietary supplement, that group put on weight at a significantly faster rate than did the other group taking only the basic diet."

"6. Although the soya bean group showed greater rate of weight increment than did the control, the difference is small and not significant." Address: Dep. of Physiology and Biochemistry, College of Medicine, Univ. of the Philippines.

672. Concepcion, Isabelo; Paulino, Peregrino. 1938. The influence of certain dietary supplements on the growth of Filipino children. *Natural and Applied Science Bulletin (Univ. of the Philippines)* 6(4):337-56. Dec. [14 ref]
• ***Summary:*** Various dietary studies have shown that the Filipino diet has a deficiency of milk and dairy products, is low in calcium, animal protein, and fat, and is deficient in vitamins, especially A, B-1, and C. The high cost of milk and dairy products in the Philippines prevents their widespread use among infants and children.

Four supplements were tested in the diets of 67 children. The authors found that the addition of liquid milk (reconstituted from whole milk powder) to a basic diet produced an acceleration in both weight and height, and an apparent increase in the red blood cell count. "The addition of soya bean milk and a mineral mixture to the same diet, although it caused an increase both in height and weight more than the control group, is not significant however, specially with regards to height. There was also a marked increase in the hemoglobin content of the blood."

They conclude: "Of the four supplements that we have studied milk was the most effective and from the standpoint of nutritive value, the most economical." Efforts should be made to reduce the price of milk. Address: Dep. of Physiology and Biochemistry, College of Medicine, Univ. of the Philippines.

673. *Verslagen van Veldproeven. A, Variteitenproeven (Landbouwkundige Institut).* 1938. Varieteitenproeven met kedelee [Variety trials with soybeans]. A 684-701. [Dut]*

674. Balzli, Hans. 1938. Kleine Soja-Fibel. Geschichte, Anbau und Verwertung einer einzigartigen Nutzpflanze [A little soybean primer. History, culture, and utilization of a unique useful plant]. Zurich and Leipzig: Albert Mueller Verlag. 88 p. Index. 16 cm. [26 ref. Ger]
• ***Summary:*** Contents: Foreword. Economic questions. Botanical. Historical. Chemical composition of the soybean seed. Utilization in East Asia: Koji, miso, shoyu, soymilk, yuba, tofu *(Sojakäese,* like Quark), soy oil and press-cake. Utilization in Europe and America: As fertilizer and feed, as food (soy flour, roasted soybeans, soy coffee, green vegetable soybeans *(den jungen Sojakern... wie junge gruene Erbse),* soy sprouts), and industrial products (incl. "soybean steel," an invention of Henry Ford). Medicinal significance. Cultivation and yield. Epilogue. Bibliography. Author-subject index.

In the chapter on History (p. 24), the author notes: "The poet Johann Heinrich Voss (lived 1751-1826) once said: 'Young Calcuttans... with your sharp soy sauce from Jakarta *(Junge Kalkuten... mit scharfer batavischer Soja).'* Then he adds to that the observation: 'Soy sauce *(Soja)* is a powerful sauce, which is prepared from soybeans *(Sojafasele),* Dolichos Soja, which originate in the East Indies and are subject to fermentation, together with brine and spice.'"

Balzli continues on page 25: "The *Deutsche Woerterbuch der Naturgeschichte* (German Dictionary of Natural History) contained in the *Allgemeinen Polyglotten-Lexikon der Naturgeschichte* (General Multilingual Encyclopedia of Natural History) by Philipp Andreas Nemnich (1793) contains the entry: 'Sojablume. Dolichos soja.' (Soya flower. Dolichos soja)."

"In the world-famous work *Geist der Kochkunst* (Spirit of the Culinary Art), the art historian C.F. von Rumohr (lived 1785-1843) also mentions soya in the second edition (1832, p. 155) and conjectures that the Garum sauce of the Romans was an imitation of the East Indian sauce (Sulze) made from soybeans (Soja)."

Page 29 reports that "During the war of 1870 *(des siebziger Krieges,* in which Bismarck of Germany defeated Napoleon III of France) the German head artillery man, O. Wehrman, saw in the botanical garden of Montigny-les-Metz a plant that was unknown to him. It was the soybean. He took 4-5 seeds with him and planted them in early 1872 on his property / estate near Meissen (in Sachsen/Saxony, near Dresden in today's Germany). He harvested 80 to 100 seeds, with which he continued his investigations

successfully for some years" [Note: Haberlandt (1878, p. 5) tells this same story].

On page 57 the author uses the term "Sojaspeisen" to refer to soyfoods. Address: Switzerland.

675. Fairchild, David. 1938. The world was my garden: Travels of a plant explorer. New York, NY: Charles Scribner's Sons. xiv + 494 p. Assisted by Elizabeth and Alfred Kay. Illust. Index. 25 cm.

• ***Summary:*** This wonderful book, an autobiography of David Fairchild, also tells the story of the early days of the USDA and its Section of Foreign Seed and Plant Introduction, and of the pioneering work with plant introduction to the United States. It contains about 207 black-and-white photos, mostly taken by the author. Contents: 1. Background. 2. Kansas. 3. I enter government service. 4. I meet Barbour Lathrop and reach Naples [Italy]. 5. Breslau, Berlin, and Bonn [Germany]. 6. Java ho! 7. The Lathrop-Fairchild odyssey begins. 8. The Cannibal Isles (Incl. Hawaiian islands). 9. American interlude (in 1897 his father resigned as president of Kansas State College of Agriculture after the wave of Populism engulfed the college). 10. The West Indies and South America. 11. Cotton in Egypt. 12. Across the Java Sea. 13. From Finland to Dalmatia. 14. Land of the Pharaohs. 15. Malta, Tunis, Algiers, and Spain. 16. England, America, and west to the Orient once more. 17. The Persian Gulf and Bagdad [Baghdad. Note: Iraq was established in 1921 out of former Turkish territory]. 18. A glimpse of Saïgon [Saigon] and a long stay in Japan. 19. I visit Luther Burbank and circumnavigate Africa. 20. I meet Alexander Graham Bell. 21. A grand tour of these United States. 22. Mostly personal. 23. Washington, Madeira, and "In the Woods." 24. Baddeck, Nova Scotia. 25. Mostly aviation. 26. Lacquer and wild wheat. 27. Aaron Aaronsohn and Joseph Rock. 28. More plants, introduction gardens, and Mr. Bell. 29. Florida in 1912. 30. Monsters of the backyard. 31. The flowering cherry trees are planted in Washington. 32. Quarantine increases and war [World War I] begins. 33. Seeds from Afghanistan. 34. The plains of Canada. 35. The war and dried vegetables. 36. The Allison Armour expeditions. 37. Aloha.

In 1889 Beverly T. Galloway, head of USDA's Division of Plant Pathology, brought David Fairchild, age 19, to Washington, DC, to join five plant pathologists who were working in attic rooms of the old red brick department building. P. Howard Dorsett, Galloway's Wisconsin classmate, soon joined the group. Soon shy and scholarly Walter T. Swingle, Fairchild's Kansas State classmate and close friend since their student days in Germany, arrived with his growing library of agricultural references in 5 or 6 languages. Seeking an opportunity to learn about the flora of foreign countries, Fairchild accepted a Smithsonian fellowship to study entomology in Naples, Italy, and resigned from the USDA. Fairchild's pioneering work with plant introduction traces its roots back to late 1893. On board a ship, the young plant pathologist met Barbour Lathrop, a wealthy San Francisco gentleman who later took him on an extended tour of the Pacific and showed him fruits, grains, and ornamental plants that could be valuable in America. In 1895 Lathrop gave Fairchild the money to begin his study of the plant treasures of the tropics. Returning to the USA in 1897 (with Mr. Lathrop), after an absence of 4 years, David Fairchild knew exactly what he wanted to do with his life. He visited his parents in Manhattan, Kansas, and learned that a wave of "Populism" (resembling Bolshevism) had caused his father to resign as president of the college (p. 105). In August 1897 he reached Washington, DC–without a job. James Wilson, the Secretary of Agriculture, firmly believed that "what agriculture needed most was more knowledge." "The idea of plant introduction as a government activity was germinating in other minds besides Lathrop's and mine" (p. 106). Secretary Wilson's first act after taking office had been to send N.E. Hansen to Russia in search of cold-resistant cereal grains and fruits for America's great plains. Swingle has recently presented a paper on introducing subtropical plants to Florida.

Fairchild and Swingle conceived a plan to divert $20,000 dollars of the funds appropriated for the wasteful Congressional Seed Distribution Service (which was already spending several hundred thousand dollars a year) in order to finance a section for the specific purpose of introducing new, useful, and carefully selected crops into the United States. He enthusiastically presented the idea to Secretary Wilson, who approved the plan and asked him to organize the new Foreign Seed and Plant Introduction Section (p. 107). Housed on the fifth floor under the eaves of the old Department of Agriculture building and staffed by one teenage secretary, it became a reality when Congress passed the revised appropriation bill in July, 1898.

"In 1899, all that existed of the Department of Agriculture was housed in an ugly old building with a mansard roof topping its red-brick walls. It was situated in a park south of Pennsylvania Avenue, just beyond one of the most disreputable quarters of the city" (p. 18).

In 1916 David and Marian Fairchild purchased a piece of property located in Coconut Grove on Biscayne Bay, Florida; they named it The Kampong. On the property was a very old stone barn, a huge stone entrance gate, and many fine old tropical trees (p. 452-53, 456A, 472C). A Kampong is a Malay word (first used in English in 1844) meaning "a native hamlet or village in a Malay-speaking country."

Good photos show: (1-4) Members of the USDA Section of Plant Pathology taken in the early 1890s: Walter T. Swingle, Joseph James, David Fairchild, Theodore Holm, Beverly T. Galloway, Merton B. Waite, and P. Howard Dorsett (p. 26A-B). (5) Barbour Lathrop and David

Fairchild in the cabin of a boat, off Sumatra, Christmas, 1895. (6) The uniform of a worker at Mr. Suzuki's nursery in Tokyo, Japan. The back is decorated with large Chinese characters. (5) Fermentation vats with conical bamboo covers in a soy sauce factory at Ichang (I-ch'ang or Yichang), a city in west Hupeh / Hubei province in Central China (p. 256F, probably taken by Frank N. Meyer in 1917). (6) page shows "A prolific Soy Bean plant ripe for harvest" and loaded with pods (p. 256F). (7) David Fairchild (seated) and Howard Dorsett (standing), each in two-piece suits, by at a desk, examining various fruits (p. 472A). Address: USDA.

676. Prijono, -. trans. 1938. Sri Tanjung, een oud Javaansch verhaal [Sri Tanjung, an old Javanese story]. 's-Gravenhage, Netherlands: H.L. Smits. [12] + 32 + [2] + 273 + [3] p. Illust. [1 ref. Jav]*

• ***Summary:*** This book is based on his 1938 PhD dissertation at Leiden University *(Rijksuniversiteit te Leiden).* The original manuscript is believed to have been written in the 12th or 13th centuries. It contains the earliest known mention of the soybean *(kadele)* in today's Indonesia. For details see Astuti 1999 (p. 3-4). Address: Netherlands; native of Indonesia.

677. Simonds, William Adams. 1938. Henry Ford and Greenfield Village. *GVS* Illust. No index. 20 cm.

• ***Summary:*** In chapter 9, titled "Industry and Agriculture," Henry Ford's work with soybeans is discussed on pages 230-35. Ford developed plastics using soybeans. "The cost of one pound of soybean molding material has as yet proved higher than that of a pound of steel, but the polishing and finishing of the steel makes the cost of its finished part somewhat greater than that of the finished plastic. When a molded plastic part replaces one of steel, weight is decreased with consequent reduction in gasoline consumption.

"Two years before experiments with the soybean in its relation to industry were commenced, the bean was the subject of another definite line of research in the food and diet laboratory maintained by the Company in the rear of the Engineering Laboratory directed by Mr. Ford's old seatmate, Dr. Edsel Ruddiman... Many will doubtless recall the howl of laughter that went up when Mr. Ford informed a reporter one day of his belief that synthetic milk could be produced. Nevertheless, milk has been produced from the soybean in the Ford laboratories and elsewhere. It is even better than cows' milk for certain infants' cases, where skin afflictions make use of the latter undesirable...

"When Dr. Victor Heiser, author of 'An American Doctor's Odyssey,' visited Greenfield Village he told me of the wide use of soybean milk among the Filipinos, and how the addition of a little oil of banana had made it much more palatable...

"With this milk soybean cheese, similar to cottage cheese except in flavor, may be made. While somewhat insipid in taste, the cheese proves very useful when mixed in salads, sandwich spreads, croquettes with a food having a strong flavor. The whole bean has many food uses, among them soups, baked beans, salads, and canning. As the flavor of the soya is slightly stronger than that of the ordinary bean, onions and tomatoes are often used to cover it. The process of canning the green soybean was first demonstrated under Dr. Ruddiman's direction. Production of soybeans in 1935 totaled 590 cans; and in 1936 it reached 1,000."

Defatted soybean flour "finds a ready market among visitors at the Village. It is used in many common baked goods such as bread, rolls, muffins, biscuits, cakes, cookies, and so on... Another product that has proved popular with visitors is the salted soya, put up in small packages like nuts. In preparing these, the bean is soaked in water for a time, then roasted in hot soya oil. The salt is added to taste." Lecithin can be used to make a "chocolate sauce and coating for soybean candies, with which the Ford men have done much experimenting.

"As a practical demonstration of the possibilities of the soybean in a variety of foods, a dinner was served one August evening in 1934 at the Ford exhibit in the Chicago Century of Progress Fair. Every dish on the menu was comprised, in part at least, of the legume. Following was the list [of 15 dishes served].

"Tomato juice seasoned with soybean sauce. Salted soybeans. Celery stuffed with soybean cheese. Purée of soybean. Soybean crackers. Soybean croquettes with tomato sauce. Buttered green soybeans. Pineapple ring with soybean cheese [tofu] and soybean dressing. Soybean bread with soybean butter. Apple pie (soybean crust). Cocoa with soybean milk. Soybean coffee. Assorted soybean cookies. Soybean cakes. Assorted soybean candy."

Note 1. The listing and spelling of the items in this menu differs slightly from the original menu of 17 Aug. 1934.

Note 2. No mention is made of soy ice cream being served at this meal in Aug. 1934. Yet shortly thereafter, and definitely by Aug. 1935 soy ice cream for dessert was served at similar meals in the pine-panelled dining room in the Ford Engineering Laboratory (Strother 1961).

Chapter 10, titled "Little Factories," discusses Ford's rural industries, including the mills at Saline, Tecumseh, Milan, and Ypsilanti. At Tecumseh, in the heart of soybean country, the Hayden Mills, after its restoration, "was used for cleaning and sacking soybeans for seed, preparing them for distribution to neighboring farmers in the spring." At "the village of Saline where the Chicago pike crosses the Saline River a few miles north of the soybean farms..." the old Shuyler mill and its dam were restored. "The fall of

1936 also found workmen busy at the town of Milan east of the soybean area..."

An excellent panoramic view of and guide to Greenfield Village are shown inside the front cover and on the facing page. #11 is a "soybean extraction plant."

Note 3. This is the earliest English-language document seen (Oct. 2001) that uses the term "Salted soybeans" to refer to soynuts. Address: Dearborn, Michigan.

678. Toxopeus, H.J. 1938. Over het voorkomen van de knolletjes bacteriën van kedelee (soyaboon) in verband met de wenschelijkheid van enten van het zaaizaad [The frequency of *Rhizobium japonicum* (the of root nodule bacteria of the soybean) in the soils of the Netherlands East Indies and the desirability of inoculation of the seeds]. *Mededeelingen van het Algemeen Proefstation vor den Landbouw (Buitenzorg)* No. 29. 20 p. [Dut; eng]*
• ***Summary:*** In Dutch, with an English-language summary on pages 19-20.

679. Bloch, Kurt. 1939. Netherlands India takes advantage of soybean situation. *Far Eastern Survey* 8(3):34-35.
• ***Summary:*** Japanese expansion in East Asia and the worldwide economic depression have combined to encourage the cultivation of soybeans outside of Manchuria, especially in the Netherlands Indies [today's Indonesia] were soybeans have long been a basic foodstuff and where new land has become available because of the decrease in area planted to sugar cane. "The area devoted to soybean cultivation in Netherlands India has increased its relative position from less than 5% to more than 10% of the Manchurian area."

During the past eight years [since 1931], two main factors have influenced the international soybean market: (1) Japan's occupation of Manchuria has led to a sharp reduction of soybean acreage and production there; (2) Germany's *Fettwirtschaft* (edible fats' consumption regulation), initiated in 1933, resulted in a sharp reduction in the international demand for soybeans since Germany used to consume more than half of all European supplies. In addition, the fact that soybeans were dependent on a silver exchange standard has made them comparatively high priced, and soybean oil has been unable to compete with rival products.

"As a result soybeans have developed into a profitable crop in other areas, especially since in recent years the German-Manchurian barter trade has served to support the international level of prices in this commodity." There has also been a great expansion of soybean area in southeastern Europe–especially in Roumania and Bulgaria.

680. Schuller, R. 1939. Culture et commerce du Soja [Soybean cultivation and commerce]. *Revue Internationale des Produits Coloniaux et du Material Colonial* 14(158):66-69. Feb. [Fre]
• ***Summary:*** Manchuria is the world's leading soybean producing country. The cultivation of oilseeds (poppy seeds, colza) has practically disappeared from France. The construction of large oil mills, an extension of the importation of peanuts and the concentration of oilseed processing at French ports, has gradually led to the almost total disappearance of regional oilseed production and oil mills. Thus one can envision the need for new crops–such as soybeans. Mr. Chevassu, a professor of agriculture, has conducted a promising study of this crop.

Concerning production of soybeans in French colonies: In Indochina, no more than 500 ha produce an estimated 300-400 metric tons (tonnes) per year. The main provinces and villages producing soybeans are listed. Soybean imports to Indochina are: 1935–529 tonnes. 1936–1,349 tonnes. 1937–1,207 tonnes. Address: Counsellor of Foreign Commerce (Conseilleur du Commerce Extérieur).

681. Rodrigo, P.A. 1939. Acclimatation du Soja aux Philippines [Acclimatization of soybeans to the Philippines (Abstract)]. *Revue de Botanique Appliquee & d'Agriculture Tropicale* 19(212):290-92. April. [1 ref. Fre]
• ***Summary:*** A French-language summary of the following English-language article: Rodrigo, P.A. 1938. "Acclimatization of soybean in the Philippines. I." *Philippine J. of Agriculture 9(3):223-50.* July/Sept. Plus 6 plates on unnumbered pages at end.

682. Morse, W.J. 1939. Soybeans–The world around. *Proceedings of the American Soybean Association* p. 39-44. 19th annual meeting. Held 11-12 Sept. at Madison, Wisconsin.
• ***Summary:*** Contents: Introduction. Asia: China, Manchoukuo [Manchuria], Chosen (Korea), Japan, Netherlands Indies [Indonesia], Philippine Islands. Europe. Rumania. North and South America. Africa. Australia.

In Europe, production is presently "confined largely to European Russia, Bulgaria, Yugoslavia, Czechoslovakia, and Rumania. In Europe as a whole, slightly more than 3 million bushels of seed were produced in 1938, 80 per cent of which was produced in Bulgaria, Rumania, and Yugoslavia. The largest increase has been in Rumania, due chiefly to the fact that Germany, by guaranteeing purchases, has given a certain stability to cultivation... Russian scientists have for the past several years carried on extensive experiments with the soybean. At the present time the principal areas of cultivation are the Ukraine and certain regions in northern Caucasus.

"Previous to the World War, Europe absorbed about 50 per cent of the exports of soybeans from Asiatic countries, the largest of the imports being taken by the United Kingdom, with Denmark and the Netherlands taking the

remainder. In the post-war period [after World War I] important changes took place, Germany taking first place as an importer and other nations entering into the international trade in the bean and its products. At present Germany still holds first place as an importer of soybeans, followed by Denmark, England, Sweden, and the Netherlands. Among other countries that have increased their imports are France, Norway, Latvia, and Italy...

In South America, soybeans are at the experimental stage. "Successful results have been obtained in Cuba, Argentina, Brazil, Chile, and in some parts of Mexico."

"Africa: Extensive experiments have been conducted with the soybean in various parts of Africa for many years but as yet it is an unfamiliar crop to the majority of African farmers. It has been successfully cultivated in the upland, midland, and coast districts of Natal and throughout Gambia, Sierra Leone, Nigeria, and the Gold Coast Colony. In the cotton and corn growing districts of Belgian Congo the soybean has been grown successfully for forage and food purposes. Results in all cases, however, indicate that more and better varieties, and improved methods of culture and harvesting are essential before the soybean becomes a factor of much economic importance in African agriculture. The crop is advised more as a crop for domestic use than the European market. It is of interest to note that in 1938 nearly 4 million pounds of soybean meal were used in native rations in the mine compounds of South Africa.

"Australia: Successful results have been obtained with a few American varieties in Victoria and Queensland, but thus far efforts to establish the soybean as a commercial crop have been disappointing. At the present time, however, more extensive tests are being conducted to obtain adapted varieties in order to produce beans on a commercial scale."

A table (p. 43) gives "Acreage, production, and imports of soybeans by countries (Compiled from official sources)," based largely on 1938 statistics. The countries are: Austria, Belgo-Luxembourg [Belgium], British Malaya, Bulgaria, Canada, China, Chosen (Korea), Czechoslovakia, Denmark, Estonia, France, Germany, Hongkong, Italy, Japan, Kwantung, Latvia, Manchoukuo, Netherlands, Netherlands Indies, Norway, Poland-Danzig, Rumania, Sweden, Taiwan (Formosa), United Kingdom, United States, U.S.S.R. (Russia), Yugoslavia.

Leading soybean producers are: China 217,192,000 bushels (1936), Manchoukuo 170,269,000 bushels, United States 57,665,000 bushels, Chosen 18,480,000 bushels, Japan 13,473,000 bushels (1937), Netherlands Indies 9,873,000 bushels (production minus seed for planting), U.S.S.R. 2,502,000 bushels, Rumania 1,804,000 bushels.

Leading soybean importers include: Germany 28,766,356 bushels (the world's largest soybean importer), Japan 27,796,787 bushels (#2 worldwide), Estonia 195,475 bushels, Latvia 86,347 bushels, and Poland-Danzig 19,106 bushels.

Note: This is the earliest document seen (Feb. 2005) concerning soybeans in Estonia. This document contains the earliest date seen for soybeans in Estonia (1938). Address: USDA Bureau of Plant Industry, Washington, DC.

683. Wing, David G. 1939. Legislative activities of the American Soybean Association. *Proceedings of the American Soybean Association* p. 15-17. 19th annual meeting. Held 11-12 Sept. at Madison, Wisconsin.
• ***Summary:*** These activities began in 1928 when the American Farm Bureau Federation, the National Grange, and the Dairymen's League cooperated with the American Soybean Association in procuring a tariff of $6 per ton on soybean cake and meal, most of which was being imported from Manchuria. This tariff was effective, however it did not stop the ever-increasing importation of foreign vegetable oils, of which, during 1935, over a billion pounds were imported. Of course, the major portion of these were coconut oil and palm oil coming from the Philippines, Brazil, the Dutch East Indies, and the west coast of Africa. These low-priced oils, selling for as little as 2 cents per pound, along with importations of soybeans and soybean oil from Manchuria, forced the price of vegetable oils in the USA to a very low level.

"The Legislative Committee of the American Soybean Association spent much of its time that winter in supporting the Bailey Amendment to the 1936 Revenue Bill which provided for a processing tax of from 3 to 5¢ per pound on all the chief foreign oils imported for processing purposes. It was through the efforts of this Committee, and the thousands of soybean growers scattered over many states, that the Revenue Act passed and became effective August 21, 1936."

"This brings us up to the formation of our present legislative setup. Largely, through the efforts of the American Soybean Association with E.F. Johnson and President Glen G. McIlroy taking the lead, a meeting was held in St. Louis [Missouri] early last winter. The purpose of this St. Louis meeting was to get together all the allied fats and oils interests and to organize them into a conference which might work together to the good of all concerned. A great deal of enthusiasm was displayed, and a second meeting was called in Memphis [Tennessee] for the following month. Jacob Hartz of Stuttgart, Arkansas, representing the American Soybean Association, and E.F. Johnson attended this conference."

E.F. "Soybean" Johnson took charge of this meeting. President McIlroy represented the ASA at the next meeting, which was in Washington, DC. The associated groups hired A.M. Loomis of the National Dairy Union to serve as their lobbyist in Washington, DC.

"Mr. Johnson and Mr. McIlroy have both been in Washington numerous times and have testified before the Senate Finance Committee. They feel that our efforts are not

in vain and that early next season we may be able to get relief from this deluge of cheap coconut and palm oils now coming into this country, which tends to force soybean oil down to 3½¢, and cottonseed oil and lard down to 5¢ and lower!... May I take this opportunity to congratulate President Johnson, his officers, and legislative committees for their efforts this last session of Congress. I, personally, want to congratulate the members of my Committee for the hundreds of letters and telegrams which they have sent in response to my call or to the call of our Washington representative, Mr. Loomis." opportunity to congratulate President Johnson

Note: This is the earliest document seen (Nov. 1998) by or about David G. Wing (of the well-known Wing family) related to soybeans. Address: Chairman Legislative Committee, ASA. From Mechanicsburg, Ohio.

684. Schuitemaker, B. 1939. Marktoverzicht van de voornaamste Nederlandsch Indische producten gedurende het jaar 1938 [Market overview of the leading Netherlands Indies' products during the year 1938]. *Landbouw (Buitenzorg, Java)* 15(10):634, 641-42. Oct. [Dut] Address: Java.

685. Benemerito, B.N. 1939. If you want bean sprouts... For the market or for family consumption, follow the steps outlined in this article. *Agricultural-Industrial Monthly (Manila)* 7(2):23-24. Nov.

• ***Summary:*** Describes how to make soy sprouts or mung bean sprouts on a commercial or home scale. Address: Agronomy Section, Bureau of Plant Industry.

686. Hennefrund, Helen E. comp. 1939. The peanut industry: A selected list of references on the economic aspects of the industry, 1920-1939. *USDA Bureau of Agricultural Economics, Agricultural Economics Bibliography* No. 80. viii + 238 p. Nov. 28 cm. [641 ref]

• ***Summary:*** This bibliography was compiled under the direction of Mary G. Lacy, librarian at the Bureau of Agricultural Economics. Contents: Foreword, by Mary Lacy. Sources consulted. General. United States: General, Agricultural Adjustment Program, cost of production and labor requirements, grading and standardization, legislation, markets and marketing, mechanization, periodicals, Philippine Islands, statistics, storage, utilization (general, feed and its nutritive value, peanut butter, peanut oil).

Foreign countries: General, Algeria, Argentina, Australia, Belgium and Belgian Congo, Brazil, British Empire, British East Africa, British West Africa, Bulgaria, Canada, Ceylon, China, Colombia, Cuba, Denmark, Egypt, France, French West Africa (incl. Senegal, French Guinea), Germany, India, Indo-China, Italy, Japan and Manchuria, Malaya, Mexico, Morocco, Netherlands and Dutch East Indies, Palestine, Poland, Portugal and Colonies, Rhodesia, South Africa, Spain, Sudan, Sweden, Thailand (Siam), Tunis [Tunisia], Turkey, Union of Soviet Socialist Republics, Uruguay, West Indies (British), Yugoslavia.

Pages 1-145 contain 641 bibliographic references (partially annotated), arranged by subject as shown above. Pages 146-238 are indexes.

The Foreword notes: "This bibliography supersedes and brings up to date a typewritten list by Vajen E. Hitz issued in 1931 entitled 'The peanut industry: Selected references on the economic aspects of the industry... 1920 to date.' It contains references to books, pamphlets, and periodical articles relating to the economic aspects of the peanut industry in the United States and in foreign countries from 1920 through the first five months of 1939... Call numbers following the citations are those of the U.S. Department of Agriculture Library, unless otherwise noted. 'Libr. Congr.' preceding a call number indicates that the publication is in the Library of Congress." Address: USDA Bureau of Agricultural Economics.

687. Morse, W.J.; Cartter, J.L. 1939. Soybeans: Culture and varieties. *USDA Farmers' Bulletin* No. 1520 (Revised ed.). 39 p. Nov. Revision of April 1927 edition, further revised in 1949.

• ***Summary:*** Contents: History. Description. Distribution and production. Climatic adaptations. Soil preferences, Varieties (classified by length of growing season into 7 groups, and divided within each group into "Seed, forage, green vegetable, and dry edible" types). Description of varieties (describes 125 varieties). Preparation of the seedbed. Fertilizers and lime. Inoculation. Time of seeding. Methods of seeding. Rate of seeding. Depth of seeding. Cultivation. Soybeans in rotations. Soybeans in mixtures. Soybeans drilled in small grains. Cost of production. Insect enemies of soybeans. Soybean diseases. Other enemies of soybeans.

"History: Ancient Chinese literature reveals that the soybean was extensively cultivated and highly valued as a food centuries before written records were kept. The first record of the plant is contained in a materia medica describing the plants of China, written by Emperor Sheng Nung in 2838 B.C. Methods of culture, varieties for different purposes, and numerous uses are repeatedly mentioned in later records, indicating the soybean to be of very ancient cultivation and perhaps one of the oldest crops grown by man. It was considered the most important cultivated legume and one of the five sacred grains essential to the existence of Chinese civilization. Soybean seed was sown yearly with great ceremony by the emperors of China, and poets through the ages have extolled the virtues of the plant in its services to humanity.

"The soybean was first made known to Europeans by Engelbert Kaempfer, a German botanist, who spent 2 years,

1691-92, in Japan. Seed sent by Chinese missionaries was planted as early as 1740 in botanic gardens in France..."

"Distribution and production: The soybean is grown to a greater extent in Manchuria than in any other country in the world. It occupies about 25 percent of the total cultivated area and is relied upon by the Manchurian farmer as a cash crop. China, Japan, and Chosen [Korea] are large producers and the soybean is cultivated more or less also in the Philippines, Siam, Cochin China, Netherland India [later Indonesia], and India. In other parts of the world, particularly Germany, England, Soviet Union, France, Italy, Czechoslovakia, Rumania, Mexico, Argentina, Cuba, Canada, New South Wales, New Zealand, Algeria, Egypt, British East Africa, South Africa, and Spain, various degrees of success have been obtained."

The section on diseases discusses the following: Purple spot of seeds, bacterial blight, bacterial pustule, mosaic, wilt, brown spot, sunburn or aphid injury, downy mildew, pod and stem blight, anthracnose, sclerotial stem rot, frog-eye spots, and *Pythium* root rot.

A table (p. 6-7) shows different varieties of soybeans recommended for four different uses (seed, forage, green vegetable, or dry edible), classified by the length of the growing season. Green vegetable–Very early (100 days or less): Agate, Sioux. Early (101 to 110 days): Bansei, Chusei, Goku, Kanro, Waseda. Medium early (111 to 120 days): Fuji, Hakote, Hiro, Hokkaido, Jogun, Kura, Osaya, Sato, Shiro, Sousei, Suru, Toku, Willomi. Medium (121 to 130 days): Chame, Funk Delicious, Imperial. Medium late (131 to 140 days): Aoda, Hahto, Higan, Rokusun. Late (141 to 160 days): Nanda.

Dry edible–Early (101 to 110 days): Bansei, Chusei, Goku, Kanro, Waseda. Medium early (111 to 120 days): Hokkaido, Jogun, Osaya, Sousei, Suru, Toku, Willomi. Medium (121 to 130 days): Funk Delicious, Imperial. Medium late (131 to 140 days): Easycook*, Haberlandt*, Higan, Rokusun, Tokyo*. Late (141 to 160 days): Nanda. Note: All dry edible varieties except three (Easycook, Haberlandt, and Tokyo–which are followed by an asterisk (*)) are also included in the green vegetable group. But many in the green vegetable group are not included in the dry edible group.

Detailed descriptions of the following 125 varieties are given (p. 7-17): Agate, A.K., Aksarben, Aoda, Arksoy, Avoyelles, Bansei, Barchet, Biloxi, Black Beauty (same as Ebony), Black Eyebrow, Cayuga, Chame, Charlee, Chernie, Chestnut, Chiquita, Chusei, Clemson, Columbia, Creole, Delnoshat, Delsta, Dixie, Dunfield, Early Green (same as Medium Green), Early Virginia Brown (same as Virginia), Early Wilson (same as Wilson), Early Wisconsin Black (same as Wisconsin Black), Early Yellow (same as Ito San), Easycook, Ebony, Elton, Fuji, Funk Delicious, George Washington, Georgian, Goku, Guelph (same as Medium Green), Habaro, Haberlandt, Hahto, Hakote, Harbinsoy, Hayseed, Herman, Higan, Hiro, Hokkaido, Hollybrook, Hongkong, Hoosier, Hurrelbrink, Illini, Ilsoy, Imperial, Indiana Hollybrook (same as Midwest), Ito San, Jogun, Kanro, Kingwa, Kura, Laredo, Large Brown (same as Mammoth Brown), Large Yellow (same as Mammoth Yellow), Late Yellow (same as Mammoth Yellow), Lexington, Macoupin, Mamloxi, Mammoth Brown, Mammoth Yellow, Mamredo, Manchu, Mandarin, Mandell, Mansoy, Medium Early Green (same as Medium Green), Medium Early Yellow (same as Ito San), Medium Green, Medium Yellow (same as Midwest), Midwest, Minsoy, Missoy, Monetta, Morse, Mukden, Nanda, Nanking, Norredo, Northern Hollybrook (same as Midwest), Ogemaw, Old Dominion, Oloxi (formerly Coker's Black Beauty), Osaya, Otootan, Ozark, Palmetto, Pee Dee (Coker's 31-15), Peking, Pine Dell Perfection, Pinpu, Richland, Rokusun, Sato, Scioto, Shiro, Sioux, Sooty, Sousei, Southern Green, Southern Prolific, Soysota, Suru, Tarheel Black, Toku, Tokyo, Virginia (selection {19186-D} from the Morse variety at Arlington Experiment Farm in 1907), Waseda, Wea, White Biloxi, Willomi, Wilson, Wilson-Five, Wisconsin Black, Woods' Yellow, Yelredo (a nonshattering selection, Coker's 319), Yokoten. Address: 1. Senior Agronomist; 2. Assoc. Agronomist, Div. of Forage Crops and Diseases; Both: USDA Bureau of Plant Industry, Washington, DC.

688. Wallace, G.B. 1939. French bean diseases and bean fly in East Africa. *East African Agricultural Journal* 5(3):170-75. Nov. [13 ref]

• ***Summary:*** "During the past year planters in the Tanga and Northern Provinces of Tanganyika Territory have inquired what explanations can be offered for the poor growth and low yields that have been obtained from French beans." Halo Blight is a disease caused by the bacterium *Phytomonas medicaginis* var. phaseolicola. This disease was present in the Territory in 1929. Legumes that are resistant to Halo Blight include Soy, Adzuki, and the Kudzu vine.

The bean fly, *Agromyza (Melanagromyza) phaseoli* "has been known for many years in tropical and sub-tropical countries. In Tanganyika Territory it was recorded in 1936 by Harris who referred to its larvae 'boring into the stems of haricot beans at the collar, causing total loss of crop.'" W.H. Hargreaves states (1926, *in lit.)* that flies reared from larvae that attacked the stems of *Phaseolus vulgaris* (common beans) "have been identified as *Melanagromyza sojae* Zehnt. (?) by van Emden." "Other Agromyzids parasitize other leguminous crops, usually in the leaves and seeds; a species is known in the pith of the stems of soy beans and other plants in Java." Address: Ph.D. (Edin.), Plant Pathologist, Dep. of Agriculture, Tanganyika Territory.

689. Soetisna, Mas. 1939. Kedelé mas Toegoemoeljo [The yellow soybean of Toegoemoeljo]. *Kolonisatie Bulletin* 6:9-

11. [Ind]
• ***Summary:*** In the author's name, the term "Mas" may be a Javanese title, of lower rank than Raden. "Toegoemoeljo" (presently spelled Tugumulyo) is a place name but it can also be translated as "Column/Pillar of Glory," in Javanese culture refers to the manifestation of the highest level of happiness. The document tells about yellow soybeans from this place. Address: Adjunct-landbouwconsultent di Loeboek Linggau.

690. *Verslagen van Veldproeven. A, Variteitenproeven (Landbouwkundige Institut).* 1939. Varieteitenproeven met kedelee [Variety trials with soybeans]. A 752-54, A 778-98, A 910-15, A 917-18. [Dut]*

691. Vollema, J.S. 1939. De sojaboon. Een voordeelige ondergroei in jonge rubbertuinen [The soybean, a profitable undergrowth in young rubber plantations]. *Bergcultures (Batavia, Dutch East Indies)* 8(20):460. [Dut]*

692. A handbook of Philippine agriculture. 1939. Manila, Philippines: College of Agriculture, University of the Philippines. vii + 803 p. No index. 18 cm.
• ***Summary:*** On the title page: "Issued in commemoration of the thirtieth Anniversary." The University of the Philippines was founded in 1908. The Foreword (by L.B. Uichanco, Dean, College of Agriculture) states that its College of Agriculture opened on 14 June 1909, at which time "scientific Philippine agriculture was virtually nonexistent." The idea for the book originated with the former dean of the College of Agriculture, Dr. B.M. Gonzalez, before he was appointed president of the University of the Philippines. Soybeans and soyfoods are discussed extensively.

"Coffee adulterants" (p. 104), commonly mixed with ground coffee, include roasted ground corn, soybean, peanut, mungo, cashew, and sometimes ipil-ipil *(Leucaena glauca).*

In Chapter I, "Field crops" is a long section titled "Peanut, soybean, cowpea" (p. 132-43). Contents of "Culture of soybean" (p. 134-41): Varieties. Preparation of the land. Planting. Cultivation. Harvesting and threshing. Yield. Green and yellow seeds of Ami soybean. Soybean sprouts. How to prepare–Soybean coffee, soybean cake [dessert, with baking powder], soybean milk, "tao-si" (salted soybean; Method furnished by Superintendent of the Davao Penal Colony), "toyo" or soy sauce.

The two main kinds of insecticides in 1939 (p. 223-31) were stomach poisons (which kill when eaten; incl. lead arsenate, calcium arsenate, Paris green) and contact poisons (incl. concentrated tobacco decoction, as in Black Leaf "40").

"Diseases of beans and other legumes (p. 319+) include downy mildew of soybean and rust of soybean.

A table (p. 448) gives the content of five vitamins found in various feeds incl. soybean seeds, soybean leaves, soybean meal, peanut meal, and peanut seeds.

"Leguminous silage" includes that from cowpea, soybean, and mungo [mung bean] *(Phaseolus aureus).* Tables give: (1) The "Average digestible nutrients in feeds" incl. soybean (p. 459, 462).

(2) The "Nutritive value of foods" incl. seaweeds (ara-rosip, *Gracilaria crassa,* p. 534), mungo sprouts (p. 536), green soybeans (p. 537), seguidilla or kalamismis *(Psophocarpus tetragonolobus,* fresh and sun-dried seeds, p. 538), soy products (p. 538-39) incl. soy sauce (toyo, Superior {Senkee and Co.}, Commercial), soy milk–boiled, soy residue (sapal), soy residue after second drawing of toyo, soy curd (toqua [tofu]).

(3) "Foods as sources of minerals" (calcium, phosphorus, iron; p. 580-81), incl. miso or soybean mush, soybeans–baked flour, soybeans–baked sprouts, soy curd or toqua, soy sauce or toyo (four brands: Solo, Great Eastern, Violin, Rooster), tahuri or soybean curd preserved in strong brine solution (solid portion).

(4) "Foods as sources of vitamins" (p. 593-94) incl. bean–asparagus or cigarillas *(Psophocarpus tetragonolobus),* bean–mungo (in pods or sprouts), bean–soy (dry, green, or leaves), peanut butter, seaweed, sesame (p. 601). Address: Manila, Philippines.

693. International Institute of Agriculture. 1939. Oils and fats: Production and international trade. *Studies of Principal Agricultural Products on the World Market* No. 4. Part I. 345 p. See p. 59-76. [Eng]
• ***Summary:*** Nine major oilseed crops and their respective oils are discussed: cottonseed, groundnut, linseed, soya beans (p. 59-76), sunflower seed, colza seed–rapeseed–mustard seed, sesame seed, castor seed, perilla seed, others (hemp seed, poppy seed, maize/corn). I. Grinenco wrote section IV titled "Soya beans and soya bean oil." Contents: I. Production (p. 59-68). Areas of production: Table 18 shows "Areas cultivated for soya." Average 1924-1928, 1929, 1930, 1931, 1932, 1933, 1934, 1935, 1936, in China, Manchukuo, Chosen [Korea], Japan, Netherlands Indies [Indonesia], United States, USSR, Europe.

Table 19 shows "Areas cultivated for soya" during the same time periods shown above. In 1936 the world's leading soybean producing countries (in 1,000 metric tons) were: China 5,911.0, Manchukuo [Manchuria] 4,175.5, United States 816.0, Chosen [Korea] 487.1, Japan 339.8, Netherlands Indies (Java and Madura) 247.4, USSR 44.3, Kwantung 17.7, Taiwan 4.4.

Table 20 shows "Area and production of soya in China by provinces (average 1931-1935)." The leaders in total production are (in 1,000 metric tons): Shantung 1,980.7, Kiangsu 1087.4, Honan 765.0, Szechuan 517.0.

Table 21 shows "Production of soya in Manchukuo by provinces in 1936 (in 1,000 metric tons):" Northern provinces: Pinkiang 1,083.9, Kirin 980.8, Lungkiang 464.9, Sankiang 260.6, Chientao 91.4, Heiho 2.7. Total north: 2,884.3. Southern provinces: Fengtien 985.4, Antung 154.7, Chinchow 151.1. Total south: 1,291.2.

Table 22 shows "Area cultivated for the production of soya bean in the United States (in 1,000 ha):" Figures are given for Illinois, Indiana, Iowa, Ohio, North Carolina, Mississippi, Missouri, Other states. Total.

II. Trade (p. 68-76). Principal countries exporting soya beans: Manchukuo, Chosen [Korea], The United States. Principal countries importing soya beans: Germany, Denmark, Sweden, Netherlands, France, Norway, Latvia, Italy, Japan, Chosen, Netherlands Indies. Principal countries exporting and importing soya oil: Manchukuo, Japan, United Kingdom, Austria, Czechoslovakia, Finland, French Morocco, Hong Kong. III. Conclusion (p. 76).

Concerning Norway: Table 24 (p. 71) shows "Net world imports of soya beans (in 1,000 metric tons)," yearly from 1929 to 1936, plus average 1909-1913, and average 1924-1928. A footnote shows that in 1910-11 Norway imported 700 tonnes of soybean oil, followed by an average of 100 tonnes in 1924-28. Norwegian imports of soybean oil were zero from 1929 to 1932, then 2,200 tonnes in 1933, rising to 15,300 tonnes in 1934, then 15,700 tonnes in 1935, and 22,900 tonnes in 1936.

Concerning Finland: Pages 74-75 state that Finland imports soya oil. Finland's first recorded imports were in 1931, when 684 metric tons (tonnes) were imported. By 1936 Finland was importing 2,565 tonnes of soya oil a year. Note: This is the earliest document seen (May 2002) concerning soybean products (soy oil) in Finland; soybeans as such have not yet been reported. This document contains the earliest date seen for soybean products (soy oil) in Finland (1931).

Concerning Latvia: Page 72 states: "Among the countries that have increased their imports of soya beans are France, Norway, and Latvia, although the quantities imported up to the present are relatively small." They are so small that no statistics are given. Address: Villa Umberto I, Rome, Italy.

694. Matagrin, Am. 1939. Le soja et les industries du soja: Produits alimentaires, huile de soja, lécithine végétale, caséine végétale [Soya and soya industries: Food products, soy oil, vegetable lecithin, and vegetable casein]. Paris: Gauthier-Villars. x + 390 p. 18 cm. [300 ref. Fre]

• ***Summary:*** Contents: Introduction. 1. The agricultural, industrial, and commercial history of soya: Asiatic origins and propagation in Europe, soya in America (its cultivation and industries), soya in Europe, Asia, Africa, and Oceania (1936) (1. Admission of soya in the agriculture and industry of European nations (p. 35): Soya in France, soy industry and commerce in central and northern Europe {England, Germany, Holland, Denmark, Sweden, Poland, Austria and Hungary, Switzerland}, penetration of soya into southern Europe {Iberian peninsula, Italy, Balkan countries of Dalmatia, Istria, Yugoslavia, Greece (p. 47), Bulgaria, Romania, Ukraine}, the grandeur and decadence of soya in Russia. 2. Soya in modern Asia (p. 51): China and Manchuria, Japan, Korea, Formosa, French Indochina {Tonkin, Cambodia, Cochin China}, the British and Dutch Indies {Siam, Assam, Bengal, Burma, Ceylon, India, Straits Settlements [later Singapore] / Malacca}, western Asia {Turkestan, Persia (p. 57)}. 3. Soya in Africa and Australia (p. 57-58): South Africa, Rhodesia, Nigeria, Gold Coast [later Ghana], Cote d'Ivoire, Dahomey, Togo, Algeria, Tunisia, Morocco, Egypt, Australia {Queensland, New South Wales, Victoria}, Tasmania, New Zealand, not yet in British New Guinea [later Papua New Guinea], Philippines, Java).

2. The botany and agronomy of soya: The plant, its names, its botanical characteristics, its varieties (original and created by selection), the cultivation of soya. 3. The general chemistry of soya: Chemical composition of the plant, structure and chemical composition of the beans. 4. Using soya in soyfoods and soyfood products: Whole soybeans (fresh, dry, sprouted, roasted and salted *(Fève grillée, fève salée de soja, fèves de soja salées,* p. 166-67), soynut butter *(un mélange rappelant les beurres végétaux),* soy coffee, soy confections, soy chocolate, soy sprouts), soymilk and tofu *(le lait et le fromage de soja),* okara *(pulpe résiduaire de la préparation du lait de soja),* fermented soy products (solid, paste, and liquid condiments; natto, miso, and shoyu [soy sauce]; kiu-tsee and lactic ferments), soy flour and bread. 5. The soy oil industry and products derived from it: Extraction and refining of soy oil, properties and use of soy oil. 6. The vegetable lecithin industry: Extraction of vegetable lecithin, properties and use of vegetable lecithin. 7. The vegetable casein industries and plastic materials based on soya: Soybean cakes and flours from which the oil has been removed, use of such cakes and flours, in the crude state, as a raw material for plastics, manufacture and use of vegetable protein, soybean cellulose for artificial silk, soya furfural and furfuraldehyde (phenolic resins). Conclusion: How to launch soya industries in France. important terms:

Note 1. This is the earliest French-language document seen that uses the terms *Fève grillée, fève salée de soja,* or *fèves de soja salées,* "roasted soy beans" to refer to soynuts.

Note 2. This is the earliest French-language document seen (April 2005) that mentions soynut butter, which it calls *un mélange rappelant les beurres végétaux.* Address: France.

695. Matagrin, Am. 1939. Le soja et les industries du soja: Le soja en Afrique et en Australie [Soya and soya industries:

Soya in Africa and Australia (Document part)]. Paris: Gauthier-Villars. x + 390 p. See p. 57-58. 18 cm. [Fre]
• ***Summary:*** There are no indigenous soybean varieties in Africa, but soybeans were introduced by the English to the Cape [South Africa]; then to the Orange Free Province, Rhodesia, and Transvaal, and also to Nigeria, the Gold Coast [later Ghana], and Côte d'Ivoire. Likewise, they were introduced by the French to Dahomey [later Benin] and Togo. Today soybeans seem to offer good promise everywhere, but production has been developed only in southern Africa. In northern Africa, earlier trials, which were rather indecisive due to the lack of selection and lack of human experience (except for those of Asian peoples), have been undertaken more seriously since 1918 in Algeria, then in Tunisia and then in Morocco; the coastal regions, where irrigation is unnecessary, seem more favorable.

Elsewhere, it is important to get early maturing varieties in order to avoid dehiscence of the pods under the influence of the summer heat. Note: Seedpods of some soybean varieties dehisce at maturity. That is, they split lengthwise along the natural line of the pod and discharge the contents of the pod–the soybean seeds.

The sandy and rocky soils, which are sometimes well tolerated by soybeans grown in the USA (North Carolina, etc.), are poorly suited in Algeria.

Following the advice of Mr. Rouest, we could try planting the seeds in two rows (20 to 25 cm apart), leaving between the two rows a space of about 1 meter of fallow (unplanted) land. In Tunisia, the climate and the vast territory offer advantages to many soybean varieties, and the trials which began in the 19th century, have now reached a certain amplitude / developed prosperously.

Note: Haberlandt (1878, p. 6) states that he obtained one green-seeded soybean from Tunis [later renamed Tunisia] in 1873 at the Vienna World Exposition *(Wiener Weltausstellung).*

In Morocco, where 35,000 to 50,000 tonnes per year of other beans *(d'autres fèves)* are produced, at least one-third of which is exported (including the bean of Safi, which reminds one of the horse bean or dry kidney bean *{féverole}* of Egypt), this crop succeeds in the regions that are rather cool zones or that allow irrigation. This crop could enrich the soils with nitrogen in the valley of Sebou and the area around Fez, the small market-garden valleys of Mogador, perhaps even on the plains or plateaus of the Chaouïa and of the Doukala [Doukkala; the latter two places are now both in Morocco].

As for Egypt, it has already been worked over by the English propaganda, and soy has spread in the valley of the Nile, beside the horse-beans *(féveroles)* which have an ancient reputation.

In Australia this Asian legume is finally being cultivated successfully. It began at the start of the 20th century in the southeast, and today it grows all along the eastern coast (Queensland, New South Wales, Victoria). From there it somehow spread a bit to Tasmania and toward Adelaide, and above all to New Zealand, where it was welcomed. It does not seem that British New Guinea [later renamed Papua New Guinea] contributed its transmission, although the Dutch region of this large insular territory [Dutch New Guinea, later named Irian Jaya = Irian Barat or West New Guinea] did adopt the soybean, either from Mindanao (Philippines) or from Java [Indonesia].

Tables show: (1) Production and utilization of soybeans in the USA in 1934 and 1935, by states (in 100 metric tons) (p. 18-19). (2) Quantity and value of soybeans, soybean cake, and soybean oil imported into the USA from 1909 to 1928 (p. 26). (3) Importation of soybeans and soy oil into Great Britain (from 1913), Germany (from 1922), Netherlands (from 1913), Denmark (from 1913), and Sweden (from 1930) (all in Europe) in 1913, 1922, 1925, 1930, 1933, 1934, and 1935 (p. 41). (7A) Production of soybeans in China, Manchuria, Korea, and Japan (all in East Asia) in 1928 and 1935 (p. 51). (7B) Soybean trade among countries in Asia in 1909-13, 1922-23, 1924-25 incl. China and Manchuria, Japan, Korea, Dutch Indies, Java and Madura, Formosa, British and French possessions (p. 51).

Note 1. This is the earliest document seen (Aug. 2009) concerning soybeans in Dahomey (later Benin), Côte d'Ivoire (Ivory Coast), or Togo, or the cultivation of soybeans in Dahomey, Côte d'Ivoire, or Togo. This document contains the earliest date seen for soybeans in Dahomey, Côte d'Ivoire, or Togo, or the cultivation of soybeans in Dahomey, Côte d'Ivoire, or Togo (1939; one of two documents for Côte d'Ivoire). The source of these soybeans is unknown. Unfortunately, the author gives no documentation for this early cultivation of soybeans in Dahomey, Côte d'Ivoire, and Togo.

Note 2. Matagrin says (without citing any source) that soybean trials were conducted in Tunisia (a protectorate of France from May 1881 to 1956) in the 19th century. If that were true, this document would contain the earliest date seen for the cultivation of soybeans in Tunisia. In 1869, Tunisia declared itself bankrupt. An international commission, with representatives from France, the United Kingdom, and Italy took over its economy. In 1878 Friedrich Haberlandt wrote that he had obtained 20 varieties of soybeans at the Vienna World Exposition in 1873; at least one of these, he said, came from Tunis (Tunisia). How did soybeans get to Tunisia in order to be tested there? One possibility is that they were sent there from France by the Society for Acclimatization, which reported that it was conducting soybean trials in neighboring Algeria a few years before 1880. Address: France.

696. Winstedt, Richard Olof. 1939. An English-Malay dictionary: Roman characters. 3rd ed. Singapore: Kelly & Walsh. 524 p. 25 cm. *

• ***Summary:*** States that the Indonesian word *kedelai,* meaning "soybean" comes from the Tamil language of southern India. Sir Richard Olof Winstedt was born in 1878. "Notes: Based on Mr. R.J. Wilkinson's Malay-English Dictionary." Richard James Wilkinson lived 1867-1941.

697. Yenko, F.M.; Baens, Luz. 1940. Rice as a substitute cereal in the manufacture of soy sauce. *Philippine J. of Science* 71(1):1-3. Jan. [2 ref]
• ***Summary:*** Rice is the most abundant cereal grain in the Philippines. Rice flour was found to be a good substitute for wheat flour or barley in the preparation of soy sauce by the mold-hydrolysis method. Soy sauce obtained after a month of fermentation contained 5.3% protein, and after 3 months 7.5% protein. Address: 1. Lissar Company; 2. Bureau of Science. Both: Manila, Philippines.

698. Bolhuis, G.G. 1940. Natuurlijke kruisbestuiving bij kedelee [Natural backcrossing by soybeans]. *Landbouw: Landbouwkundig Tijdschrift voor Nederlandsch Indie (Buitenzorg, Java)* 16(2):119-28. [10 ref. Dut; eng]
• ***Summary:*** Discusses the results of experiments in natural backcrossing conducted in Java. These experiments began in 1934 at Buitenzorg (Java), but the first seeds were harvested in 1937. Previous to 1907 it was generally assumed that natural cross-pollination in the soybean did not occur. In that year, Piper and Morse found some aberrant plants with hybrid nature in plots of some pure-grown varieties. Address: Ir., Landbouwkundig Instituut van het Algemmen Proefstation voor den Landbouw te Buitenzorg, Java.

699. Calma, Valeriano C.; Tiangsing, Julian P. 1940. The comparative effects of soybean and peanut planted with sugar cane and ammonium sulfate upon the yield of sugar cane. *Philippine Agriculturist* 29(1):20-29. June. [6 ref]
• ***Summary:*** Legume intercrops had a detrimental effect on the germination of sugar cane, and on the yields of cane and sugar. "The average income from peanut pods ranged from 70.58 to 76.37 Philippine pesos, and that from soybean seeds from 22.25 to 48.37 pesos." Address: Dep. of Agronomy, Univ. of the Philippines, Los Baños.

700. Gutierrez, M. 1940. The vitamin B-1 (thiamine) content of Philippine foods. I. The vitamin B-1 content of corn, mungo and soya bean. *Acta Medica Philippina* 1(4):415-23. April/June. [13 ref]
• ***Summary:*** The chief nutritional deficiency disease in the Philippines is beriberi. Each year it causes many deaths. "In the past, attempts to eradicate this disease have been directed towards the encouragement of the use of unpolished rice instead of polished rice..." This "met with very little success, owing chiefly to the unappetizing appearance and taste of unpolished rice and its lack of keeping quality, a lack which makes rice merchants unwilling to hold in stock this kind of rice."

The vitamin B-1 (thiamin) contents of corn *(Zea mays)*, mungo *(Phaseolus mungo [mung beans])*, and soya bean *(Glycine max)*, are 69 I.U. [International Units], 363 I.U., and 398 I.U., per 100 grams. Address: Nutrition Lab., Inst. of Hygiene, Univ. of the Philippines.

701. LeClerc, J.A. 1940. Re: Manufacture of soy sauce. Letter to Dr. Harry W. Miller, International Nutrition Laboratory, P.O. Box 326, Mt. Vernon, Ohio, Aug. 19–in reply to inquiry. 2 p. Typed, without signature. [16 ref. Eng]
• ***Summary:*** "I was very glad to get your letter of August 12, and to learn that it will be possible to see you at Mount Vernon on the 23rd. I hope, of course, to see you also in Detroit at the meeting of the Soybean Convention."

In answer to Dr. Miller's request for information regarding the manufacture of soy sauce and its supplementation with "sodium glutamate," Dr. LeClerc encloses one bulletin from the Philippines, and cites 9 scientific articles, 15 U.S. patent numbers, and one British patent number.

The following are all interested in the manufacture of sodium glutamate: (1) Dr. W.O. Snelling, 110 South 13th Street, Allentown, Pennsylvania; (2) R.W. Greef, 10 Rockefeller Center, New York City; (3) Huron Milling Co., Harbor Beach, Michigan; and (4) Amino Products Company, Rossford, Ohio. Address: Senior Chemist, Food Research Unit, Agricultural Chemical Research Div., USDA Bureau of Chemistry and Soils, Washington, DC.

702. Burlison, W.L. 1940. Importance of soybeans to American agriculture (With some notes on soybean research). *Proceedings of the American Soybean Association* p. 27-35. 20th annual meeting. Held 18-20 Aug. at Dearborn, Michigan.
• ***Summary:*** Contents: List of 11 things that the future of the soybean as an important Illinois crop is dependent upon–according to G.L. Jordan, Dep. of Agricultural Economics, Univ. of Illinois. Where do we go from here in soybean production? Table 1–Annual production of soybeans in five leading countries from 1925-1939: USA, Manchuria, Chosen [Korea], Japan, Netherland India. Table 2–World production of soybeans in 1,000 bushels (excluding China) from 1925-1939, including percentage increase each year over 1925. These figures include, in addition to the countries shown in Table 1, Kwantung, Taiwan, USSR, Rumania, Bulgaria, Yugoslavia, and certain other small countries in Europe. U.S. soybean production as a percentage of world production. Why this rapid increase in U.S. soybean production? Rapid increase in U.S. soybean production during the past 6 years. Research leads the way: List of typical research projects at larger corn belt agricultural experiment stations.

Extracts from letters on the future of soybeans in Illinois from thoughtful observers: H.G. Atwood, Allied Mills, Inc., 26 Dec. 1939. G.G. McIlroy, President, American Soybean Association, 7 Dec. 1939. W.J. O'Brien, The Glidden Co., 8 Dec. 1939. N.P. Noble, Swift and Company Soybean Mill, 8 Dec. 1939 (Swift has now built soybean mills at Cairo, Illinois; Des Moines, Iowa; and Fostoria, Ohio. Swift is using larger quantities of soybean oil in their various products). Edward J. Dies, National Soybean Processors Assn., 14 Dec. 1939. D.F. Christy, Acting Director, USDA Office of Foreign Agricultural Relations, 17 Feb. 1940. E.F. Johnson, Ralston-Purina Company, 21 Dec. 1939. H.P. Rusk, Dean and Director, Illinois Experiment Station, 22 May 1940. J.W. Hayward, Archer-Daniels-Midland Company, 24 May 1940.

Growth in the number of soybean crushing mills in the USA from about 10 in 1925 to approximately 75 in 1939. Increase in soybean yields in Illinois from 13.5 bushels/acre in 1925 to 24.5 bushels/acre in 1939. Growing industrial utilization of soybeans. Conclusion: "The importance of soybeans to American agriculture is bound to be of greater significance as the years go by."

Concerning research: "Our research program on soybeans in this country is nothing less than remarkable. In 1937 a list of soybean projects was published by H.M. Steece, Specialist in Agronomy, Office of Experiment Stations, U.S. Department of Agriculture." In 1937 some 53 agricultural experiment stations were conducting 258 separate investigations on soybeans. "By far the largest number of these have to do with the varieties and methods of production." A photo (p. 29) shows a tractor pulling a combine harvesting soybeans in Indiana.

Note: This is the earliest English-language document seen (March 2003) that uses the term "soybean research" (see subtitle) to refer to research on soybean production. Address: Head, Dep. of Agronomy, Univ. of Illinois.

703. Morse, W.J. 1940. Soybeans around the world. *Proceedings of the American Soybean Association* p. 72-74. 20th annual meeting. Held 18-20 Aug. at Dearborn, Michigan.

• ***Summary:*** The areas where soybean production has recently increased are the East Indies, Rumania, Austria, Bulgaria, Czechoslovakia, and Yugoslavia. "Soybean production in the Danube Basin in 1939 amounted to approximately 5 million bushels. The acreage in Bulgaria, Hungary, Rumania, and Yugoslavia increased more than 60% in 1940, this being attributed to the activities of two German companies which distributed selected seed and inoculation culture, and contracted in advance for taking the entire production at increased prices. The Greek government planned extensive cultivation of soybeans in 1940, providing for importation of seed, requiring compulsory cultivation of the crop, and the purchase of the entire crop from farmers at remunerative prices."

The increase in production has been largely due to the development of adapted soybean types through introduction, selection, and hybridization. "Soybean breeding programs have been carried on extensively in Germany, Russia, Netherland Indies, Rumania, Japan, Manchuria, South Africa, Canada, and some of the Balkan countries, and to a lesser extent in Sweden, England, Holland, France, Italy, Poland, Australia, India, and the Philippines."

"The outbreak of hostilities in Europe and the resulting interference with the flow of Manchurian soybeans into European markets brought about a rather critical situation to the producers in that part of the Orient. Moreover, Manchurian authorities on November 1, 1939, set up a soybean monopoly whereby the government purchases all soybeans for sale, fixes the price, and makes all export sales... Soybean exports from Manchuria for the first 8 months of the 1939-40 marketing year amounted to approximately 24 million bushels as compared with 59 million bushels for the corresponding period last season. Exports to Europe during the 8 months of this season were estimated at about 4 million bushels as compared with actual exports of 32 million bushels for the same months in 1938-39. About one million bushels were exported this year to Germany via Trans-Siberian Railway, and over 2.5 million bushels to Europe by sea, a major portion of which went to Italy.

"With practical cessation of direct shipments to European countries, Japanese and Manchurian officials began concentrating on the development of new industrial outlets for soybeans. The process of making usable protein from soybean material as a substitute for imported milk casein has been widely studied by government and industrial agencies in Manchuria and Japan. At present the principal ways in which soybean protein is substituting for milk casein are as glue for wooden articles, furniture, veneer, plywood, etc., paper sizing, as the adhesive element in insecticides and water paints, and as material for artificial wool and plastics. In 1938 more than 22 million pounds of soybean glue were used. A few Japanese companies have industrialized the manufacture of protein on rather an extensive scale. In Japan only one firm is reported to be producing soybean plastics, and these are not entirely satisfactory. Soybean fiber, or casein fiber as it is known in Japanese trade circles, is manufactured exclusively by one concern which sells its products to a spinning firm for making into yarn and cloth. The present capacity of the factory is about 22,000 pounds per day although actual daily production is said to be only about 13,000 pounds. The fiber known as 'Silkool' has not yet been exported. The domestic prices range from 33 to 35 cents per pound.

"A sample of 'Soyalex' recently received from Japan was said to contain not less than 60% pure lecithin. This new soybean product may be used in making butter, chocolate, for dressing of leather, making of shoe polishes and toilet foods such as face creams and soaps, for cooking, making noodles and macaroni, and in the preparation of valuable chemicals." A portrait photo shows W.J. Morse.

Note 1. This is the earliest document seen (Jan. 2000) concerning the cultivation of soybeans in Sweden.

Note 2. This is the earliest English-language document seen (Dec. 2004) that uses the term "soybean fiber" to refer to spun soy protein fiber used like a textile fiber. Address: USDA Bureau of Plant Industry, Washington, DC.

704. Agati, Julian A.; Garcia, Eugenia H. 1940. Studies on soybean nodule bacteria *(Rhizobium* sp.): 1. *Philippine J. of Agriculture* 11(1-3):271-83. Plus four plates on unnumbered pages at end. First, second, and third quarters. [18 ref]
• ***Summary:*** The four plates show soybean plants growing in different types of cultures–some solid, some liquid Address: Bureau of Plant Industry [Manila, Philippines].

705. Anandan, M. 1940. Soy bean trials in Madras. *Madras Agricultural Journal* 28(9):329-37. Sept.
• ***Summary:*** As far as the author knows, the first soybean trial in Madras was conducted in 1915-16 by Mr. R. Cecil Wood, then Principal of the Agricultural College, Coimbatore, in one of the fields on the Central farm. "The crop was a fair one but its cultivation was not continued in subsequent years.

"Great interest in this crop was aroused in India in about 1932-33 as a result of Major General Sir Robert McCarrison's advocacy for the inclusion of soy beans as a very cheap and valuable source of first class vegetable protein in the average Indian diet, which badly lacks it. Another contributory cause for the spurt of such enthusiasm of the people in this new food crop was the decision of Mahatma Gandhi to give it a trial by including it in his daily diet... A third reason for stimulating the interest of the people was the fact that the soy bean was becoming a serious competitor in the overseas market with the Indian groundnut, the premier oilseed crop of the country. The result of all this at the time was a great demand for soy bean seed and for information regarding its cultivation. But unfortunately, the Department of Agriculture could not help the public either with the seed or information regarding the cultivation of soy bean as it bad not been grown or tried on any of the Agricultural Research Stations before, except once on the College Farm in 1915-16. The Department, however, lost no time in taking up the trial of this new crop... Field trials were carried out from 1935 onwards" at three locations: Agricultural Research Station, Hagari (two varieties, Kachin and Pe Ngype, were obtained from Burma). Agricultural Research Station, Nandyal. Central Farm, Agricultural College, Coimbatore. Soybeans did best in the Godavary and Cauvery deltas with deep alluvial soil and annual rainfall of 40 inches or over. Address: L. Ag., Asst. Director of Agriculture, Cuddalore, India.

706. Rodrigo, P.A.; Urbanes, Placido S. 1940. A comparative test of some promising varieties of soybean. *Philippine J. of Agriculture* 11(1-3):285-300. First, second, and third quarters. Includes 4 plates (p. 298-300). [1 ref]
• ***Summary:*** These tests were started in May 1936 and the data presented here include those obtained up to April 1939. Fourteen soybean varieties were tested at two locations: at the Lipa Coffee-Citrus Experiment Station, and the Provincial Nursery, Bangar, La Union. "The results of the dry season planting of soybean at the Bangar Provincial Nursery show the great possibility of this crop in certain sections of the country." The varieties showing the greatest promise are Mis 33 Dixie and Mis 28 E.B. Str. 3910. The highest yield at any location was 47.4 cavans per hectare. Address: 1. Horticulture Section, Bureau of Plant Industry, Manila; 2. Provincial Agricultural Supervisor for La Union.

707. *Ohio Farmer.*1940. Now its soybean milk! This and other foods produced by new Ohio plant. 186(11):10. Nov. 30. Whole No. 4606.
• ***Summary:*** About the work of Dr. Harry W. Miller (of Ohio and China) with soymilk. Today, because of the Japanese invasion of Shanghai, there now stands in Mt. Vernon, Ohio, a plant producing soybean milk, powder, and a number of products from the edible soybean. The head of this company, International Nutrition Laboratory, is Dr. H.W. Miller, who was born in Miami County, Ohio, and educated as a surgeon. For many years he was head surgeon in an American mission hospital in China. During this time he saw the need for milk and other dairy products in China; they were unavailable to most people due to the high cost and short supply. So he and his associates started a plant in Shanghai for the production of soybean milk. In 1937, at the time of the Japanese invasion, they had 15 delivery boys going out each day on bicycles to deliver the soybean milk to thousands of customers.

When Japanese bombs destroyed the plant in 1937, Dr. Miller decided to relocate near Mt. Vernon, in Knox County, Ohio. He and his sons built the plant, and also designed and built much of the equipment in it. According to Dr. Miller, soybean milk "is more quickly assimilated by the body than animal milk, it gives a quick recovery from exhaustion and fatigue, and is especially desirable as a food for infants and invalids. The liquid and powdered soybean milk produced in this plant is sold to doctors and hospitals all over the United States..." The steps in the process are described. They also make Mien Jing, based on wheat gluten, to which are added fresh vegetables and soya sauce to make a nutritious food with a meat-like flavor.

"During the past summer this plant also packed a quantity of edible soybeans. These were canned, both as green beans, and dried beans with tomato sauce added. Another product is a soybean flour..."

Some of the edible soybeans used in this plant were grown on the farm run by Dr. Miller near Mt. Vernon and by farmers in the neighborhood. However it has been necessary to import a large portion of the soybeans from other states.

Dr. Miller's organization is presently establishing another plant for the production of soybean milk in the Philippines. Moreover, 2,000 pounds of powdered soybean milk were recently shipped to China from Mt. Vernon.

Photos show: (1) Dr. Harry Miller, seated at a desk in a coat and tie, examining samples of edible varieties of soybeans. (2) The plant of the International Nutrition Laboratory near Mt. Vernon, Ohio. (3) A worker inspecting a can of edible soybeans, which are packed in cans and labeled, ready to ship to all parts of the USA.

708. *Philippine J. of Science.*1940. Book review: *Soybeans: The Wonder Food! A Brief Treatise on Modern Nutrition.* 73(3):370. Nov. [1 ref]

• ***Summary:*** "Dr. Charles E. Fearn, who wrote the foreword, considers the appearance of this work of Dr. Ferri on the soybean and its nutritive value particularly opportune and desirable. The ceaseless effort of man to provide the world with sufficient nutritious food occasionally brings out startling results."

709. LeClerc, J.A. 1940. Re: Soy sauce. Letter to Mr. E. Bradley Fairchild, P.O. Box 2, Manila, Philippine Islands, Dec. 10. 1 p. Typed. [1 ref. Eng]

• ***Summary:*** "Dear Sir: I have been requested by Mr. W.J. Morse, of the Bureau of Plant Industry, to send you such information as we have on the preparation of soy sauce by the use of hydrochloric acid.

"Is is my understanding that most of the soy sauce made in this country at the present time is produced by the modern process of using hydrochloric acid for the conversion of protein rich material such as gluten, soybean pressed oaks, etc. This process can be completed in about two days, whereas the old process used in China requires from six months to two years. Furthermore, the new process is much more sanitary. On a laboratory scale we have made soy sauce in this way as follows:

"Take 15 grams of wet gluten and 80 cc of 3.7% HCl [hydrochloric acid] (1+9). This is heated in an autoclave at 20 pounds pressure for 3 to 4 hours. The digested material is then concentrated to one-half its volume and neutralized with an alkali, or rather almost neutralized. This is then filtered and the product thus obtained is similar in most respects to soy sauce." Address: Senior Chemist, Agricultural Chemical Research Div., USDA.

710. **Product Name:** Miller's Soya Lac. Renamed Soyalac by 1952.

**Manufacturer's Name:** International Nutrition Products, Inc.

**Manufacturer's Address:** 41 Nagathan St., Manila, Philippines. Phone: 6-62-71.

**Date of Introduction:** 1940.

**New Product–Documentation:** Ad in Manila Tribune. 1941. Aug.

Ad in *A Half Century of Philippine Agriculture.* Manila, Philippines: Liwayway Publishing. p. 433. "Soyalac. The wonder vegetable milk. Processed by International Nutrition Products, Inc., 41 Nagathan St., Manila. Tel. 6-62-71. Note: This is the earliest reference seen for the company's name, address, and phone number. They could have been different in 1941. Note also that the product is now named Soyalac.

Shurtleff & Aoyagi. Soymilk Industry & Market. p. 106-07. Made at the first soymilk plant in the Philippines, set up by Dr. Harry Miller and Mr. Paul Sycip.

Note: This is the earliest known commercial soy product made in the Philippines.

711. Rodrigo, P.A. 1940. Directions for growing soybean. *Plant Industry Leaflet* No. 28. *

712. Roux, Charles. 1941. Le soya [The soybean]. *Revue Internationale des Produits Coloniaux et du Material Colonial* 16(181):8-25. March. [Fre]

• ***Summary:*** Contents: Introduction. Chemical composition. Cultivation. Food and industrial uses of soybeans: Incl. soymilk, tofu, soya casein, soy flour, soy bread, soy oil, soybean cake, green vegetable soybeans, fermented soy condiments (natto, miso, shoyu), roasted soy coffee, industrial uses, petroleum substitute.

Appendix A: Composition of various parts of the soybean plant: (1) Green–stems, leaves, pods. (2). Dry–stems, leaves, pods. (Averages based on analyses by M. Lechartier). (3) Composition of soybean seeds: Whole seeds, cotyledons, embryos, seed coats (based on analyses by the Municipal Laboratory of Paris and the Laboratory of the Biological Society of the Far East *[la Société Biologique d'Extrême-Orient]).*

Appendix B. Composition of the seeds of various soybean varieties by various analysts: Steuf, Pellet, By Steuf: From Hungary, Yellow from Mongolia, From China, Chinese reddish brown. By Pellet: From China, from Hungary, from Etampes. By Giljaransky [Giliaranskii, Giljarinsky, Giljaranskii, Giljaranski, Gilyaranskii, Gilyaranskii]: Yellow from Russia, Yellow from China, Yellow from Japan, Black from China, Black from Japan, Green from Japan. By Lechartier: From Etampes, Etampes dry, Black, Black dry. By Jardin Colonial: Soja from Laos, Soja from Tonkin, Soja from China. By Schroeder: Reddish brown dry, Yellowish brown dry, Tumida pallida yellow. By

König: Tumida castanea brown, Tumida astrospermal [sic, atrosperma] black.

Appendix C. (1) Composition of soybeans (maximum and minimum) compared with four other legumes. (2) Composition of soybeans and beef compared. (3) Composition of soy flour and wheat flour compared. Address: Director General of the Association Technique Africaine.

713. Takahashi, R. 1941. Some injurious insects of agricultural plants and forest trees in Siam and Indo-China. I. Aphididae. *Taiwan Government Agricultural Research Institute Report* No. 78. 27 p. March. *
• ***Summary:*** Discusses *Aphis glycines, A. laburni.*

714. Concepcion, Isabelo. 1941. Significance of soy bean in the dietary of Filipinos. *Acta Medica Philippina* 2(4):479-95. April/June. Read before the Sixth Pacific Science Congress, San Francisco, California, July 24 to Aug. 12, 1939. [28 ref]
• ***Summary:*** Contents: Introduction. Composition and nutritive value. Supplementary value of soy bean (to a rice-based diet). Forms of soy bean used in Philippines: Soy bean curd or "tokua," fermented bean curd or "tahuri," soy bean curd brain or "tojo" (served with a little thick brown sugar syrup), soybean with shaved ice or "mongo con hielo," soy bean flour, soy bean milk. Deficiencies of Filipino diet. Effects of improper food. The need for a campaign to popularize soy bean products. Conclusions.

"Soy bean is grown in many parts of the Philippines where it is known as 'utao' and also as Chinese 'Balatong.' It is grown in large quantities in Batangas Province. The green pods are harvested in October and November and the dried seeds may be had in bulk in December and January. Just when soy bean was first cultivated in the Philippines is not known. For years casual plantings have been made but it is only in comparatively recent years that the cultivation has been seriously considered as an agricultural industry. Statistics indicate that consumption of soy bean in the Philippines has grown faster than production. They also show a growing appreciation of soy bean in the Philippines."

Soy bean with shaved ice "is a very popular soy bean mixture introduced by the Japanese but now sold in nearly all refreshment parlors all over the Philippines. The preparation consists of a mixture of boiled red mongo and soy bean mixed with cream, brown sugar and ice shavings. This form of soy bean mixture is more nourishing than any other preparation just described on account of its cream and sugar content."

The consumption of soy bean products in the Philippines "does not amount to very much. The reason for this apparent neglect is the general lack of sufficient information. It is desirable that the government should initiate the necessary campaign to inform the people regarding the valuable nutritive properties of soy bean. Although the Bureau of Science since 1931 has been carrying a demonstration campaign to teach the public the different methods of cooking soy bean with the aim of popularizing its use among the masses, its efforts so far have not yielded the expected results. Another reason is the lack of a central body in the Philippines that can coordinate all the nutrition work to be carried out in that country. Furthermore, there is lacking a definite long range policy for the betterment of nutrition...

"The popularization among the masses of soy bean and soy bean products like soy bean curd, soy bean flour, and soy bean milk should be undertaken along with a more intensive campaign about its nutritive value carried on in the different schools all over the Philippines."

Note 1. In section titled "Fermented bean curd or 'Tahuri'" (4 paragraphs and 1 table), the text is a combination of that first presented by Gibbs and Agcaoili (1912) and Orosa (1932). Although the word "fermented" is used here to describe *tahuri* for the first time, no information about a fermentation microorganism or process is given.

Note 2. This is one of the earliest English-language documents seen (Sept. 2006) that uses the term "Soy bean" in a new way–as a singular noun, like corn or wheat, not preceded by "the." Examples: "Soy bean is grown in many parts of the Philippines..." "... campaign to teach the public the different methods of cooking soy bean with the aim of popularizing its use among the masses,..." Address: Dep. of Physiology and Biochemistry, College of Medicine, Univ. of the Philippines.

715. *Manila Tribune (Philippines).*1941. Soya-Lac Supplement (Ad). Aug. 16. *
• ***Summary:*** This full-page supplement, including a 5-column ad for Miller's Soya Lac, is devoted to the story of soya milk and the soya bean. The lead article states: "By unbiased laboratory analysis, soya milk has been found to be virtually identical to cow's milk in nutritional elements, and higher, in fact, in protein content." Paul Sycip, a soya milk chemist and a graduate of the University of the Philippines, recently returned from a tour of U.S. soya milk factories. He stayed most of the time with Dr. Harry W. Miller, owner of the patent on soya milk processing.

Another article quotes Rafael Alunan, Philippines Secretary of the Interior, as saying that "The National Land Settlement Administration is already committed to the growing of the soybean on a large scale in the Koronadal Valley and to making soybeans one of the major producing crops."

716. Matagrin, Am. 1941. La culture du soja dans l'Empire français [The cultivation of soybeans in the French empire].

*Revue Internationale des Produits Coloniaux et du Material Colonial* 16(183):102-05. Aug. [Fre]

• ***Summary:*** Discusses the status of soybean cultivation in Guadeloupe (many trials are underway), Martinique (soybeans have not yet been introduced there), Indochina (Tonkin [15-20,000 ha], Annam [750 ha], Laos, Cambodia, Cochin China; soy is of little importance in the last 3 regions), French West Africa (Unsatisfactory trials were made in 1923 and 1926 at the experimental station at Soninkoura. In 1935 trials started again at the Banankoro station. Note: Both stations are probably in today's Mali), Algeria (soybeans are not presently cultivated there), Madagascar (soybean cultivation was introduced in 1911), Morocco (trials were started almost 15 years ago [i.e. about 1927], but cultivation is still at an experimental stage), the Island of Reunion (soybeans are cultivated only experimentally at the Agronomic Station), Tunisia (soy is of little practical importance there at present, though forage trials are being conducted), New Caledonia (soybean culture was introduced in 1928; the future does not look bright).

Note: This is the earliest document concerning soybean cultivation in tbe Pacific Islands (New Caledonia)–not including Hawaii, Australia, or New Zealand.

717. Ukil, A.C. 1941. Soya bean as a component of balanced diet. *Science and Culture (Calcutta)* 7(1):49-53. July; 7(2):111-16. Aug. [3 ref]

• ***Summary:*** This article is largely a summary of: Orosa, Maria Y. 1932. "Soybeans as a component of a balanced diet and how to prepare them." *Manila (Philippines) Bureau of Science, Popular Bulletin* No. 13. 53 p.

It begins: "In view of the interest recently created in the value of the soya bean to make up for the deficiency of protein in the diet of starch-consuming agricultural populations of countries lacking a sufficient supply of high quality proteins like milk, fish, meat and eggs in their diet and in view of its extensive use in China, Japan, the Philippines, U.S.A. and more recently the German army, the following..."

"Although isolated attempts [have been made and] are being made in India to cultivate the bean, no systematic efforts have yet been made to encourage its use on a sufficiently large scale for commercial purposes and to supplement the food resources of the country... Soya bean is not only much more nourishing but has many more uses than *dal."*

Foods discussed include: Soya-bean flour, soya-bean milk (regular or condensed), coffee made from roasted soya beans, soya bean sprouts (a table shows they are much more nutritious than mung bean sprouts), soya bean oil, soya bean casein, soya bean curd [tofu].

August issue: "Some common foods and their methods of preparation:" Soya sauce (using koji, based on Groff 1919). Soya-bean flour. The cooking of soya beans (immature [green vegetable soybeans] and mature). Some food recipes with soya beans: Of the 22 recipes, 17 call for boiled whole soya-beans, 2 for dry roasted soya-beans [soy nuts], one for soya-bean flour (Angel cake), and 3 for soya-bean milk (two puddings and a custard). Address: Member, Sanitary Board, Bengal [India].

718. Kee, Pank Kwok. 1941. Studies on the fertilizing value of Mayon Volcano ash. V. Effects upon the growth and yield of soybean. *Philippine Agriculturist* 30(6):500-09. Nov. [10 ref]

• ***Summary:*** In general, this ash neither stimulated nor adversely affected the growth, development, or yield of soybean plants.

719. Chouard, Pierre. ed. 1941. Chronique horticole: Indications documentaires sur le soja [Horticultural chronicle: Documents on soybeans]. *Revue Horticole; Journal d'Horticulture Pratique (Paris)* 113(2084):505-06. Dec. 16. [7 ref. Fre]

• ***Summary:*** Two notes communicated by *l'Institut Agricole et Industriel du Soja* (Agricultural and Industrial Soya Institute) contain some interesting details: The vernacular names of the soybean in various languages are: German–Sojabohn. Italian–Soia. England and USA–Soy Bean. China–Yeou-téou. Japan–Mame. Annam–Dâu-nanh. Tonkin–Dâu-twong. Cambodia–Sân Dêk.

In China, the home of the soy bean, all the legumes are called *téou,* with the addition of the color, form or usage, such as *Hei* (black), *T'song* (brown), *T'sin* (green), *Houang* (yellow)... The note proposes the name *Haricot d'Asie* (haricot/bean of Asia) to designate the soybean in our daily language in the West. A bibliography of seven French-language works is given. Address: France.

720. Chouard, Pierre. ed. 1941. Chronique horticole [Horticultural chronicle]. *Revue Horticole; Journal d'Horticulture Pratique (Paris)* 113(2084):503-05. Dec. 16. [2 ref. Fre]

• ***Summary:*** Two articles in this section relate to soy: (1) Prize for soybean growers *(Prix en faveur des planteurs de soja).* The Agricultural and Industrial Institute for Soya (L'Institut Agricole et Industriel du Soja) has established an annual prize called the *Prix de l'Institut du Soja,* of 2,000 French francs for the grower, in France or the French empire, who by hybridization or by importation, contributes the cultivation of the best soybean varieties, on the condition that he has, on 1 Sept., at least one hectare of soybeans under cultivation.

(2) *Indications documentaires sur le soja.* Two notes from the Agricultural and Industrial Institute for Soya. They concern the name of the soybean in various countries: Germany, Italy, England and USA, China, Japan, Annam (Dau-nanh), Tonkin (Dau-twong), and Cambodia (San Dek).

The names of soybean colors are also given. Address: France.

721. Thongjaya Punyasingha, -. 1941. The relation of varieties of the soybean to various strains of the Rhizobium. *Thai Science Bulletin* 3(1):11-27. *

722. van Veen, A.G. 1941. [The protein supply in infertile districts of Java]. *Natuurwetenschappelijk Tijdschrift voor Nederlandsch Indië* 101:321-23. [Dut]*

723. Westenberg, J. 1941. De visserij-producten van Indo-China [The fishery products industry in Indo-China]. *Institute of Seafisheries, Batavia. Communication* No. 6. p. 16-45. [Dut]*

724. Becker, Joseph A.; Froulich, Paul; Jackson, D.; et al. 1941. Agricultural statistics, 1941. Washington, DC: U.S. Government Printing Office. 731 p. For soybeans and soy products see p. 7, 299-305, 490, 494, 496, 519, 523.
• ***Summary:*** "This volume presents information formerly published (until 1935) in the statistical section of the Yearbook of Agriculture" (p. 1). "Export and import statistics of the United States include trade with the Philippine Islands. They also include any trade between foreign countries and Alaska, Hawaii, and Puerto Rico, but do not include shipments between continental United States and these possessions. Prior to January 1, 1935, the Virgin Islands of the United States were treated in the same manner as the Philippine Islands, but since that date the Virgin Islands are treated in the same manner as Alaska, Hawaii, and Puerto Rico." (p. 5). A bushel of soybeans weighs 60 lb and a gallon of soybean oil weighs 7.5 lb (p. 7). Note: No separate statistics are given for soybeans or soybean products grown in or exported to or from Alaska, Hawaii, Puerto Rico, or the Virgin Islands.

Table 392 (p. 299) gives U.S. soybean acreage statistics for the years 1924-1940, including: Acreage grown alone for all purposes, total acreage (incl. half the interplanted acres), acreage harvested for beans, yield per acre, production, price (dollars/bushel), farm value (in 1,000 dollars), foreign trade (imports and exports, year beginning in July). In 1924 for soybeans: Acreage grown alone for all purposes: 1,567,000. Total acreage: 1,782,000. Acreage harvested for beans: 448,000. Yield per acre: 11.0 bushels. Production: 4,947,000 bushels. Average price per bushel received by farmers: $2.46.

The corresponding figures in 1928 were: Acreage grown alone for all purposes: 2,154,000. Total acreage: 2,439,000. Acreage harvested for beans: 579,000. Yield per acre: 13.6 bushels. Production: 7,880,000 bushels. Average price per bushel received by farmers: $1.88.

Table 393 (p. 299) gives U.S. soybean production and farm disposition statistics for the years 1924-1940, including: Total production, used for seed (total, or home grown), fed to livestock, sold.

Table 394 (p. 300) gives U.S. soybean statistics for acreage, yield, production, and season average price received by farmers, by States, average 1929-38, annual 1939 and 1940. The states are: New York, New Jersey, Pennsylvania, Ohio, Indiana, Illinois, Michigan, Wisconsin, Minnesota, Iowa, Missouri, Nebraska, Kansas, Delaware, Maryland, Virginia, West Virginia, North Carolina, South Carolina, Georgia, Kentucky, Tennessee, Alabama, Mississippi, Arkansas, Louisiana, Oklahoma, Texas, and USA total.

Table 395 (p. 301) gives soybean statistics for acreage and production in specified countries, average 1930-34, and annual 1935 to 1940. The countries are China, Manchuria, United States, Chosen [Korea], Japan, Taiwan, Netherlands Indies, Rumania, Bulgaria, Yugoslavia, Hungary, and estimated world total.

Table 396 (p. 302) gives the average price per bushel of soybeans received by U.S. farmers each month and season average from 1930 to 1940.

Table 397 (p. 302) titled "Soybeans for seed" gives the average wholesale price per bushel at Baltimore and St. Louis, 1931-1941, each month from Jan. to May and average.

Table 398 (p. 302) titled "Soybeans for crushing" gives the average price per bushel, U.S. No. 2 Yellow, bulk, carlots, net track Chicago, 1933-40, each month from Oct. to Sept.

Table 399 (p. 303) gives statistics on amount of soybeans crushed, and production, imports, and exports of soybean oil (crude basis), and soybean cake and meal, USA, 1930-1940.

Table 400 (p. 303) gives the average price per pound of soybean oil (domestic crude) in tank cars, midwestern mills, 1929-1940, each month and yearly average.

Table 401 (p. 303) gives the average price per pound of soybean oil (domestic crude) in drums, New York, 1931-1940, each month and yearly average.

Table 402 (p. 304) gives the average price per ton of soybean meal (41% protein), at Chicago, 1930-1940, each month and yearly average.

Table 403 (p. 305) for soybeans and soybean oil, gives international trade (exports and imports), averages 1925-1934, annual 1938, 1939. For soybeans: Principal exporting countries–China, Manchuria, United States, total. Principal importing countries–Germany, Japan, Denmark, United Kingdom, Sweden, Italy, Netherlands, Canada, total. For soybean oil: Principal exporting countries–China, Manchuria, Denmark, Japan, Sweden, total. Principal importing countries–Netherlands, United Kingdom, Italy, Germany, United States, Belgium, Chile, France, Morocco, Norway, Algeria, Austria, Czechoslovakia, Canada, USSR, total.

Table 659 (p. 490) gives U.S. exports (in pounds) of vegetable oils (incl. corn, cottonseed, linseed, cocoa butter, coconut, peanut, and soybean oil) from 1914 to 1939.

Table 617 (p. 455) gives statistics on oleomargarine–materials used in manufacture, USA, 1924-1940. Concerning soybean oil: Less than 500 lb were used in 1924 and 1925, but 33,000 lb were used in 1926. The first significant amount was used in 1930: 2.25 million lb. Note: Additional statistics on oleomargarine production and consumption in the USA are given on p. 454-57.

Table 660 (p. 494) gives U.S. imports (in pounds) of oilseeds (incl. soybeans {but no data given for 1918-1926}, sesame seeds, rapeseed) and vegetable oils (incl. olive oil, palm oil, palm kernel oil, peanut oil, perilla oil, rapeseed oil, soybean oil, and tung oil) from 1914 to 1939.

Table 662 gives imports of principal agricultural products (incl. soybean and soybean oil) into the United States, by countries, each year 1932-1940. The source countries for soybean (p. 519) are: Kwantung, Japan, China, Germany, other countries, total. The source countries for soybean oil (p. 523) are: Kwantung, Japan, China, Netherlands, other countries, total. Address: U.S. Dep. of Agriculture, Yearbook Statistical Committee, Washington, DC.

725. Fallon, F. (Baron). 1941. Le soja [The soybean]. *Belgique. Ministere des Colonies. Direction Generale de l'Agriculture et de l'Elevage. Propagande et Vulgarisation Agricoles* No. 21. 39 p. Bruxelles: Impr. Industrielle et Financiere. [17 ref. Fre]

• ***Summary:*** Contents: Botanical description: Introduction, the plant's needs, varieties. Soybean cultivation in Europe: Introduction (for some countries preferred early, medium, and late varieties are listed), France, Great Britain, Hungary, Poland (selection has been done at the Wilna experiment station using varieties imported from Hungary and Czechoslovakia), Romania (About 30,000 ha are devoted to soybeans, primarily in Bessarabia [Besarabia], Dobrouja [Dobrudja, Dobrogea], Bukovina [Bucovina], Walachia or Wallachia or Valachia [now called Muntenia, a fertile belt across southern Romania], and Moldavia. Most of these varieties came from Austria), Switzerland, USSR (the main soybean regions are all warm ones–the Caucasus, Ukraine, and Transcaucasia). Soybean cultivation in America. Soybean cultivation in Africa (especially in South Africa, mainly for forage in the Natal and Transvaal). Soybean cultivation in Asia: China and Manchuria, Malaysia, British Indies, Dutch Indies, Indochina, Japan. Soybean cultivation in Oceania (mainly Philippines).

Cultivation: Crop rotation, inoculation, planting and propagation, maintenance and manuring the land, harvest, seed storage, yield, selection of varieties. Soybean utilization: As human food (dry soybeans, soy sauce, soy flour, soymilk, tofu, soy oil), industrial uses (soy oil, refining and use, soymilk casein). Soya as a fertilizer: Green manure, or soybean cakes. Soya as a feed for domestic animals: Green forage, hay, silage, pasture, seeds, cakes. Soybean cultivation in the Belgian Congo. Soybean trade.

In the Congo various soybean trials have been undertaken since 1936 at the stations of the National Institute for Agronomic Study of the Belgian Congo (l'Institut National pour l'Etude agronomique du Congo Belge). Numerous varieties from the USA and Manchuria have been tested. Address: Directeur au Ministere des Colonies, Professeur a l'Institut Agronomique de Gembloux [Belgium].

726. Naerssen, Fritz Herman Van. 1941. Oudjavaansche oorkonden in Duitsche en Deensche verzemelingen [Ancient Javanese documents in German and Danish collections]. Leiden, Netherlands: A published dissertation. 117 p. See p. 82-105. 28 cm. [Dut]*

• ***Summary:*** The Watukura A (Watu Kura) inscription is dated A.D. 902. The place it was found is unknown. It is a copperplate, now in a private collection in Copenhagen, Denmark. A transcription with translation can be found in this book by Fritz Van Naerssen (p. 82-105). Mentions that tofu was eaten at a feast in Indonesia.

Fritz Van Naerssen was born in 1904. Address: Leiden, Netherlands.

727. Chevalier, Aug. 1942. Production mondiale de graines de Soja [World soybean production]. *Revue de Botanique Appliquee & d'Agriculture Tropicale* 22(245-246):98-99. Jan/Feb. [Fre]

• ***Summary:*** The world's leading soybean producers in the mid- to late 1930s, in terms of million tonnes produced, were: China 5.01, Manchuria 4.32, USA 1.57, Korea 0.507, Japan 0.367, and the Netherlands Indies [Indonesia] 0.288. Address: France.

728. *Soybean Digest.* 1942. Manila paper praised milk from soybean. Feb. p. 7.

• ***Summary:*** On 16 Aug. 1941 the *Manila Tribune,* in the Philippines capital, published a "Soya-Lac Supplement" The full page, including a five-column advertisement for Miller's Soya Lac, is devoted to the story of soya milk and the soya bean. A nice photo shows Dr. Harry W. Miller.

729. Dies, Edward J. 1942. Tables (Document part). In: E.J. Dies. 1942. Soybeans: Gold from the Soil. New York, NY: The Macmillan Co. 122 p. April. 21 cm.

• ***Summary:*** Tables show: (1) U.S. soybean acreage, yield, and production, 1924-1941 (p. 5). During this time acreage has increased more than 12-fold from 448,000 to 5,855,000 acres. Yield as increased 88% from 11.0 to 20.7 bushels/acre. Production has increased more than 21-fold from 4.947 million to 106.712 million bushels.

(2) Soybean production in specified countries and estimated world total (p. 10-11). The countries are: China, Manchuria, United States, Chosen [Korea], Japan, Netherlands India [later Indonesia], Kwantung [Leased Territory], Taiwan, U.S.S.R., Rumania, Bulgaria, Yugoslavia, other Europe (incl. Poland, Czechoslovakia, and what was formerly Austria).

(3) Illinois soybean acreage, yield, and production, 1919-1941 (p. 25). Production (in bushels) increased from 30,000 in 1919, to 46,000 in 1920, to 167,000 in 1921, to 812,000 in 1922, to 1,431,000 in 1925, to 6,970,000 in 1930, to 24,012,000 in 1935, to 34,912,000 in 1940, to a peak of 49,128,000 in 1941.

(4) "Soybean varieties–Origin and varietal characteristics" (p. 38-47). For each variety is given: Place of origin, year introduced to USA, days to mature, flower color, pubescence color, seed characters (seed coat color, germ color, hilum color, seeds per pod, seeds per pound, oil percentage, protein percentage), use (de = dry edible beans, f = forage, gra = grain, gv = green vegetable).

Soybean varieties described in the table on p. 38-47 are: Agate, A.K., Aksarben, Aoda, Arisoy, Arksoy, Avoyelles, Bansei, Barchet, Biloxi, Black Eyebrow, Cayuga, Chame, Charlee, Chief, Chernie, Chestnut, Chiquita, Chusei, Clemson, Columbia, Creole, Delnoshat, Delsta, Dixie, Dunfield, Easycook, Ebony, Elton, Emperor, Etum, Fuji, Funk Delicious, George Washington, Georgian, Green Giant, Goku, Habaro, Haberlandt, Hahto, Hakote, Harbinsoy, Hayseed, Herman, Higan, Hiro, Hokkaido, Hollybrook, Hongkong, Hoosier, Hurrelbrink, Illini, Ilsoy, Imperial, Ito San, Jogun, Kanro, Kanum, Kingwa, Kura, Laredo, Lexington, Macoupin, Magnolia, Mamloxi, Mammoth Brown, Mammoth Yellow, Mamredo, Manchu, Mandarin, Mandell, Mansoy, Medium Green, Midwest, Mingo, Minsoy, Missoy, Monetta, Morse, Mount Carmel, Mukden, Nanda, Nanking, Norredo, Ogemaw, Old Dominion, Oloxi, Ontario, Osaya, Otootan, Ozark, Palmetto, Patoka, Pee Dee, Peking, Pine Dell Perfection, Pinpu, Richland, Rokusun, Sato, Scioto, Seminole, Seneca, Shiro, Sioux, Sooty, Sousei, Southern Green, Southern Prolific, Soysota, Suru, Tarheel Black, Tastee, Toku, Tokyo, Virginia, Waseda, Wea, White Biloxi, Willomi, Wilson, Wilson Five, Wisconsin Black, Wood's Yellow, Yelredo, Yokoten.

(5) U.S. production and crushing of soybeans, and production of soybean oil and meal from 1924 to 1941 (p. 53, based on government reports). Domestic production of soybean oil, only 2.2 million lb in 1924, had increased almost 6-fold by 1929 to 13.424 million lb. Then in June 1930 the protective Smoot-Hawley tariff went into effect. By levying a tariff on imported soybeans and soybean oil, it stimulated domestic soybean crushing and production. Oil production (in million lb) jumped immediately, from 13.424 in 1929 to 34.688 in 1930 (even though the Great Depression had begun), to 208.9 in 1935, to 565.2 in 1940. Note: A semi-log graph of U.S. soy oil production vs. time shows that it increased at the most rapid rate from 1924 to 1935. This rate decreased slightly between 1935 and 1942, then decreased again from 1942 to about 1980.

(6) Soybean oil imported and exported (pounds to and from USA, from 1912 to 1940) (p. 58). The first soybean oil was exported from the USA in the latter half of 1919. At least 1 million pounds/year was exported from that time until 1940. The peak year was 1920, when 46.7 million lb were exported. Source: Department of Commerce, Bureau of the Census.

(7) Factory consumption of soybean oil by classes of products, 1931-1940 (p. 61). The classes are: Compounds and cooking fats [shortening], oleomargarine, other edible products, soap, paint and varnish, linoleum and oilcloth, printing ink, miscellaneous, foots and loss, total. In 1931 and 1932, and in most subsequent years, the leading class was shortening. In 1939 the top four classes were (in million lb): shortening 212.3, oleomargarine 87.1, other edible products 39.9, and paint and varnish 29.8. Source: Bureau of Census reports.

(8) Supplies of feed in 1939 (p. 78). Feed supplies are composed of feed grains (91.73% of the total), cereal by-products (5.16%, including wheat meal products, gluten feed, distillers and brewers dried), and oil and cake meals (3.10%, including cottonseed {1.55%}, soybean {1.04%}, linseed {0.32%}, and other 0.17%). Address: USA.

730. Ladejinsky, W.; Rossiter, Fred J. 1942. Food situation in far eastern and southeastern Asia. *Foreign Agriculture* 6(4):147-64. April.

• ***Summary:*** Rice is the most important food product in all of the countries except North China and Manchuria. Following the Japanese invasion of 1931, soybean production dropped, declining 38% by 1934. Between 1935 and 1939 agricultural output increased once again, though it did not attain previous levels. Then beginning in 1939, a new decline in agricultural production set in. This coincided with the establishment of a stringent control over all aspects of Manchurian agricultural economy in order to enable Japan to get a large supply of foodstuffs as soon as possible and for as little as possible. Because of the opposition of the Manchurian farmers to this scheme, the shortage of both human and animal labor, and not altogether favorable climatic conditions–the soybean crop was reduced from 157 million bushels in 1938 to 145 million bushels in 1939 and in 1940 and 1941 to an estimated 125 and 115 million bushels, respectively. The net effect of reduced production has been a sharp decline in agricultural exports.

Since soybeans and soybean products constitute Manchuria's leading export crop, the exported volume of these products is especially revealing. In 1939-40 (October-September) Manchuria exported 25 million bushels of

soybeans, 775,000 short tons of beans cake, and 150 million pounds of bean oil, as compared with 77 million bushels, 1.1 million short tons, and 220 million pounds of soybeans, cake, and oil, respectively, the previous year.

This decline in Manchurian soybean exports affected Japan's food supplies adversely. Aside from the direct use of soybeans for food, probably the most important soybean product from the viewpoint of diet is bean curd [tofu], one of the main sources of protein for the great majority of the Japanese urban population. In 1939-40 Japan was able to get 41 million bushels of soybeans (including cake and meal), against 58 million the previous year. In 1940-41 Japan increased its soybean takings to 48 million bushels, but it was much below the planned record import volume of 84 million bushels. Address: Office of Foreign Agricultural Relations [USDA].

731. Bunnell, D.J. 1942. Soybean oil in the war time economy. *Soybean Digest.* Oct. p. 4.

• ***Summary:*** Germany has long needed to import large amounts of edible oils. Anticipating war, Germany took prepared for the time when she would be cut off from world trade. A program was instituted to build stock-piles and plans were made to increase production within her zone of influence. In 1937 Germany imported 21½ million bushels of soybeans from Manchuria, up from 16 million bushels in 1936. Indications of stock-piling were first apparent in 1937, and increased progressively up until the war started in 1939.

After extensive experiments, Germany found that she was not well suited to large production of oil-bearing seeds. Her best potential source of new supply was from corn-growing countries within her zone of influence in southeastern Europe. Germany's Ministry of Agriculture worked out a plan in which Bulgaria and Romania were guaranteed 10% better return per acre, independent of yield, if they would convert corn acres to growing soybeans. The results were not large, yet several million bushels of soybeans were grown to add to Germany's oil supply. "During the present growing season, soybeans have been planted in the conquered territory of the Ukraine."

In the spring of 1940 when Germany invaded Norway, the 60-70 million pounds/year of mostly fish oil that the USA imported from Norway were cut off. When Germany moved into Spain, southern France, Italy, and Greece, American imports of about 100 million pounds/year of olive oil were cut off. Yet as long as the war was confined to Europe, the USA was not seriously handicapped. Our total imports of edible oil had amounted to 1½ to 2 billion pounds/year before the war; so we had lost only about 10% of our imports.

The picture changed abruptly in Dec. 1941 when Japan invaded the Philippines and the South Pacific. That area had been supplying us with well over one billion pounds/year of edible oils–mainly coconut oil from the Philippines, palm and palm-kernel oil from the Netherlands East Indies and Malaya, tung oil from China, and perilla oil from Japan. The USA now faced severe oil shortage within months.

To aggravate this situation, our domestic consumption had increased in 1941 to almost 11 billion pounds, from 9.7 billion in 1940. In addition, our allies needed oil from us; Russia had lost her main source (the Ukraine) and we were already supplying England and the other United Nations under the Lend-Lease Act. In early 1942, U.S. government officials awoke to the fact that she would have to be the world's largest exporter of edible oils for the duration of the war.

Our domestic production had to be sharply increased if shortages were to be avoided. American farmers were asked to sharply increase their acreages of soybeans, peanuts, and flax. The soybean current soybean harvest is estimated at 211 million bushels, up from 106 million one year ago. Also, peanut acreage doubled. A portrait photo shows D.J. Bunnell. Address: Vice-President, Central Soya Co., Chicago, Illinois.

732. *Scientific American.* 1942. Miracle beans: Long called "The Cow of China," the soybean is now invading almost every field of endeavor. 167(5):216-18. Nov.

• ***Summary:*** This article begins: "America in general has just begun to 'discover' the widely varied possibilities of the soybean. Henry Ford makes steering wheels of it, midwestern farmers look on it as a promising money crop, diet and health practitioners are starry-eyed about its protein, calcium, and iron content... the little bean is a capital meat substitute; that coffee, cheese, candy, salad oil, lubricating oil, printer's ink and celluloid and glue, airplane bodies and rubber substitutes are made from it. It's good for cattle–good for dog food and linoleum and paint and rayon panties, good for explosives, good for building bone and muscle in fighting men. It's a fine forage crop and, like alfalfa, it will enrich the soil.

"But five years from now, when the present war has made the soybean as familiar an institution in America life as cellophane and synthetic rubber, it will be well to remember that the 'discovery' of today was known to the Chinese thousands of years before the birth of Christ. The emperor Shen Nung speaks of it in his "Materia Medica," written in 2838 B.C. Whole ages before this... a legend was current which had been handed down in northern China and Manchuria to the present day, telling how man first became acquainted with the soybean.

"A caravan of merchants, says the legend, was homeward-bound, loaded with gold after a successful trading expedition, when it as attacked by bandits. Taking shelter in an easily defended ravine, the traders held off the attackers for several days until their food ran low. Starvation threatened–until one of the servants returned to camp with a

sack of beans he had found on a vine-like plant which the animals were eating. They mashed up these beans to a paste with a little water and baked them–and on this crude biscuit the famished men regained enough strength to hold off the attackers until help arrived.

"The Chinese have looked on the soybean as their staff of life for ages." Many have never tasted milk except that from the soybean, which costs one-fourth as much as cows milk. "Long it has been called the Cow of China. The Orient uses the bean not so much as a vegetable as for making cheese [tofu], [soy] sauce, bread, and meat substitutes. For thousands of years it has been the basic protein food in Manchuria, China, Korea, Japan, and the Malay Peninsula.

"Soybeans first came to America in 1804 on a clipper ship whose Yankee master had ordered several bags tossed in the hold in case his provisions ran low."

William J. Morse, now senior agronomist at the USDA, worked for 34 years "with the quiet fervor of a missionary to bring the miracle bean prominently into the agriculture of this country."

In 1929 some 9 million bushes of soybeans were grown in the USA, increasing to 91 million bushels in 1939. The soybean is now America's fourth largest cash grain crop; "we grow as much as Manchuria. The cow of China has become a hundred-million-dollar American industry.

More than 75% of America's soybean oil goes into food products; most of the rest goes into paint, lacquers, and soaps. About 95% of the soybean meal is fed to livestock; the remaining 5% is used to make plastics, flour for baking, glue, fertilizer, dog food, breakfast cereals, macaroni, baby foods, reducing diets, and diabetic foods.

Discusses (at great length) the work of Henry Ford and Robert Boyer with soybeans, including soy fiber (which has the potential to replace wool), Ford's suit made of 25% soybean fiber, plastic parts in cars, the car of the future with a plastic body over a tubular steel framework (it will weigh only 85% as much as 1942 models did), and his solvent extraction system.

Note: This is the earliest document seen (Dec. 2009) with the term "Cow of China," referring to the soybean, in the title.

733. *USDA Agricultural War Information (AWI).* 1942. Soybeans for oil. Heavy on the soybeans. AWI-10. 2 p.
• ***Summary:*** "Uncle Sam needed more than a billion pounds of this oil when imports were cut off from the Pacific. He needed it: For quick-drying paints for planes... and ships. To keep fighting men well fed: Lard substitutes and a highly nutritious flour are important foods from soybeans. For tanks: Soybean meal is used in the process of metal casting [for foundry cores]. An illustration (cartoon) accompanies each statement.

"Soybean are coming through in a big way. They were asked to grow at least 9 million acres of soybeans for harvest in 1942 as beans–10 million if possible–as compared with less than 6 million acres harvested last year. And it looks as if they're making the grade."

"Soybean oil can be used in making soap, medicines, linoleum, oilcloth, printer's ink, glycerin, leather goods, and some metals. The oil can be used in the protective coating of ships, tanks, guns, plans and cantonments [usually temporary quarters for troops]. It takes 3,500 bushels of soybeans to produce enough oil for use in painting a battleship; 1,000 bushels for oil to paint a cruiser; 200 bushels to paint a destroyer; and 155 bushels to paint a submarine."

"Soybean meal is also useful. It is becoming more and more popular as a high-protein feed for livestock. Highly nutritious flour, macaroni, crackers, and such foods can be made out of the meal. It can be used in plastics which take the place of metals that have gone to war."

Note: In pre-Pearl Harbor days, coconut oil from the Philippines, palm oil from the Dutch East Indies and Malaya, and tung oil from China accounted for about 50 percent of America's vegetable oil imports. Address: USDA Agricultural Adjustment Agency.

734. Jalbert, J. 1942. [Colonial motor fuels and lubricants from plants]. *Carburants Nationaux (Les).* 2:119-24. (Chem. Abst. 27:833). [Fre]*
• ***Summary:*** Michael at ACS looks at the record and thinks it may have been taken from Chem. Zentr. = Chemisches Zentralblatt.

735. Giraud-Gilliet, J. 1942. Le soja, aliment d'avenir; manière de le cultiver; 2 à 300 façons de le consommer [Soya, food of the future; how to cultivate it; 200-300 ways to consume it]. Saigon: SILI Anct. C. Ardin. 282 p. [Fre] Address: Administrateur des S.C. de l'Indochine; Vietnam.

736. Reed, Howard S. 1942. A short history of the plant sciences. Waltham, Massachusetts: Chronica Botanica Co. 312 p. [262* ref]
• ***Summary:*** Excellent information on the lives of the early botanists, including Mr. Hagerty (translator of Chinese for the USDA). Chapter 6, The Seventeenth Century, discusses the work, the tragic life, and the undefeatable spirit of Rumphius. In chapter 7, The Eighteenth Century, under "Progress in Plant Classification," is a brief biography and discussion of the work of Carolus Linnaeus (1707-1778). Chapter 9 titled "Plant Geography" discusses the contributions of de Candolle. Chapter 19 titled "Plant Pathology," contains information directly related to the history of research on soybean diseases. Address: Prof. of Plant Physiology, Univ. of California, Berkeley.

737. Rouest, Antoine. 1942. Le soja français [French soybeans]. Argenton, France: Langlois. 48 p. Preface by J.

Bordas. [9 ref. Fre]
• ***Summary:*** Contents: Preface, by L Brétignière (Prof. at Grignon, Member of the Academy of Agriculture). Preface to the first edition, by Louis Forest (1921). Introduction to this new edition: Soviet Russia and the soybean *(le Soja;* includes the story of Rouest's stay in the Northern Caucasus, Russia, from 1930 to 1933), Germany and Poland take up the soya question, the canons [guns] of Germany versus the Manchurian soybean, a secret contract to provide the weapons of war, organization of a Polish bank in Manchuria, Germany cultivates soybeans in Romania and Bulgaria in preparation for the war, France and the cultivation of soybeans.

1. What is soja? 2. History of the propagation of soja: Introduction of the soybean into France and Europe, the soybean is cultivated in central Europe, in Austria, in 1875, in France the soybean is the object of numerous trials from 1876 to 1881, its cultivation worldwide, the study and acclimatization of soya become generalized.

3. Botanical characters of the soybean: And the varieties of soybeans. 4. Chinese varieties: The soybean in China, the production of soya in China in 1916 and 1917, production of soya in the Far East during the year 1928, exportation of soya from the Far East to Europe.

5. Japanese varieties: The soybean in Japan, varieties of soya from Indochina and from other Asian countries. 6. The soybean in America: American varieties, cultivation of soybeans in Ohio, selection of soya using pure lines in Connecticut.

7. The soybean in Europe: Italy, Russia, France, French climatic zones for the cultivation of Soja hispida, the Atlantic zone, the continental zone, the Mediterranean zone and climate, can the soybean cultivated in all the French climates including those in the north, northeast, and northwest, speedy production of soybeans in view of agricultural production and of the creation of early varieties for the regions in north and northeast France.

8. Instruction for growing soja in France. 9. Soja in Manchuria. 10. Soja seeds. 11. Selection of soja. 12. Varieties of soja. 13. Different ways of planting soya seeds. 14. Soy yield. 15. Nitrogen fixation in soya seeds. 16. Tilling and preparing the earth. 17. Soja fodder. 18. Soja, striking and improving. 19. Harvesting soja grain. 20. Soja oil. 21. Soja oil-cake for animal feeding. 22. Vegetable milk, soja milk and industrial casein.

23. Soja in human food: Soy flour and its applications, soy bread with wheat, nutritional composition of soja compared to dry legumes, soy viewed as a dry legume to replace meat, comparative production of nutritive elements among the various legumes used for human food, comparative value in calories of the usual foods and of soja, preparation of soy soups and meals in compressed tubes, what varieties of soy can serve the special neds of human nutrition, Sojenta, potatoes stuffed with soy, force meat balls *(boulettes)* of rice and soy, bread of rice and soy, pudding of soy and rice, soy sprouts and their food value, fresh soy sprouts in a salad, soy sprouts with vegetables, soy preserves and confections, soy chocolate, soy coffee, soybeans conserved in containers, soy with smoked fish, soup with soy vegetable meat, soymilk soup, omelet with smoked soy vegetable ham, green soy sprouts, soy cake, soy force-meat fritters.

24. The utilization of soja in the Far East: Vegetable cheese (tofu), soy-based condiments, Japanese natto (2 types), Japanese miso, Chinese miso, soy sauce *(soyou* or *schoziou),* making soy sauce in Kwantung, China, making soy sauce in Japan, koji or molded rice.

25. The culture of soja in North Africa (Rouest has varieties that would grow and yield well in the French colonies of Tunisia, Algeria, and Morocco). 26. Opinions of some authors on soja. Conclusions. Bibliography on soja.

A small photo on the "Dedication" page shows Léon Rouest (born in Paris on 11 Nov. 1872). Address: Directeur de la Station des Recherches Agronomiques d'Avignon.

738. Reiser, Raymond; Fraps, G.S. 1943. Determination of carotene oxidase in legume seeds. *J. of the Association of Official Agricultural Chemists* 26(1):186-94. Feb. [6 ref]
• ***Summary:*** Table 4 lists the carotene oxidase activity (in units/mg) of 34 different legumes. The highest activity is found in Mandalay soy bean (60.0). The third highest is Laredo soy bean (25.). The lowest is Lima bean (1.9). Address: Agric. Exp. Station, College Station, Texas.

739. Thadani, K.I.; Mirchandani, R.T. 1943. Studies on soybeans in Sind. *Madras Agricultural Journal* 31(6):167-73. June. [9 ref]
• ***Summary:*** Contents: Introduction. Cultivation method. Description of varieties tested: Indian varieties (spreading vs. erect), foreign varieties (lists 13 varieties obtained from USA, United Kingdom, and South Africa). Acclimatization. Maturity. Natural cross pollination. Genetic behaviour of the flower color.

Introduction: "There is sufficient evidence to show that soybean has been cultivated in Northern India and Burma since a long time. Major T.E.T. Aitchison (1881) found the soybean largely cultivated in the Kuram valley, North-west Frontier Province, especially in the Kuram district, occasionally in Hariabab and also frequently as a weed in the cultivated fields. Hooper (1911) in his investigations on soybeans has recorded seeds aggregating perhaps into nine distinct varieties, collected from Burma and from places situated on the lower slopes of the Himalayas extending from Kashmir to Darjeeling. Woodhouse and Taylor (1913) describe nine Indian varieties secured from Darjeeling, Bankipur and Bhagalpur. Most of the Indian varieties have slender twining stems, small pods, and small seeds. They resemble the wild soybeans much more closely than do the

varieties of China and Japan. The existence of different local names for soybeans in Bengal, Assam, Nepal and the North-west Frontier Province is also an evidence of its ancient culture in India.

"With the opening of the Lloyd Barrage in Sind, investigations into the possibilities of cultivation of soybean in Sind under the perennial irrigation system, were started at the Agricultural Research Station, Sakrand, in the year 1929; but all attempts failed until 1931 when for the first time a successful crop was grown for seed. Several varieties of soybeans obtained from abroad and from various provinces of India have been tested. The small seeded and late-maturing varieties have succeeded fairly well under Sind conditions."

"The Indian varieties have small seeds with oil content varying from 13 to 16 percent while the exotic [foreign] varieties have big seeds with oil content varying from 16 to 21 percent." The Indian varieties, obtained from Pusa, Punjab, Madras, and Ranchi, are mostly (75%) spreading types.

Note 1. This document contains the earliest date seen for soybeans in Pakistan, or the cultivation of soybeans in Pakistan (1929, at Sakrand)–even though the cultivation was not successful until 1931. The source of these soybeans is unknown.

Note 2. In 1929 (when the first trials were conducted) the Sind or Sindh constituted the northern part of Bombay presidency in British India. It became an autonomous province in India on 1 April 1937, and that was its status in 1943, when this paper was published. In August 1947 it became part of Pakistan; the capital is Karachi. Its provincial status was abolished in 1955, but restored in 1970. The region was generally flat, lying on both sides of the Indus River, and the chief occupation was agriculture. It is bounded on the east and south by India and on the southwest by the Arabian Sea.

Note 3. In 1992 Sakrand is a city in the Sindh province of Pakistan, near the Indus River north of Hyderabad. Address: 1. Director of Agriculture, Sind; 2. Agriculturist, Agricultural Research Station, Dokri.

740. Kishlar, Lamar. 1943. The soybean has growing pains. *Chemurgic Digest.* July 15. p. 108-10.

• ***Summary:*** "With the entrance of the United States into World War II and the subsequent loss of most of our imports from the Far East and Africa, our fats and oil meal situation was transformed from a condition of plenty to one of scarcity. The dislocation of world trade denied our country imports amounting to more than 1,500 million pounds of oils annually. Over half of this [oil] came form the Pacific area. Principal items imported from this region were coconut oil and copra, most of which was grown in the Philippines, and palm oil from the Netherlands East Indies and Malaya. Supplies of perilla seed are controlled by Japan; tung oil is a Chinese product...

"The demands of Lend-Lease, our armed forces and our allies cut deeply into our supplies of oils and fats... Three-quarters of all acreage harvested for [soy] beans was located in the 4 states of Illinois, Iowa, Indiana and Ohio." Address: President, Soybean Nurtition Research Council.

741. Concepcion, Isabelo. 1943. Significance of soy bean in the dietary of Filipinos. In: Proceedings of the Sixth Pacific Science Congress of the Pacific Science Assoc. See vol. 6, p. 437-47. Held July 24-Aug 12, 1939. Berkeley, CA: Univ. of California Press. [26 ref]

• ***Summary:*** See: Concepcion, Isabelo. 1941. "Significance of soy bean in the dietary of Filipinos." *Acta Medica Philippina* 2(4):479-95. April/June.

742. *New York Times.* 1944. Soybean protein. Feb. 13. Section 4. p. 9.

• ***Summary:*** "An unlimited supply of pure low-cost protein can now be extracted from soybeans for industrial use, Robert A. Boyer told the National Forecast Council recently. When the loss of the Philippines deprived us of about a billion pounds of fat annually, soybean oil stepped into the breach."

743. Holman, Ross L. 1944. Know your soybeans. *American Mercury* 58:177-79. Feb.

• ***Summary:*** Used as a raw material in industry, the soybean can provide automobile bodies, steering-wheels, paints, buttons, rubber, candles, linoleum and explosives. It makes excellent wool for clothing when spun into fiber. Future uses as a plastic include: clocks, chairs, houses, fountain pens, and all the other synthetic industrial products devised by modern chemistry.

Soy flour is mixed with bread, cereals, doughnuts and cakes. "Oil extracted from the bean is made into margarine, and in its pure form has helped replace the imported oils and fats lost to us when the Japanese overran Malaya and the Netherlands' Indies." Soy sausages are 25% cheaper than those made from pork and "are an important item in our lend-lease supplies to Great Britain." Robert Boyer, Henry Ford's engineer at Highland Park, perfected a method of making soy fiber which can be manufactured into a cheaper textile than yet produced in America. It yields a wool which costs less than half as much as sheep's wool. Ford's pilot plan went into production several months ago and produces 1,000 pounds of soy fiber daily. 2 acres of land used for sheep grazing will produce 8 to 10 pounds of wool a year. The same acres planted to soybeans will produce 400 pounds of protein suitable for fiber, according to Boyer. Address: Tennessee.

744. Post, J.J. 1944. Oogstanalyse bij sojaboonen, vergelijking van 6 rassen [Harvest analyses of soybeans, comparison of 6 races]. *Landbouwkundig Tijdschrift* 56(688):256-65. May. [3 ref. Dut]

745. Bordas, Jean. 1944. Le Soja: Agronomie du soja, utilisations agricoles et alimentaires, usages industriels, économie du soja, état actuel de la question en France. Dieuxème ed. [The soybean: Agronomy, agricultural and food uses, industrial uses, economics, and present status in France. 2nd ed.]. Montpellier, France: Dubois et Poulain. 32 p. The 1st edition (36 p.) was published in 1937. [39 ref. Fre]

• ***Summary:*** Contents: 1. Introduction (he notes that World War II is "the war we have just lost"). 2. Soybean agronomy: Botanical characteristics, varieties (in Japan, China, Manchuria, USA), acclimatization trials in Europe, soybean cultivation (incl. inoculation), 3. Food and agricultural uses of soya: Chemistry of the soybean, alimentary physiology, as a feed for animals (soybean cake, forage, soybean seed and flour, soymilk mixed with 25% animal milk), other agricultural uses, as a human food (soy sprouts, tofu, fermented tofu, smoked tofu, how to make tofu), condiments–sauces (soy sauce miso, tuong of the Annamites, soy coffee, provisions / rations), human therapy (incl. infant foods).

4. Industrial uses: Soybean oil, casein, plastic materials (Sojalithe), vegetable lecithin, cellulose, sterol.

5. Soy in the economy: Production, imports and exports.

6. The present state of the soybean question in France–Conclusion.

On page 8 is an interesting map of France which shows: (1) Twelve centers of agronomic research. (2) A shaded zone which is the area of optimal production of soybean seeds. It is in the southeast of France and along the eastern side of France all the way to the northern border. This zone includes (from southwest to northeast) the following centers: Toulouse, Montpellier, Avignon, Antibes, Clermont, Dijon, and Colmar (in Alsace).

Pages 5-6: The first trials made by the agronomic stations in France date from 1901. Mr. Lechartier, director of the station at Rennes, concluded at the end of his observations, that the production of soybean seeds would be more advantageous in a climate that was drier and warmer than that of Brittany (Bretagne).

These were the same conclusions that Mr. Brioux, director of the agronomic station at Rouen, arrived at some years later.

Starting in 1924 the agronomic station at Avignon, the central station for plant improvement at Versailles, in 1935 the stations at Colmar, Clermont-Ferrand and Dijon, and in 1940 the School of Merle (Bouches-du-Rhône), established soybean [germplasm] collections which originated in many different places, in order to test the earliest and most productive varieties that were adapted to each region.

Rouest and Rondet in the south of France, Dr. Balzli in Alsace and de Guerpel in Normandy were the main agronomists and selectionists who were passionately interested in the cultivation of Soya in France.

Note: Rouen is the historic capital city of Normandy, in northern France on the River Seine. Address: Ingénieur Agronome, Directeur de la Station Régionale de Recherches Agronomiques d'Avignon, France.

746. International Institute of Agriculture. 1944. Agricultural commodities and raw materials produced and consumed in the different parts of the world 1934-1938. Villa Umberto, Rome, Italy: IIA. 229 p. Index. 24 cm.

• ***Summary:*** Concerning world soya production (worth $184 million gold), Asia [mainly China, Manchuokuo [Manchuria], Chosen [Korea], Netherlands Indies (Java and Madura), Japan, Kwantung, and Taiwan; based on 1939 IIA studies of world market #4] produces 89.6% (393.5 million bu of 60 lb each, worth $165 million), North America 9.4% (41.2 million bu, worth 17 million), USSR 0.6% (2.6 million bu, worth $1 million), and Europe 0.4% (1.8 million bu, worth $1 million).

Concerning world soya consumption (worth $184 million gold), Asia consumes 78.4% (worth $145 million), Europe 11.6% (worth $21 million), North America 9.3% (worth 17 million), USSR 0.7% (worth $1 million).

Between 1934 and 1938 soya production has increased greatly, rising 90% in Asia, 9% in North America, and 1% in the USSR and Europe. The biggest soya exporting continent is Asia, and the biggest importer is Europe. In Europe, Germany (at 24.3 million bushels, each 60 lb) imports more than all other European countries combined, followed by Denmark (8.8 million), the UK (4.8), Sweden (4.4), and Netherlands (3.7). Address: Rome, Italy.

747. Hollett, S.D. 1945. Processor's idea of a good variety. *Soybean Digest.* March. p. 13-14.

• ***Summary:*** Discusses the characteristics that soybean crushers search for in soybean varieties, and the effect of World War II on soybean prices and involvement by the USDA and the Commodity Credit Corporation.

In January 1942, "only a few weeks after Pearl Harbor, Ohio soybean growers were electrified by an announcement from Washington [DC] that the Government had fixed the price of soybeans at $1.60 per bushel and had set a production goal requiring approximately 9 million acres. This was almost double any previous year's planting. Then in 1943 the price was $1.80 per bushel and you were asked to plant 10 million acres. All this was culminated by the planting in 1944 of approximately 15 million acres to soybeans from which you have harvested beans worth $2.04 per bushel, with premiums for low moisture content...

"When the Japs captured the Philippines they deprived us of about a billion pounds of fat a year. In September of the year 1942 every processor in the country received a letter signed by J.B. Hutson, president of the Commodity Credit Corporation, which read in part as follows: 'The President and Secretary of Agriculture in order to promote the production of soybean oil *for war purposes* and the orderly movement of soybeans at the support price have authorized the Commodity Credit Corporation to develop a program designed to accomplish these objectives...'" A portrait photo shows S.D. Hollett. Address: Manager, Swift & Co.'s Fostoria, Ohio, soybean mill.

748. Mayo, J.K. 1945. Soya beans in Nigeria. *Tropical Agriculture (Trinidad)* 22(12):226-29. Dec. [10 ref]
• ***Summary:*** "The first recorded trial of soya beans was made in 1910 at Ibadan. The crop was a failure.

"In 1928, in response to requests to the United States and Southern Rhodesia for fodder legumes likely to succeed in Nigeria, the Department of Agriculture received several varieties of soya beans. These were grown for some years at Kano, Zaria, Yandev and Ibadan. Yields up to 500 lb. per acre were recorded at Zaria in small scale trials and nodules developed without inoculation. As a fodder plant it was found inferior to other plants, as an export crop it had no prospect at that time in competition with Manchuria, and as a food for human beings it was not seriously considered. Trials were discontinued in 1933. The best of these varieties seemed to be Otootan (black seed) which gave 500 lb. per acre at Zaria and 430 lb. at Yandev in 1930 and 1932. Five varieties from Russia were discarded after two years' trial.

"The Missions, especially the Church of the Brethren Mission at Garkidda on the plateau and the Leper Settlement in Itu in the Eastern Provinces have, from time to time, introduced and tried a number of varieties. They grow the crop solely as a food for human beings

"In 1937, tropical varieties were introduced and tried by the Botanist at Ibadan and Zaria. These varieties came from Trinidad, British Guiana, Malaya, India, the Philippines, Ceylon, the Dutch East Indies, the United States and South Africa... From 1940 onward the more promising varieties were grown at most of our farms with very variable success... variable yields were recorded sometimes as high as 800-1,200 lb. seed per acre, the best yielders being Malaya and Benares... In the Cameroons soya beans have been tried at Bamenda (4,500 ft.) and Esosong (3,300 ft.) which lies on a slope of Mount Kupe...

"The peasants have not begun to grow soya beans in Nigeria, except here and there under the direct encouragement and example of Europeans, *e.g.* at Yandev and Ilorin, in the Anchau 'corridor' in Zaria Province, and near Bamenda...

"Dr. Ogle carried out a controlled experiment on school children in Lagos in 1942 using soya bean milk and flour. She concluded that 'it is dangerous as well as difficult to interfere with native diets' and recommended that further tests with steamed flour and soya bean milk be carried out and beans distributed to teachers and health workers for trial in their homes... The army tried soya beans as part of the rations of West African troops in 1944, but further trials by the Medical Department are needed." Address: Senior Botanist, Dep. of Agriculture, Nigeria.

749. Honig, Pieter; Verdoorn, Frans. eds. 1945. Science and scientists in the Netherlands Indies. New York, NY: Board for the Netherlands Indies, Surinam and Curacao. xxii + 491 p. Illust. 27 cm. [Eng]
• ***Summary:*** Includes: Map of population density (p. 41. Central Java is the most dense). Map of languages (p. 45. Malay is spoken throughout Indonesia). History of the Visitors' Laboratory ("Treub Laboratorium") of the Botanic Gardens, Buitenzorg, 1884-1934, by K.W. Dammerman (p. 59+. It was the first botanical station in the tropics. Koorders and Eijkman were among the first researchers. Prof R. Nakazawa, mycologist, of the Institute for Experimental Researches in Formosa stayed at Buitenzorg in March 1926). A short history of beri-beri investigations in the Netherlands Indies, by W.F. Donath, M.D. and A.G. van Veen (p. 75+. In 1897 Vorderman published an excellent report showing that polished rice as the principal article of diet was followed by beri-beri, and the substitution of unmilled rice caused the disease to disappear. By 1898 Eijkman was recommending that unmilled rice be served in prisons in place of milled rice). An American plant hunter in the Netherlands Indies, by David G. Fairchild, PhD, ScD, President Emeritus, Fairchild Tropical Garden, Inc., Coconut Grove, Florida (p. 79+). Map of the Experimental Gardens of the Govt. Botanic Gardens in Buitenzorg in 1892 *('sLands Plantentuin te Buitenzorg. Cultuur Tuin,* p. 178). Chapters in the history of Chinchona, by Pieter Honig (p. 181+. A source of quinine used to treat malaria). Rumphius, the blind seer of Amboina, by M.J. Sirks (p. 295-308). A short history of botany in the Netherlands Indies, by F.A.F.C. Went (p. 390+. In 1815 the Netherlands East Indies were returned to Dutch rule. The history begins in 1817 with the foundation of the Government Botanic Gardens at Buitenzorg. Prior to 1800 all botanic gardens were connected with universities). Scientific institutions and workers in the Netherlands Indies (p. 426-57). Bibliography. Address: Editors, Natuurwetenschappelijk Tijdschrift voor Nederlandsch Indie.

750. **Product Name:** [Tempeh].
**Foreign Name:** Tenpe.
**Manufacturer's Name:** ENTI (Eerste Nederlandse Tempeh Industrie).
**Manufacturer's Address:** Zevenhuizen, Netherlands.
**Date of Introduction:** 1946. April.

**New Product–Documentation:** Form filled out by from Firma Lembekker. 1982. Says ENTI was started in April 1946, then sold to Mrs. Duson in Zevenhuizen; Letter from Sjon Welters. 1982. Sept. 27. "The company was founded around 1954." Mrs. Duson, who is now the producer, took over about 10 years ago from the foundress.

Letter from Sjon Welters. 1983. March 2. The official name of this company is Firma Enti. It was founded by a woman named Wedding. Her man was an Indonesian. Mrs. Duson, the woman who owns it now, could not remember if Mrs. Wedding was Dutch or Indonesian.

Shurtleff & Aoyagi. 1985. History of Tempeh. p. 28. This was Europe's first commercial tempeh company, founded in April 1946 by a Dutch couple whose last name was Wedding. They had learned to make tempeh while living in Indonesia. In the early 1970s the company sold to Mrs. Duson in Zevenhuizen. It was then making 2,000 lb of tempeh a day. Interview with Sjon Welters. 1984. Oct. 25. ENTI went out of business in January 1984 and the original Indonesian culture, now over 135 years old, was deliberately destroyed.

751. Balzli, Jean. 1946. Le soja à travers le monde [The soybean around the world]. *Revue Internationale des Produits Coloniaux et du Material Colonial* 21(204):134-35. Sept. [1 ref. Fre]
• ***Summary:*** Discusses soybean developments in the following countries: Canada, China, USA, Great Britain, Greece, Mexico, Philippines, Hawaii, Switzerland, Sweden. Address: PhD.

752. Roelofsen, P.A. 1946. Tempeh-bereiding in Krijgsgevangenschap [Tempeh-making in prisoner-of-war camps]. *Vakblad voor Biologen* 26(10):114-16. Oct. [Dut]
• ***Summary:*** Throughout this article, and in the title, the Dutch and Malay word previously spelled tempé or tempe is spelled "tempeh." Note: This is the earliest Dutch-language publication seen that uses the word tempeh. Several years later, that spelling would become the standard English-language spelling. Address: Director, Deli Proefstation, Medan (Sumatra, Indonesia).

753. Pendleton, Robert L. 1946. The agriculture of Siam [Thailand]. *Foreign Agriculture* 10(11):154-67. Nov.
• ***Summary:*** Siam, or Thailand, as it has been known for the past 8 years, is the only independent Kingdom in southeastern Asia. It has about 16 million inhabitants. The soybean is a crop that is becoming better established as a second crop, following rice, in the northern valleys. Evidently originating in higher latitudes, soybeans in the low latitudes of Siam, especially the better qualities, are rather unsatisfactory in that high yields are difficult to obtain. Address: Soil scientist, Royal Dep. of Agriculture, Bangkok.

754. Portères, Roland. 1946. Observations sur les possibilités de culture du soja en Guinée forestière [Observations on the possibilities of growing soybeans in the forested parts of French Guinea]. *Bulletin Agronomique (Ministere de la France d'Outre Mer, Direction de l'Agriculture, de Elevage et des Forets)* No. 1. 80 p. Nov. [Nogent-sur-Marne (Seine), France]. [3 ref. Fre]
• ***Summary:*** Contents: Introduction. Table showing the climate of the Sérédou [Seredou] station. 1. Varieties tried at the Sérédou Station: Introduction of soybean varieties (in 1935 [from Manchuria, and Japan], in 1938 [from Annam, Cochinchine, and Cambodia], in 1939 [from Tonkin, Java, USA, and France], and in 1940 [from French Cameroon, Poland, Argentina, Netherlands, Italy], new acquisitions in 1939 and 1940, multiplicity of varieties), classification of the soybeans at Sérédou, agro-botanical observations on the varieties, attempt at classification (general, botanical classification, classification of seed varieties), principal characters (incl. name and place of origin) of the soybean varieties cultivated at Sérédou in 1940.

2. Ecology: The ecological behavior of some (39) varieties, general ecological behavior (the phases of vegetation and critical periods), soya for forage, soybean seeds and their selection, facilities needed for cultivation and production during the year, inoculation of the seeds, quality of the soil, enemies of the soybean including parasites and diseases.

3. Plan for production of soybeans in a forested tropical zone: Organization of cultivation, map of precipitation in West Africa (Sérédou receives about 2,000 mm/year), exports (3-4 crops a year can be grown), cropping patterns, growing soybeans for use as food.

4. Modifications of indigenous methods: The need to introduce soya as an indigenous food and badly needed source of protein, difficulty of cooking soybeans, selecting varieties best suited to cooking, soaking, washing and cooking, cooking by the local people, times of year favorable for introducing soya into the diet, place of soya in the crop rotation.

5. The nutritional composition of soybeans grown in West Africa (analyses of varieties cultivated at Sérédou were made by M. Nguyen Van Cuc, a chemist at Nogent-sur-Marne), graph showing that oil content and protein content are inversely related. 6. General conclusions based on the first trials: Based on the 1939 and 1940 trials one can conclude that in the forested areas of [southeast] Guinea (Gueckedou, Macenta, N'Zerekore [Nzerekore]), and the sub-forested areas (Kissidougou, Beyla), soybeans can be grown with good results, and every effort must be made in this direction in the years to come. Soybeans can help meet the food shortages that exist in June, July, and part of August.

The preface (p. 3) states: "Sporadic attempts at the introduction of soybean cultivation have been in French West Africa since 1900. They have been conducted on a small scale in the various stations of Dahomey [later Benin], Ivory Coast, Upper Volta, French Guinea, French Sudan *(Soudan français* [Mali]), Upper Senegal-Niger *(Haute-Sénégal-Niger* [Mali]), and at the Office of Niger (Soninkoura [probably Soninnkoura in the Segou region of Mali on the Niger River], using irrigated cultivation). Practical results have been obtained in forested Guinea (at the Sérédou Station) and in the upper Ivory Coast. This study focuses on the results of trials conducted at Sérédou in 1939 and 1940.

The section on "Introduction of soybean varieties at the Sérédou Station" (p. 5) states that in 1935 five varieties were tested at Macenta by M. Barthes. They were Nogent 2856–Black *Wou T'ecu,* from Manchuria. None germinated *(ne germèrent pas).* Nogent 2855–Black *Hoi T'ecu,* from Manchuria. None germinated. Nogent 2852–Yellow *Huen T'ecu,* from Manchuria. 102 plants matured. Nogent 2817–Yellow of Japan. 17 plants matured. Nogent 2853–Green *Tsing T'ecu,* from Manchuria. 1,000 plants matured. Of these five, only No. 2853, the green-seeded soybean from Manchuria did well, and was kept and appreciated, but its cultivation was continued until 1939.

The best The best period for vegetation is from October to March in low irrigated lands, and until June in high lands. The vegetation period varied from 80 to 160 days for the different varieties (in the short cycle varieties branching is very reduced). Soybeans can be cultivated for export or for local consumption, both as forage and as food for the natives. Soybeans for export must be harvested during March-April and exported during the dry season. As a food for the natives it can be a supplement during the food-short months of June and July. Since soybean seeds lose their germination power quickly during the rainy season, it is necessary to have a little cultivation during June, August, and September in order to produce the necessary seeds for export. This cultivation cannot be integrated into the cultivation for food as it produces in a season when rice, which is preferred by the natives, is available.

Note 1. This is the earliest document seen (Aug. 2009) concerning soybeans in Upper Volta (renamed Burkina Faso in 1984), or the cultivation of soybeans in Upper Volta.

Note 2. This is the earliest reliable document seen (Aug. 2009) concerning soybeans in Dahomey (renamed Benin in 1975), or the cultivation of soybeans in Dahomey.

Note 3. This document contains the earliest date seen for soybeans in French Guinea, or the cultivation of soybeans in French Guinea (1935). The source of these soybeans was Manchuria and Japan. Address: Ingénieur d'Agronomie Coloniale, Licencié ès Sciences.

755. Read, Bernard Emms. trans. 1946. Famine foods listed in the "Chiu Huang Pen Ts'ao": Giving their identity, nutritional values and notes on their preparation. Shanghai, China: Henry Lester Institute of Medical Research. 90 p. Illust. Index. 25 cm. [16 ref. Eng]

• ***Summary:*** Contains two entries related to the soybean. (1) 12.2 (p. 49) is *Lao Tao, Glycine ussuriensis,* Regal. G. soja, S. & Z. Wild soya. Used exactly like the ordinary [cultivated] soybean. The nutritional composition of the seeds is given.

(2) *Huang Tou Miao (shoots), Glycine hispida,* Maxim. Yellow soybean. *G Soja.*

"The seedlings are cultivated and eaten by Chinese in Malaya (Burkill)." Leaf and stem:–3.0% protein, 1.0% fat, 11.5% carbohydrates, 2.4% ash.

Fresh young pods:–15.2% protein, 7.1% fat, 9.7% carbohydrates, 1.82% ash; vitamin C small amount.

Bean:–40.5% protein, 20.2% fat, 21.0% carbohydrates, 5.0% ash; "a medium amount of vitamins A, B, and B-2 and a small amount of vitamins C and E [sic]. The leaves and stems make excellent fodder."

On title page: "Published by the aid of a grant from the British Council." Address: Henry Lester Inst. of Medical Research, Shanghai [China].

756. Stahel, Gerold. 1946. Foods from fermented soybeans as prepared in the Netherlands Indies. I. Taohoo, a cheese-like substance, and some other products. *J. of the New York Botanical Garden* 47(563):261-67. Nov.

• ***Summary:*** Contents: Introduction. Sprouts and milk from soybeans. Cheese-like products. How taohoo is made. Condiments made with Aspergillus.

In East Asia–as in Surinam–people have developed "means for overcoming the rather bitter taste of soybeans and their failure to cook soft. They have learned to ferment the soybeans with quick-growing fungi, thus making several palatable and wholesome foods.

"Most important of these foods are *taohoo* and *tempe;* also *taokoan,* a cheese made from *taohoo; taotjo,* a fermented paste-like condiment, and *ketjap,* which is soy sauce. Soybean milk is also made, but without a fungus, and sprouted soybeans are widely used by orientals."

"In the Netherlands East Indies [later Indonesia] sprouted soybeans are called *tokolán* or *taogé.* They are one of the ingredients of every 'rijst-tafel' (rice table, or combination of rice dishes) and therefore are never lacking in the 'passar' (market). Even in our Paramaribo market *tokolán* is displayed every day."

In China, soy milk is used in the same manner as cow's milk. It is also consumed in the United States, though on a very limited scale. In the Netherlands East Indies, soy milk "is only slightly known as food, but it is produced in large quantities for the manufacturing of soy cheese, called *taohoo* or *tahoo."*

The curd [tofu] "is either eaten fresh or baked in oil or lard. In China it is sometimes processed further into a kind of real cheese by impregnating the curd with turmeric and reducing the water content by heavier pressing. This cheese, called *taokoan* [Chinese: doufugan], has a yellow color and can be shipped abroad."

"After tempe [made with *Rhizopus Oryzae],* taohoo is the most common form of soybean product eaten in the Netherlands East Indies. In China, it is the most important soy product. Taohoo is manufactured here in Surinam only on a very limited scale, by a single Chinese store-keeper close to the Paramaribo market-halls along the Surinam river. Twice daily, between 2 and 4 o'clock in the morning and again in the afternoon, he manufactures 11½ kilograms of taohoo, to be sold after 6 o'clock the next morning." A detailed eyewitness description of the tofu-making process is then given.

Describes briefly how to make taotjo (a kind of paste) and ketjap (soy sauce) with *Aspergillus oryzae,* another fungus. Taotjo is not made in Surinam, but ketjap is. "To make taotjo, boiled soybeans are mixed with roasted meal of wheat or glutinous rice. The mass is wrapped in hibiscus leaves, which commonly harbor the *Aspergillus* fungus." After 2-3 days the moldy mass is immersed in brine, where it is kept for several weeks. "Palm sugar is added at intervals. Taotjo must be made in the dry season, because every day it has to be brought outside into the sun and air for hours." This dish is eaten in East Asia with the 'rijst-tafel.'"

To make ketjap, soybean are boiled, cooled, then wrapped in hibiscus leaves–but without mixing in roasted meal. After fermenting for 2-3 days, the mass is immersed in brine, as with taotjo. Each day, for one to several months, it is exposed to the sun. A little palm sugar is added at intervals. Then the fluid is filtered off and the solid residue is cooked several times with fresh water to extract all the soluble material. "The fluid is then concentrated by slow boiling. Spices and other piquant materials are added, according to the *specialité de la maison.* These may include galangal, ginger, cloves, Jew's ear fungus, and dried and ground fish and chicken meat."

Photos show: (1) Chinese kitchen [shop] equipped with implements for tahoo manufacture, with hand-turned millstones, soybean mash flowing into cheesecloth bag hanging in wooden barrel, press, earthenware pot filled with brine for the "coagulation of the curd." (2) Four pieces of fresh taohoo, four-fifths natural size. (2) Four pieces of freshly baked taohoo, four-fifths natural size.

Note: This is the earliest English-language document seen (Feb. 2004) that uses the word "taohoo" or "taokoan" to refer to tofu. Address: Agric. Exp. Station, Paramaribo, Surinam.

757. van Veen, A.G. 1946. De voeding in de Japansche interneerings-kampen in Nederlandsch Indie [The food in Japanese internment camps in the Netherlands Indies]. *Voeding* 7(5):173-86. Dec. 15. [Dut; eng; fre]

• ***Summary:*** Among the foods consumed in these camps were soybeans *(soojaboonen),* tempeh *(tempe,* see p. 175, 183-84), and ontjom, starting in November 1944. "The food was very insufficient, calorically as well as regards further composition and taste. So numerous cases of nutritional oedema and other deficiency phenomena occurred. The construction of kitchens, bakeries and such was done by the inhabitants of the camps themselves with the most primitive materials. Food yeast, baker's yeast, maize malt, vitamin B extracts and other useful products were also made by the inhabitants themselves mostly out of waste products. For the patients very simple diets were composed." Address: Geneeskundig Laboratorium, Hoogschool, Batavia (Jakarta, Indonesia).

758. Stahel, Gerold. 1946. Foods from fermented soybeans as prepared in the Netherlands Indies. II. Tempe, a tropical staple. *J. of the New York Botanical Garden* 47(564):285-96. Dec. [6 ref]

• ***Summary:*** Contents: Summary. Introduction. Experimenting with tempe. Native method of manufacture (used by a Javanese peasant woman named Sinem, living near Lelydorp. "Every day she makes about 80 tempes for sale"). Packaging the tempes (in large leaves). Rapid deterioration (after the tempe is 2½ days old). Quantities measured (losses during preparation and fermentation). Large tempes for festive occasions (containing 1 kg of soybeans in a layer 1 to 1½ cm thick fermented between leaves in a bamboo tray about 1 foot in diameter). Directions for making tempe.

During World War II, "soybeans were sent to New Guinea [probably Western New Guinea, called Netherlands New Guinea in 1946] by the United States Government to feed the Europeans and Indonesians living there. For two years the people had had none of this to them important food. What the shippers did not realize, however, was that plain soybeans would be unpalatable to people of Indonesian eating habits. A specific fungus was needed to ferment the soybeans into *tempe,* a food that would be relished. Since the Papuans, the aboriginals of New Guinea, do not use soybeans in any form, all cultures of the fungus were lost when connections were broken with other Indonesian islands.

"The author then was asked to send the tempe fungus from Surinam, where it was known to be in use by Javanese people living there. The pure cultures and quickly dried tempe cakes arrived in New Guinea by plane in a little more than a week. The people then were able to use the ample stores of American soybeans by making their familiar and well liked tempe cakes."

The author isolated the tempe fungus and used it to make tempe in a laboratory. He describes several local Surinam methods of making and packaging tempe. In Surinam the inoculated soybeans are wrapped in large monocotyledonous leaves, e.g., of the family Musaceae (such as the genera *Musa* and *Heliconia),* and also of the family Marantaceae, such as *Ischnosiphon.* 30 to 40 grams of inoculated beans are folded into each leaf. Then the packet is tied with rice straw or with raffia.

Photos show: (1) A young lady in the Paramaribo market, Surinam, holding a round bamboo tray loaded with leaf-wrapped packets of tempe. (2) Two close-up shots (four-fifths natural size) of cakes of tempe as sold in the Paramaribo market; on the upper cake is a luxuriant growth of *Rhizopus Oryzae,* whereas on the lower cake the growth of the fungus is more scanty due to insufficient oxygen supply. (3) Longitudinal and cross-sectional views of "tempes" from the Paramaribo market; the lower ones are still wrapped in banana leaves. (4) Ten cakes of tempe made in a laboratory. All were wrapped with an Ischnosiphon leaf before incubation. Two cakes are shown still wrapped with the leaf, tied around the middle with a string. (5) "A large tempe, one foot in diameter, cultured between Ischnosiphon leaves on a flat bamboo basket called a 'tampa.'" (6) A lady "Making a tempe package with Ischnosiphon leaves."

Note: This is the earliest article seen about tempe [tempeh] published in the United States. Address: Director, Agric. Exp. Station, Paramaribo, Surinam.

759. Meals for Millions Foundation. 1946-1967. Meals for Millions Foundation Records, 1946-1967 (Finding aid for archival collection). Los Angeles, California: University of California at Los Angeles (UCLA). 48 boxes.
• ***Summary:*** Collection No. 1107. Repository: UCLA Library, Dep. of Special Collections, Los Angeles. Physical location: Stored off-site at SRLF (Southern Regional Library Facility). Please contact UCLA for paging information.

"The Meals for Millions Foundation of Los Angeles was a non-profit organization dedicated to the eradication of hunger in the world through 'three-cent meals.' The plan for such a program was formulated by Clifford Clinton (of Clifton cafeterias in Los Angeles, California), who, with the assistance of Dr. Henry Borsook of Caltech organized the foundation in 1946. The basic product of the foundation, known as Multi-purpose Food, was a tasteless additive that could be mixed with virtually anything. Developed by Dr. Borsook, MPF was said to provide one-third of the daily vitamins, minerals, and protein needed by the average adult.

"Shortly after setting up the Foundation, Clinton brought in Florence Rose and Ernest Chamberlain to be co-directors and take over the day-to-day management. This collection or archive consists primarily of the office and personal files of Miss Rose, most of which she rescued from destruction when Meals for Millions began to change course in 1965. Florence Rose left the Foundation at that time and was then associated with Investors Overseas Services until her death in 1969.

"The collection came to UCLA indirectly (via Smith College) from Ernest Chamberlain, close friend and confident of Miss Rose. The files have been alphabetically listed and their arrangement retained as originally filed. Consequently, a great deal of duplication exists throughout and the interrelationships of materials are often cloudy at best" (Quoted from the Biographical narrative on the website, July 2007).

Boxes 38 to 47 are MFM projects in foreign countries or regions, listed alphabetically: Africa, Alaska, Argentina, Bolivia, Brazil, Ceylon, Chile, Finland, Germany, Haiti, Honduras, Hong Kong, Hungary, Iceland, India (5), Indonesia, Israel, Japan, Korea, Lebanon, Mexico, Pakistan, Paraguay, Peru, Philippines, South Vietnam, Taiwan, Tanzania, Thailand, Uruguay, Vietnam. Box 48 is oversize materials. Address: Los Angeles, California.

760. Bergeron, Trader Vic. 1946. Trader Vic's book of food and drink. New York, NY: Doubleday & Co. 272 p. Illust. Index. 20 cm.
• ***Summary:*** The only soyfood mentioned in this books is soy sauce. "Soya sauce, which was once eyed distrustfully and termed 'bug juice' by the uninformed, is now accepted on familiar terms and we are even beginning to appreciate its usefulness in our own kitchens" (p. 157).

The recipe for Chicken livers with water chestnuts (p. 183) concludes: "For added flavor, dip the livers first in soya sauce." The next recipe, Chicken livers in egg batter (p. 183-84), begins: "Cut chicken or duck livers in small strips, dip them first in soya sauce and then in a very light..."

The chapter on "Barbecuing" contains the most information on recipes using soya sauce (p. 237-41): "A word about soya sauce before we proceed. The use of this little-known ingredient in cooking introduces an indescribable flavor that cannot be equaled. It gives a beautiful brown glaze to all meats and makes the fat crisp and appetizing. Most people associate soya sauce with the little jugs on the tables in Chinese restaurants; it is vulgarly called 'bug juice' by the uninitiated. It belongs in the kitchen right along with your other seasonings and as you experiment with it you'll find yourself using it as often as you would salt and pepper. Try basting a leg of lamb with it–the flavor and color are superb. Lamb chops, too, whether you fry, broil, or barbecue them, are improved by the use of soya sauce" (p. 237).

"Steak Hawaiian: This recipe illustrates perfectly the value of cooking with soya sauce. You'll find the steak has color and an indescribable flavor, and the fat has a crisp brownness that can't be achieved in any other method of

cooking." The steak is marinated on both sides for about 15 minutes total in a mixture of finely minced garlic and ½ to 1 cup of soya sauce. Then it is barbecued, fried, or broiled.

"Barbecued squab [young domestic pigeon]: Brush whole squabs inside and out with soya sauce and barbecue" for 20-25 minutes. Or roast for about the same time. If desired, the "squab may be basted occasionally with a mixture of soya sauce and melted butter while cooking."

Barbecued lamb, first marinated in a mixture that contains 6 tablespoons soya sauce. Javanese Saté calls for "4 teaspoons Saté spice," which is sold in Jars at Trader Vic's Trading Store, 6500 San Pablo Ave., Oakland, Calif. Note: It probably contains soya sauce. Saté is an Indonesian / Malay word.

Barbecued shrimp: "Peel large gulf shrimp; dip them in soya sauce..." Smoked oysters: "Dip oysters in soya sauce," skewer, then barbecue. Barbecued chicken livers: "Dip in soya sauce, skewer on wire, and barbecue..."

A recipe for Trader Vic's daiquiri (p. 92-93) states: "This drink should be made in a Waring type mixer with one large handful of fine ice, and no more than three should be made at one time."

Note 1. This is the earliest document seen (May 2010) concerning soy ingredients used in Indonesian-style recipes, food products, or dishes outside of Indonesia.

Note 2. In this book Trader Vic shows his love of rum and of swearwords. Address: Oakland, California.

761. *Soybean Blue Book.*1947-1966. Serial/periodical. Hudson, Iowa: American Soybean Assoc. Annual. Titled Soybean Blue Book from 1947-1966; Soybean Digest Blue Book from 1967-1979; Soya Bluebook from 1980 to present.

• ***Summary:*** A directory and information book for the soybean production and processing industries–but with much greater emphasis on processing and utilization. One of the most valuable sources of worldwide information on soybeans. During the period from 1947 to the 1960s, the Blue Book was usually published in March or April of each year.

In the 1966 Blue Book (p. 28-29) are two full-page tables titled "World Soybean Production." The first gives acreage in 1,000 acres, yield in bushels per acre, and production in 1,000 bushels. The second gives hectarage, yield in kilograms per hectare, and production in 1,000 metric tons. Figures are given for: 1950-54 (average), 1955-59 (average), 1963, 1964, and 1965. Statistics are given for the following countries: North America: Canada, United States. South America: Argentina, Brazil, Colombia, Paraguay. Europe: Italy, Rumania, Yugoslavia, Other Europe (excluding USSR). USSR (in Europe and Asia). Africa: Nigeria, Rhodesia, Tanzania. Asia: Turkey, China (Mainland), Cambodia, China (Taiwan), Indonesia, Japan, Korea (South), Thailand. Estimated world total. Address: Hudson, Iowa.

762. Centraal Kantoor voor de Statistiek, Afd. Landbouwstatistiek. 1947. De productie van sojaboonen [The production of soybeans]. *Economisch Weekblad* 13(11):175-76. March. [3 ref. Dut]

• ***Summary:*** Discusses and gives statistics for soybean production in the USA (1931-46), Manchuria, China, Java, and Madura (1930-44).

763. Chevalier, Auguste. 1947. Cultures nouvelles et cultures qui disparaissent en Afrique Occidentale [New crops and crops which are disappearing in West Africa]. *Revue Internationale de Botanique Appliquee et d'Agriculture Tropicale* 27(293-294):134-38. March/April. [Fre]

• ***Summary:*** Soya is listed among the new crops. "Soya (Le Soja; *Soja max* Piper = *Glycine soja* Zuccar.) in the indigenous cultures of black Africa in some regions: Upper Côte d'Ivoire, Sudan, South Nigeria, and Cameroon. It is the colonial administrations which have extolled the crop and have distributed the seeds. Thirty years ago the soybean was completely unknown in black Africa, even at the agricultural experiment stations. The first acclimatizations succeeded poorly. It was necessary to introduce the root nodule bacteria in pure cultures in order to have them sown on lands where soya was cultivated for the first time. Next, it was necessary to investigate the varieties suited to the various tropical climates. The crop was developed in West Africa at the stations of Bingerville at Sérédou (French Guinea), at Dschang (Cameroon), in Nigeria, etc. In Côte d'Ivoire it is only from 1940 that this crop has been propagated and spread among the indigenous people.

"Only 4 varieties have given good results: Haberland [Haberlandt], an old European variety, Bingitt 27 and Bingitt 29, and Mocara black *[Mocara noir]*, originally from Java (Roland Portères). These varieties have spread among the indigenous people of the high plateaus of Cameroon, to the south of the Adamawa (l'Adamaoua), and in French Guinea, the region of Macenta and in Upper Côte d'Ivoire, near Bobo-Dioulasso, Banfora, Sikasso, etc. The indigenous people have used them to make fermented pastes to replace the *Soumbara* [also spelled Soumbala], a condiment prepared with the seeds of *Parkia.* However the plant does not seem to be able to contend with peanuts for export. Meanwhile, according to Portères, soya bas a certain and promising future in the Mossi [in what is today central Burkina Faso] and in certain mountainous regions of black Africa.

Note 1. This is the earliest reliable document seen (June 2004) concerning soybeans in Côte d'Ivoire, or the cultivation of soybeans in Côte d'Ivoire.

Note 2. This is the earliest document seen (Dec. 2001) that mentions *Soumbara* (also called Soumbala or dawadawa), a condiment made from soybeans instead of the traditional *Parkia* seeds. Address: Professeur honorare au Museum national d'Histoire naturelle de Paris, France; and publisher of this journal.

764. Kerle, W.D. 1947. Soybeans. *Agricultural Gazette of New South Wales* 58(5):227-31. May 1; 58(6):295-98. June 1. Summarized in Soybean Digest, Nov. 1947, p. 34.
• ***Summary:*** Contents: Introduction. World distribution. Experience in New South Wales. Soil and climatic requirements. Soil preparation. Time and methods of sowing. Fertilisers. Inoculation of seed. Varieties. After cultivation. Rotation. Harvesting. Storage. Yields. Insect pests and diseases. Uses of soybeans (soybean oil for food and industrial purposes, soybean meal for livestock feed, soybean plastics and wool, soybean flour, green vegetable soybeans, soybean milk, sprouts, mature soybeans). Economic aspect of soybean growing.

Experience with soybeans in New South Wales extends over the past 30 years [i.e., since about 1917]. Hundreds of varieties have been imported from East Asia, the USA, and other countries, and field experiments have been conducted in all districts of the State. Numerous trials have been conducted at Hawkesbury Agricultural and Experiment Farms with varieties, cultural practices, fertilisers, seed inoculation, etc. Several soybean varieties are now recommended and the Northern Tablelands have been shown to be the district best suited to seed production, yet the yields there (averaging 7 bushels/acre over a ten year period) have not been sufficient to recommend soybeans as a commercial crop. Yields of over 20 bushels/acre, however, have been obtained in variety trials. The best variety is Potchefstroom 169, originally from South Africa. Other good varieties available in NSW include Easy Cook [Easycook], Haberlandt, Otootan, Lincoln, Dunfield, and Richland.

Before World War II, soybeans were imported from China and the Netherlands East Indies for about 6 shillings per bushel. During the war the price for soybeans (whose production was very small) was as high as 42 shillings per bushel, and contracts were let at 25 shillings by the Commonwealth Government in 1942-43. Of all the states of Australia and New Zealand, Queensland now seems to show the best promise of success in growing soybeans.

In 1924 in the USA only about 6% of soybean production was crushed for oil, but in 1940 this figure rose to 83%.

Photos show: (1) Farmer standing in a field of high soybeans on the North Coast. (2) A field of soybeans in the early stages of growth. (3) Soybean roots showing well-developed nodules. (4) Mature plant of Potchefstroom 169. (5) A man examining Easy Cook [Easycook] soybeans growing in a field. (6) Soybeans "cocked" after harvesting with reaper and binder. (7) Soybeans being grown as a green manure crop between tung oil trees. Address: Special Agronomist, New South Wales.

765. Brillmayer, Franz A. 1947. Die Kultur der Soja in Oesterreich [The cultivation of soybeans in Austria]. Vienna, Austria: Scholle-Verlag. 97 p. Scholle-Buecherei, Bd. 80. With 33 illust. and 16 tables. 22 cm. [Ger]
• ***Summary:*** Contents: Foreword (written in May 1947 at Braunsdorf-Wien). 1. The origin of the soybean and how it spread throughout the world. 2. The history of its introduction into Europe: Into Austria, into Germany, into France, into Poland, Hungary, and the Balkans. 3. Botanical information about the soybean: Its morphology, physiology, Austrian varieties, European varieties, diseases and pests, nodule bacteria and hormones. 4. Breeding, the goals of breeding, and conduct of investigations (Versuchswesen). 5. Climate and suitable varieties. 6. Culture: Soil, preceding and subsequent crops in rotations, preparation of the soil, fertilizing the soil, time of seeding, inoculation, seeds, scarification *(Beizung)* of the seeds [to "wound" or scratch the seed coat so that the seeds imbibe water and thus germinate better], plant spacing and density of planting, amount of seeds and depth of planting, damage done by wild animals (game), care of the crop, harvest, threshing, storage.

The many interesting photos at the back of the book include: 3. The first soya field in 1924 growing the variety Platter SS 14. 5 and 6. A breeding plot in southern France (Lamagistere). In April 1937 the best Austrian soybean varieties were planted at St. Sylvain d'Anjou. 7. Threshing of Platter gelbe Riesen varieties harvested in Casablanca, Morocco. 8. A field of Austrian soybean varieties in Marrakech (Marakesh), French Morocco. 10. Marcel Blanchard with a breeding plot of Austrian soybeans at Agen (Garonne), France. 11. Soybean nodules inoculated with Radicin. 11-12. The Radicin factory. 26. The soybean breeding plots at Platt. Address: Braunsdorf, Post Roseldorf, Niederoesterreich (Lower Austria), Austria.

766. Brillmayer, Franz A. 1947. Geschichte der Einfuehrung der Soja in Oesterreich [History of the introduction of the soybean to Austria. I. (Document part)]. In: F.A. Brillmayer. 1947. Die Kultur der Soja in Oesterreich. Vienna: Scholle-Verlag. 97 p. See p. 11-14. [Ger]
• ***Summary:*** In the section titled "History of the introduction of soya to Europe," page 11 states: "Starting in 1920 again, for the second time, Austria promoted the production and utilization of soybeans, and with this the impulse for a new "soya wave," which now went all over Europe, was unleashed. Here in Vienna a soya industry also began with the production of Edelsoja. Assistant Professor Kupelwieser used it to demonstrate the outstanding

significance of soya as a protein source, going against the then current opinion that soya was primarily an oilseed. From my soybean breeding location at Platt in Lower Austria, Austrian cultivars spread all over Europe and even overseas.

"Why should it not be widely known that valuable pioneering work was performed in Austria? The line of soybeans bred in Platt went to Poland, the Balkans, to Hungary, Belgium, Holland, and Greece, to Turkey, to Persia, Canada, England, Germany, Dutch Guiana [later renamed Suriname], the Indian Peninsula [Vorderindien, incl. India, Sri Lanka, and parts of Pakistan and Burma], China, Java, Tanganyika, to French Morocco, and Bessarabia [now part of the Moldavian S.S.R. in the USSR]. It was not only new breeds of soybeans that spread out from Austria but a rekindling of the "soya idea" that had its origin here. This led to a change of opinion and the soybean came to be seen as a world power factor *(Weltmachtfaktor),* as is already well known today.

"According to Dr. [E.C.] Winkler's patented process for debittering soya, a very modern factory was erected in Vienna XX. In it, a part of the oil was expressed, leaving a meal with only half its original fat content. Dr. Winkler achieved, through prior debittering of the soybeans, an excellent food and salad oil that did not need to be further refined. Also, the production of unrefined salad oil from Edelsoja originated in Austria.

"History of the introduction of soya to Austria (p. 11): On the occasion of the Vienna World Exhibition of 1873, Japan exhibited soybeans and awakened a great interest for this Asian plant throughout Central Europe. This was mainly because of the fact that in the Exhibition attention was called to the value of the soybean. The Viennese university professor Friedrich Haberlandt took the matter into his own hands. Through the agency of the imperial embassy / legation he had the Ministry of Agriculture acquire 20 soybean samples from Japan and China. The tests were done in the warmer provinces of the Monarchy. There were 148 agronomic trials introduced in Hungary, Dalmatia [a former region on the Adriatic coast of what is now Croatia; formerly an Austrian crownland], Kärnten [Carinthia, today a state in southern Austria bordering on Italy and Yugoslavia], Steiermark [Styria, a state in the mountainous part of central and southeast Austria], Istrien [Istria, in Slovenia since June 1991], and Mähren [Moravia, a region in central Czechoslovakia]. In 1877 Haberlandt had already gathered so much experience that exact guidance for cultivating soybeans could be given. At this time the first composition analyses were undertaken, so exact knowledge of the value of soybean seeds was obtained. Likewise, through Steuf and Wolker, experience was gained in pressing oil from the seeds, and selections were undertaken in the Botanical Garden at Vienna. The highest yielding types were called "Haberlandt" and these first appeared in the seed catalog of the great seed company Vilmorin Andrieux & Co. in 1880.

"Haberlandt pointed out the value of the soybean as food and recommended a diet of soybeans and potatoes, which contained all nutrients necessary for human life. It was also recommended that the soybean be incorporated into the commissary provisions of the army, and in this process that peas in the popular pea sausage 'Erbswurst' be partially replaced by soybeans.

"At that time, the soybean could not stand on its own. It remained strong for a long time in the peasant agriculture of Krain [Carniola; now in Slovenia] and Istrien, and served as a 'coffee bean' *(Kaffeebohne)* in the preparation of a breakfast drink. There were two conditions which stood in the way of the spread of soybeans. First, the soybean is a foreign food to us. When cooked, it remains hard and has an after-taste, an off flavor that is bitter. The very thin layer under the seed coat of the bean is the source of this after-taste. In addition, it was said that Asian soyfoods have no taste. What is more, there was plenty of food in the Monarchy, so there was no need for a new, foreign food.

"The soybean completely disappeared from memory in Austria. It was only kept in a few botanical gardens as a curiosity.

"In 1920 I began breeding soybean lines with the goal of getting ones that would ripen in our climate and give reasonable yields. Conditions for soybean culture became ripe after World War I due to the general lack of food. My starting material was a matchbox full of soybeans that a prisoner of war had brought with him from Siberia. After a long delay, the solution to the soybean problem was begun in Platt in lower Austria, near Zellerndorf in the district of Hollabrun. Some of the seeds ripened and in the next year those that ripened earliest were selected. In 1924 I was able to announce to Dr. Markus Brandl (the top agricultural official in the area) that I had a field of soybeans that matured in mid-September. Immediately Dr. Fritz Drahorad was sent to Platt to inspect and report on the soybean plant. Drahorad was the current top ranking agronomic official in Vienna in charge of plant cultivation and seed testing *(Oberkommissär der Bundesanstalt für Pflanzenbau und Samenprüfung)* and the assistant to Privy Councillor *(Hofrat)* Professor Dr. Tschermak von Seysenegg, who had been involved with soya at Royal College of Agriculture *(Hochschule für Bodenkultur)* in Vienna. He wrote a confirming report, that a good yielding, early maturing variety was now at hand. This first domestic variety was small seeded and black. It was called Platter SS (Black Seeded) 14.

"Using only newspaper articles and a small price list, I propagated soybean culture. I pointed out its significance as human and animal food, established connections with central authorities in China, and exchanged experiences and breeding material with research stations in Manchuria. The

Chinese Eastern Railway soybean station in Harbin, which then employed a staff of 20 scientists, published annually a hefty volume with research results dealing with all questions of culture, breeding and utilization. In this way, Austria received new breeding material from Manchuria–over 80 soybean varieties. But in Platt they failed to perform up to our expectations because of the longer vegetation period.

"Meanwhile, from the small-seeded SS 14 a very large seeded strain was selected. In the price list of 1929, eight lines appeared, with maturity times ranging from 114 to 128 days. One thousand seeds weighed 158 to 170 gm. Yields steadily improved throughout 1929. In the same year, the new varieties of Platt Yellow and Platt Yellow Giant were made available in small quantities for research. A table (p. 14) shows that 100-gm packets of mixed types were sold, including many black types and Professor Früwirth's Black Eyebrow, all prefaced by the word 'Platter.'

Note: This is the 2nd earliest document seen concerning the cultivation of soybeans in Persia [renamed Iran in 1935]. Address: Braunsdorf–Vienna, Austria.

767. Rodrigo, P.A. 1947. Soybean culture in the Philippines. *Philippine J. of Agriculture* 13(1):1-22 + 5 plates. Third quarter. Summarized in Soybean Digest, May 1948, p. 41. [14 ref. Eng]

• ***Summary:*** Contents: Introduction. Description and history. Climatic and soil requirements. Varieties. Propagation. Preparation of the soil. Fertilizers and lime. Inoculation. Planting. Care of the crop. Harvesting and production: For day, for seed. Cost of production. Uses of soybeans. Diseases. "In the big cities in the Islands, many of the soybean products like soy sauce or toyo, tokua, tajuri [fermented tofu], tojo [soymilk curds], miso, etc. are becoming more popularly used by the Filipinos, and will be more so as their nutritive values become more fully realized. Already, in some sections of the country where soybean is being grown, the seed is used either as a green or as a dry vegetable. The dried bean is roasted and is eaten offhand or is used in adulterating coffee, and the bean in the dough stage is boiled and eaten like peanut" (p. 2).

Table 1 shows annual imports (in kg) of soybeans and soybean products into the Philippines from 1929 to 1940, including dried beans, soy sauces, soybean meal, tausi (soy nuggets, salted), paste (miso), and total. By far the leading import (by weight) from 1929 to 1937 was dried soybeans. In 1929 some 4,574,497 kg were imported. This figure rose gradually (with ups and downs) to a peak of 5,660,575 kg in 1937, then fell sharply to only 237,666 kg in 1940. Soybean sauces were the No. 2 import, starting with 606,231 kg in 1929, rising to a peak of 1,441,563 kg in 1932, then remaining above 1,000,000 for most years thereafter. Imports of soybean meal started in 1935 with 660,699 kg; they reached a peak 1,023,303 in 1936 (the next year), then remained near 1,000,000 thereafter. Tausi was first imported in 1940, the amount being 151,571 kg.

Table 2 shows the value of these items (in pesos). In 1940 the imports of greatest value were soy sauces (120,346 pesos), soybean meal (50,682), and tausi (20,280).

"In the Philippines, while the plant has been under cultivation since the Spanish regime [1571-1898], it has not gained much headway due mainly to the lack of a variety suitable for commercial planting, and perhaps due to want of interest among farmers" (p. 4-5). The Philippine Bureau of Plant Industry has, to date, introduced more than 200 soybean varieties to the Philippines from the USA, China, Japan, Hawaii, Java, and India, but it presently recommends only a few varieties for commercial planting. These include Ami, which has long been cultivated there and is well adapted to the varied soil and climatic conditions.

Based on the results of a number of years' trials in different regions of the Islands, the following varieties have been found to be productive: Yellow Biloxi Hybrid (introduced from Hawaii in 1936), Mis 28 E.B. Str. 3910 (introduced from India in 1937), Mis 33 Dixi (introduced from India in 1937), Head Green (introduced from the USA in 1935), and American Black. All of these varieties are good for May and June planting, and all but Yellow Biloxi Hybrid are good for September to December planting (dry season).

"In the Philippines, the green but fully developed pods are harvested, and the seed is cooked and eaten in practically the same way as lima bean or patani... In Lipa, Batangas, soybean in the dough stage is boiled in the pod and sold and eaten offhand" like peanuts. The more common soy products made in the Philippines are soy sauce or *toyo,* tokua [tofu], tausi [soy nuggets], and miso. "Soybean milk is being manufactured by the Bureau of Plant Industry in a limited scale and a big modern firm has started putting soybean milk and other products in the local markets" (p. 15-16).

Note: This is the earliest English-language document seen (Oct. 2008) that uses the word *tausi* to refer to soy nuggets. Address: Chief, Horticulture Research Section, Bureau of Plant Industry.

768. Food and Agricultural Organization of the United Nations. 1947. Soybeans: Area, yield, and production. *Yearbook of Food and Agricultural Statistics.* See p. 101-02.

• ***Summary:*** Under soybeans, gives region/continent and country, then statistics for soybean area, yield, and production for each soybean producing country. Statistics show that the following countries produced the following amounts of soybeans (measured in 1,000 metric tons) during the 1934-38 period (the earliest period given).

Europe: Austria 0.2. Bulgaria 11.6. Czechoslovakia 0.9. Hungary 0 (but 6.2 in 1940 and 1.3 in 1945). Italy less than 0.5 (but 0.01 in 1940 and 0.9 in 1945). Poland 0.5. Rumania

[Romania] 11.7, Yugoslavia 1.5. Europe total: Former boundaries 550, present boundaries 260. USSR: Former boundaries 68.1, present boundaries 97.1.

America: Canada 5.5. United States 1,164.0. Total 1,170.0

Asia: China: China Proper 6,092.7, Formosa (Taiwan) 4.2, Kwantung 20.2, Manchuria 3,851.0. Indochina: Cambodia 0.4 (in 1937). Japan 325.1. Korea 518.6. Netherlands Indies [Indonesia]: Bali and Lombok 9.0, Java and Madura 236.4. Asia total: 10.60. Africa: Southern Rhodesia less than 0.5 (but 0.3 in 1942 and 0.2 in 1945).

World totals: Excluding USSR–Former boundaries 11.829. Excluding USSR–Present boundaries 11.800. Including USSR: 11.9000.

769. Cort, Mabel Gilson. 1948 Personal report of Mabel Gilson Cort for the year 1947. Chiang Mai, Thailand. 2 p. Unpublished typescript. Undated.

• ***Summary:*** She has spent the entire year of 1947 at home in Chiengmai [Chiang Mai], Thailand, doing mainly dietetic work, but also some evangelical work. She has developed special diets for patients witb particular diseases. "Because of the high cost of living and the scarcity and high price of such foods as milk and eggs and the number of orphan babies we have in the hospital and the number of patients requiring milk diet, we have used quantities of soy bean product to increase our milk protein and supplies. Every day we make great quantities of white soy bean milk which is used to feed the babies, make cream soup, egg nogs, custards and even ice cream occasionally. We make tasteless soy bean flour, which I learned to make at home. We also use the ground browned soy bean flour [kinako] to feed babies, to make a beverage we call soy bean coffee, which is drunk as a beverage, using coconut milk and sugar. It is used in many hospital diets and the nurses drink it. We enrich it with sugar, starch and calcium, thus making it nearly equivalent to milk in value. We make soy bean flour, rice bran and rice flour muffins for beriberi and soy bean flour and rice bran muffins for diabetes. We also send out the browned soy bean flour to mothers in the country to make soy bean milk for their babies as the browned flour will keep indefinitely and country mothers have not the facilities for keeping the white milk which sours very easily. We buy bean curd from a Chinese merchant. We use this in curries, soups, etc. We have also increased the value of the protein in our diets and the use of the bean products are increasing every where. We think this is good public health work. All this requires a great deal of reading and compiling from books from China, Malay, the Philippines and America."

Note: Mrs. Mabel Gilson Court worked was a Presbyterian missionary in Siam (later called Thailand) from 1903. Her husband was a physician and fellow missionary. They were married in 1910. In 1915 Dr. Cort took charge of McCormick Hospital in Chiang Mai, and Mrs. Cort took charge of dietetics at McCormick Hospital.

770. Eek, Th. van. 1948. Re: *Rhizopus nigricans* culture and tempeh. Letter to Northern Regional Research Lab., Peoria, Illinois, May 18. 1 p.

• ***Summary:*** "We have sent you a culture of Rhizopus nigricans, generally used in the Netherlands East Indies to ferment soya beans for making 'Tempe' or 'Tempeh.' We isolated the culture from decayed pettels [sic, petals] of Hebiscus" [sic, Hibiscus].

In short the production is a follows: 1. Soak the soya beans in water for 12-24 hours to loosen the husks from the bean. 2. By stirring and agitating, the husks are easily taken off from the beans and because they are lighter they can be skimmed off. 3. In java the beans are laid in layers about half an inch thick between banana leaves after thorough mixing with about 1/20–1/10th of its volume with inoculum, taken from the previous batch. 4. After 24-36 hours the fungus has completely has completely grown through the bean layer tightening them together; the layer can now be cut in pieces of 1½–2 inches. 5. These pieces are salted and fried in oil or fat.

"The beans in the fermenting layer may not be damaged, because in that case other microorganismen [sic, microorganisms] will spoil the fermentation of Rhizopus.

Note: This is the earliest English-language document seen (Dec. 1998) that contains the word "Tempeh." It is an unpublished letter, written by a man whose native language is clearly not English. Address: N.V. Centrale Suiker Matschappij, Research-Afdeling, van Noordtkade 20, Amsterdam, Netherlands.

771. *Soybean Digest.* 1948. Grits and flakes... from the world of soy: Foreign technicians study manufacture of Multi-Purpose Food. May. p. 44.

• ***Summary:*** "Several foreign governments, including India, Belgium and the Philippines, have sent technicians to the U.S. to study manufacture of Multi-Purpose Food, low-cost meal now being produced in Los Angeles, reports *Pathfinder.*"

772. Miller, H.W. 1948. Survey of soy foods in East Asia. *Soybean Digest.* June. p. 22-23.

• ***Summary:*** The primary objective of Miller's company "was to develop a milk built up to formula for babies, children, and adults that could be utilized by Oriental populations where animal milk is not available, and which for economic reasons can never be a dependable source of food supplies for the masses.

"Before the war the Laboratory had branches both in Manila, Philippine Islands, and Shanghai, China. The war saw the plant in Shanghai completely demolished and the equipment destroyed. In Manila, the building was left, but

all the equipment was removed. Therefore we have been busy since the end of hostilities in restoring these plants.

"In 1946 and 1947 and during this last January and February the writer made trips and spent time in connection with these institutions. I am glad to report that on my last visit to the Philippine Islands I was able to see the plant there start its operations. The machinery and equipment are practically restored.

"At the present time there are no soybeans under cultivation in the Philippine Islands... though certain parts are very well adapted to the growth of the southern type of soybeans.

"The Manila plant is interested in marketing bottled 'Soyalac' (soy milk) both in natural and chocolate flavors, and also in entering the production of soy ice cream–we are permitted to call it that in the Philippines.

"From Manila I went to Hongkong where 8 years ago a small company known as the Hongkong Milk Factory made a beginning in homogenizing a constituted soy milk. On this last trip to Hongkong, K.S. Lo, the manager, took me through their plant. He informed me that they are now serving to each of the school children a half-pint bottle of the soy milk, both in the natural and the chocolate flavors, at their noon lunch.

"The Hongkong Milk Factory is in reality a soybean dairy. As you view the equipment including the bottle filling machine and the refrigerating unit, you would not know you were not in an American dairy. Mr. Lo informed me that if they had refrigeration they could be putting this soy milk out in many of the other cities of China on a very large scale.

"The firm obtains it beans from China, mostly from the province of Chang Tung, though some come from Manchuria. The beans are not of a very fine quality."

At Shanghai there were two soybean enterprises that particularly attracted my attention. The one for which we helped secure the machinery and equipment is being run under the name of the International Nutrition Products Co., Ltd. It is to be run very much like the Manila plant in the manufacture of liquid soy milk. The company will develop along with it a soy margarine and soy spread in the form of a mayonnaise dressing.

"The other enterprise is being undertaken by the government. The Chinese Army Quartermaster Department has purchased a property where ice cream, dried eggs and butter, and also candy were made. This large property has a splendid group of buildings with refrigeration." Here the Chinese Army intends to run a "soybean factory and a vegetable dehydration plant.

"The Chinese Army has secured the help of my son, Harry Willis Miller, Jr. He is there at the present time erecting this plant. It is perhaps the largest soy protein processing plant we know of at present. The firm has bought equipment for large-scale production of a spray-dried soy milk powder. This is to be included in other rations of a dehydrated character for use of the Chinese Army."

In Japan, the author found the people to be "greatly undernourished, especially in regard to protein. Soybeans are scarcely to be had... Bean curd plants are all closed down... I know of nothing that the Japanese nation needs worse than soybeans... I found the Japanese people, even to the advisor to the Emperor, whom I met, pleading with us to establish a plant similar to that which we have in China and the Philippines. However we have no financial interest in those plants. They are carried on wholly by local capital. Our part is simply the 'know-how' in setting them up and transmitting the processes to them."

Note: This is the second earliest document seen that uses the term "soy foods" in the title. Address: International Nutrition Lab., Mt. Vernon, Ohio.

773. Food and Agricultural Organization of the United Nations. 1948. Soybeans: Area, yield, and production. *Yearbook of Food and Agricultural Statistics–Production.* See p. 101-02.

• ***Summary:*** Under soybeans, gives region / continent and country, then statistics for soybean area, yield, and production for each soybean producing country. Statistics show that the following countries produced the following amounts of soybeans (measured in 1,000 metric tons) during the 1934-38 period.

Europe: Austria 0.2. Bulgaria 11.6. Czechoslovakia 0.9. Hungary 0 (but 1.3 in 1945). Italy less than 50 metric tons (but 0.9 in 1945). Poland 0.5. Rumania [Romania] 11.7, Yugoslavia 1.5. Europe total: 27.0.

USSR: (97.1).

North America: Canada 5.5. United States 1,164.0. Total 1,170.0

Asia: China: China Proper 6,092.7, 3,851.0, Taiwan (Formosa) 4.2. Indonesia: Bali and Lombok 9.0, Java and Madura 236.4. Japan 325.1. Korea 518.6. South Korea 0 (but 122.2 in 1945 and 130.6 in 1946). Philippines 0 (but 0.2 in 1946). Siam [later Thailand] 3.6. Turkey (but 0.4 in 1945). Asia total: 11,070.0.

Africa: Nyasaland 0 (but 0.4 in 1946). Ruanda-Urundi 0 (but 0.9 in 1947). Southern Rhodesia less than 50 metric tons (but 0.2 in 1945). Uganda 0 (but 2.6 in 1946). Union of South Africa 0 (but 1.5 in 1945).

World totals (Excluding USSR): 12,300.0.

Note: This is the earliest document seen (Nov. 2007) that gives soybean production or area statistics for Turkey or for the Middle East. This document contains the earliest date seen (1945) for soybean production or area statistics for Turkey or for the Middle East.

774. Koens, A.J. 1948. Peulgewassen [Leguminous crops]. In: C.J.J. van Hall and C. van de Koppel, eds. 1948. De

Landbouw in de Indische Archipel [Agriculture in the Indonesian Archipelago]. 'S-Gravenhage: N.V. Uitgeverij W. van Hoeve. Vol. IIA. 905 p. See p. 241-42, 258-274, 473. In collaboration with G.G. Bolhuis. [79 ref. Dut]
• ***Summary:*** Contents: The plant. Varieties. Selection. Soil and climate. Methods of cultivation. Insects and diseases. Economics. Planting. Utilization. Value as a food (source of nutrients) for the people of Indonesia *(Indonesië).* Trade and commerce *(Handel).* Contains an excellent bibliography.

The section on "Utilization" mentions (and describes briefly how each is made): green vegetable soybeans *(de halfrijpe planten),* whole dry soybeans, roasted soybeans, ketjap (or soja or shoyu or taoyoe), tofu *(tao-hoe, bonenkaas),* baked tofu, firm tofu *(tao koan;* also simmered with *Curcuma longa),* sprouts *(taogè),* Indonesian-style miso *(tao-tjiong),* soy nuggets *(tao-dji),* tempeh *(tempe),* MSG *(Vetsin),* soybean meal *(sojameel).*

775. Calma, Valeriano C.; Valencea, I.G.; Tale, J.V. 1949. Effect of mass selection of the seed and of season of planting on the yield of the soybean. *Philippine Agriculturist* 32(4):318-28. June. Experiment Station contribution No. 1524.
• ***Summary:*** Can better yields be obtained by using, in the wet-season planting, seeds selected from the crop grown in the wet season instead of those from a crop in the dry season? An experiment was conducted in the laboratory of the Department of Agronomy and in the fields of the Experiment Station from November 1946 to April 1948.

In the 1946-47 dry-season, selected seeds had 89.6% germination and control seeds 88.6%. In the 1946 wet-season, selected seeds had 74.7% germination and control seeds 76.3%. The results show clearly that mass selection of soybean seeds suited for seasonal planting does not seem to accrue any seasonal benefit. "The loss of viability of seeds in storage appears to be the controlling factor." Address: Dep. of Agronomy, Univ. of the Philippines, Los Baños.

776. Bailey, Sydney D. 1949. Dr. Wang's treatment centre. *Manchester Guardian (England).* Nov. 28. p. 3.
• ***Summary:*** While playing bridge with Dr. Wang and two of his friends in China, during World War II, the writer discovered that they were involved in a racket and a sort of smuggling ring. "Wang was opening the tins [of milk from Hanoi, Vietnam], mixing the contents with soya bean curd and buffalo milk, canning the resulting mixture, and selling it to the missionary community in Chunking."

777. INEAC. 1949. [Soybeans]. *Institut National pour l'Etude Agronomique du Congo Belge, Rapport Annuel (INEAC)* 290 p. For the year (l'exercice) 1948. See p. 112-13, 166-67, 277, 285. [Fre]
• ***Summary:*** The *Congo Belge* (Belgian Congo), formerly Zaire, is today (Nov. 2007) named "Congo"–formally "Democratic Republic of the Congo."

In the Section of Agronomic Research (p. 81+), in the subsection on Division of Food Plants *(Plantes Vivrières)* (p. 102) is a longer subsection on soybeans (p. 112-13, *Soja hispida)* which crosses / hybridization and selection. A table shows the results of three trials each comparing 5 soybean varieties. For each is given: Variety name, duration of vegetation (in days) and yield. For 1947 1st season, the variety E. 8 gave the highest yield of 1,066 kg/ha. For 1947 2nd season, the variety E. 70 gave the highest yield, 1,028 kg/ha. For 1948 1st season, the variety E. 8 gave the highest yield, 1,011 kg/ha of seeds.

In the section about the Eastern Sector, at the Experimental Station of Nioka (p. 155+), the subsection on soybeans (p. 166-67) has two tables showing the results of variety trials. The first gives the average yield (in kg/ha of seeds), for two seasons, of the best varieties: Herman 424, Otootan 396, Cocker 391, Tarruel 365, and Tokio 347. The second shows the yield in small parcels used for seed multiplication: Otootan 361, Mammoth 291, Haberlandt 236, Biloxi 211. The effect of various plants spacings on yield was also tested.

The section on the Sector of Katanga, Station of Trials at Kiyaka (p. 269, 276+) has a subsection titled Various edible plants (p. 285) which states that the theoretical yields of 66 varieties and lines of soybeans *(Soja hispida),* originating partly from Yangambi, were poor. Except for the variety Java 3334 (1,517 kg/ha of seeds) the yields were unacceptably low.

The section on the Stations of Ruanda-Urundi [Rwanda-Burundi], Station of Trials at Kisozi (p. 284+), the subsection on Food Plants–other (p. 285) contains a table showing the yields of 8 food plants. Soybeans gave 700 kg/ha, the lowest of all.

At Rubona [in today's Rwanda] (in the stations of Ruanda-Urundi) the soybean varieties Dixie, Emperor, Nanda, Dunfield, Easy Cook [Easycook], and Jogun gave seed yields of 758 to 1,296 kg/ha.

Also discusses: Peanuts *(Arachides),* bambarra groundnuts *(Voandzou; Voandzeia subterranea),* rice, maize, and Job's tears *(coix)* in this annual report.

778. Philippine Bureau of Plant Industry. 1949? Brief directions for growing soybeans (Leaflet). Manila. 2 p. Undated. 1955 rev. ed. by Office of Agricultural Information. [Eng]
Address: Chief, Horticultural Research Section, Bureau of Plant Industry, Dep. of Agriculture and Natural Resources, Manila, Philippines.

779. McCann, Lewis P. 1950. The world is our nursery. *Foreign Agriculture* 14(3):51-55. March.
• ***Summary:*** A brief overview of plant introduction into the United States from the mid-1600s to the present.

"Government participation in plant introduction was slow. Agriculture in general was considered as an individual problem. As the number of farms grew and as the demand for more and better agricultural produce increased so did the recognition of public officials in the importance of plant introduction.

"In 1827 President John Quincy Adams directed all United States consuls to forward to Washington [DC] rare plants and seeds for distribution. Twelve years later in 1839 Congress passed its first appropriation for agriculture. The sum of $1,000 was allocated to the Patent Office to be used for collecting and distributing seeds as well as for statistical and other investigation. From this humble beginning the affairs and problems of agriculture increased until 1862 when the Department of Agriculture was organized as a separate branch. The demand and interest in plant introduction continued to increase until 1898 when the Department of Agriculture created a separate unit known as the Office of Foreign Seed and Plant Introduction."

"Soybeans came to us from southeastern Asia by way of consuls, missionaries, seedsmen, and plant explorers. Most of the types now grown were brought in 20 years ago by two of the Department of Agriculture's plant explorers. Their 2-year expedition cost American taxpayers $50,000. In return for this investment, the United States has a new industry valued at more than a billion dollars a year. Soybeans alone have already repaid many times the total cost of all our plant introduction work.

"Soybeans, grown principally in the Corn Belt, are one of the most versatile products from the American farm. They are used not only as feed and as food, in margarine, shortening, and flour, but also in such products as plastics, soap, paint, and synthetic rubber."

Photos show: the Meyer medal (named after Frank N. Meyer) awarded each year for outstanding plant introduction work. It depicts history's earliest known search for new plants–Queen Hatshepsut's expedition to the Land of Punt. A two-wheeled cart in Manchuria filled with soybeans. A combine in the USA emptying soybeans into a flatbed truck. Address: Regional Coordinator, U.S. Plant Introduction Garden, Glenn Dale, Maryland.

780. Tammes, P.M.L. 1950. De bereiding van témpé [The preparation of tempeh]. *Landbouw (Bogor, Java)* 22(5/6):267-70. June. [1 ref. Dut]

• ***Summary:*** Includes a detailed discussion and photo of "ragi" (tempeh starter culture) and how it is used to make témpé (tempeh). Address: Dr., Hoofd van de Afdeling Makassar van het Algemeen Proefstation voor de Landbouw.

781. van Veen, A.G.; Schaefer, G. 1950. The influence of the tempeh fungus on the soya bean. *Documenta Neerlandica et Indonesica de Morbis Tropicis* 2(3):270-81. Sept. [18 ref. Eng]

• ***Summary:*** Contents: Introduction. Methods: Preparation of tempeh, methods of analysis. Results: Analysis of the composition of soya beans before and after treatment with the fungus (dry weight, ash, soluble carbohydrates, hemicellulose, crude fibre {cellulose}, fat {ether extract}, nitrogen compounds {quantitative, and qualitative}), extractability of tempeh with water and enzyme solutions. Conclusions.

The article begins: "Soya beans and their derivatives constitute not only one of the most valuable, but also one of the most interesting foodstuffs. The high protein and fat content is well known." During fermentation the soluble carbohydrates mainly disappear and the protein is broken down into water soluble products. This explains the tolerance for tempeh of most patients with intestinal disorders. "The unpopularity of the soya bean is probably due for the greater part to the fact that it does not soften well during cooking and is difficult to digest."

""In the following pages we draw attention to an interesting and easily digested soybean product which is little known outside Indonesia, *i.e., tempeh kedelee* (kedelee = soya bean)."

"Soya beans are a very popular food on the island of Java, and are nearly exclusively consumed as *tempeh kedelee,* a product prepared by means of a fungus *(Rhizopus oryzae)...* It is possible in this way to change products which are normally difficult to cook and digest into easily digested, comparatively easily prepared and cheap foodstuffs. Moreover, these have the advantage that little firewood is needed for cooking.

"In World War II the soya beans (which were well-nigh indigestible for the undernourished prisoners of war) were made into tempeh in many P.O.W. camps in Java and on other islands; even patients with dysentery and nutritional oedema were able to assimilate it (van Veen, 1946)."

Note: This is the earliest document seen (Dec. 1998), in English or any other language, that contains the word "tempeh." It is also the earliest document seen with "tempeh" in the title. This new spelling quickly caught on, and since the early 1960s the word has consistently been spelled this way in English and most other European languages–except in a few Dutch and English-language publications written by Indonesians–the final "h" being added to prevent the word from being pronounced "temp." Address: Lab. of Biochemistry, Inst. of Technology, Delft, The Netherlands.

782. Tammes, P.M.L. 1950. Bereiding van ketjap [Preparation of soy sauce]. *Landbouw (Bogor, Java)* 22(10-12):568-69. Dec. [Dut]

• ***Summary:*** Contains a brief description of how to make Japanese-style soy sauce, and an analysis of its composition

in both volume per 100 cubic centimeters, and grams per 100 grams. Address: Makassar (Algemeen Proefstation, Landbouw).

783. Kalshoven, Louis G.E.; Sody, J.U.; Bemmel, A.C.V. van. 1950-1951. De plagen van de cultuurgewassen in Indonesie. In twee delen [Pests of Indonesian crops. 2 vols]. The Hague, Netherlands; Bandoeng, Indonesia: W. van Hoeve. Vol. 1, p. 1-512. Vol. 2, p. 513-1065. Index. [100+* ref. Dut]

• ***Summary:*** In the index, soybeans are referred to on 20 pages in volume 1, and on 27 pages in volume 2. The pests are mostly insects. Address: 1. Lector aan de Faculteit van Landbouwwetenschasp te Buitenzorg [Bogor, Indonesia].

784. *Malayan Agricultural Journal.* 1950. Notes on current investigations. 33:230-35. See p. 232. *

• ***Summary:*** Soyabean trials are discussed on p. 232. Address: Kuala Lumpur, Malaya.

785. Burtis, E.L. 1950. World soybean production and trade. In: K.S. Markley, ed. 1950. Soybeans and Soybean Products. Vol. I. New York: Interscience Publishers or John Wiley & Sons. xvi + 1145 p. See p. 61-108. [17 ref]

• ***Summary:*** Contents: 1. Historical summary. 2. The Far East: China, Manchuria, Korea, Japan, Netherland Indies, other countries of Asia, net foreign trade of Asia. 3. Europe: Production, foreign trade. 4. United States: Varietal development, trends in planted acreage, soybeans for seed, acreage and production of soybeans for hay, vegetable-type soybeans, growth of the soybean-processing industry, soybean oil production, trade, and utilization, production and utilization of soybean oil foots (the residue from refining), soybean meal and other soybean protein products (incl. soybean flour, soybean glue, and other industrial soybean products). 5. Minor world areas.

Tables: (2) Soybean production in leading countries and estimated world total, 1922-1948. Statistics are given for China (excluding Manchuria), Manchuria, Korea, Japan, Formosa [Taiwan], Netherlands Indies [Dutch East Indies, later Indonesia], United States, Canada (1936 on), USSR (1928-1938), 5 Danubian countries (Austria, Yugoslavia, Hungary, Rumania, and Bulgaria, 1934 on, partly estimated by author).

(3) Net exports or imports of soybeans (million bushels) by major exporting and importing countries, 1909-1913 and 1922-1948. China and Manchuria (combined) dominate world soybean exports from 1910 to 1940, with the peak year being 1929 (100 million bushels) and with more than 50 million bushels being exported every year from 1926 to 1939. But by 1941 exports as fallen to almost zero. The only other exporter was the USA, which had its first net soybean exports in 1932 (4.2 million bu); this rose to a peak of 10.5 million bu in 1939 then dropped to almost zero during World War II. Europe was the largest a net importer of soybeans from 1910 to 1948; the peak years were 1929 and 1933, when 62.6 million bushels were imported. Japan was the second largest net importer of soybeans from 1910 to 1948; the peak year was 1938, when 29.8 million bushels were imported. The Netherland Indies (today's Indonesia) is the only country from Southeast Asia in this table. The country imported 2.0 million bushels in 1913. Imports steadily decreased from 4.2 million bushels in 1922 to less that 50,000 bushels in 1936. Then the country switched to being an exporter, with 400,000 bushels in 1937, and averaging about 300,000 bushels per year from 1937 to 1941. Trade stopped during World War II (1942-1947) then resumed again in 1948 with 200,000 bushels of exports.

(4) Net exports or imports of soybean oil (million pounds) by major exporting and importing countries, 1909-1913 and 1922-1948. (5) Net exports or imports of soybean cake and meal (thousands of metric tons) by major exporting and importing countries, 1929-1948. (6) Net exports or imports of soybean oil and soybean in terms of oil (million pounds) by major exporting and importing countries, 1909-1913, 1922-1948.

(7) Net exports or imports of soybean cake and meal and soybeans in terms of meal (thousands of metric tons) by major exporting and importing countries, 1929-1948. (8) Apparent consumption of soybean oil and soybean cake and meal by principal European countries, 1929-1938 (based on tables 3-7). (9) Soybean acreage grown in the United States for all purposes (equivalent solid acreage), by states and groups of states, 1924-1948 (1,000 acres).

(10) Soybean acreage harvested for beans in the United States, 1924-1948 (1,000 acres). (11) Soybean production in the United States, by states and groups of states, 1924-1948 (1,000 bushels). (12) Soybean supply and disposition in the United States, 1924-1948 (1,000 bushels).

(13) Acreage and production of soybeans, soybeans processed for oil and meal, and soybean oil produced in the United States, 1924-1948. (14) Soybean oil production, trade, (imports and exports), stocks (crude basis), and domestic disappearance in the United States, 1910-1948 (1,000 pounds; compiled from reports of the Bureau of the Census). (15) Soybean oil utilization by classes of products in the United States, 1931-1948. Food products: Margarine, shortening, other, total. Nonfood products: Soap, paint and varnish, other drying oil products, miscellaneous non-food products, loss, incl. oil in foots, total. Total domestic disappearance. One table is in 1,000 lb.; a 2nd is in per cent of total.

(16) Supply and utilization of soybean protein products (meal basis) in the United States, 1921-1947 (1,000 metric tons). For each year is given: Estimated production, imports or soybean cake and meal, total supply, exports of soybean cake and meal. Domestic utilization in: Full-fat soybean

flour, low- and medium-fat soybean flour, soybean glue for softwood plywood, soybean glue for hardwood plywood, other uses (largely feed for livestock).

A map (p. 90) shows soybeans harvested for beans in the USA, 1944. Each dot represents 2,000 acres.

A graph (p. 105) shows tonnage of high-protein feeds fed to livestock, 1926-1947. Within this are four graphs for: Soybean cake and meal, other oilseed cake and meal (mostly cottonseed), tankage and meat scraps, fish meal, dried milk products, gluten feed and meal, and (beginning 1935) brewers' and distillers' dried grains, and total.

A graph (p. 66) shows world soybean production from 1922 to 1949. The data is from Table 2. Within this are graphs for USA and for East Asia (incl. China, Manchuria, Korea, and Japan).

One bar chart (p. 73) shows domestic consumption and net exports of soybeans and soybean oil, in terms of oil (million lb.), by principal consuming countries, annual average, 1929-1938 (Based on tables 2-4. Oil equivalent of soybeans calculated at 8.4 pounds per bushel). By far the biggest consumer is China. By far the biggest exporter is Manchuria. Others: Japan, Germany, United States, Korea, Netherlands Indies, United Kingdom, Netherlands, Denmark, Other Europe (except U.S.S.R.).

Another bar chart (p. 74) shows domestic consumption and net exports of soybeans and soybean meal, in terms of meal (1,000 metric tons), by principal consuming countries, annual average, 1929-1938 (Based on tables 2, 3, 5, and 7. Meal equivalent of soybeans calculated at the rate of 0.02117 metric tons per bushel). The biggest consumer is China, followed by Japan. By far the biggest exporter is Manchuria. Other small exporters: Germany, United States, Korea, Formosa, Netherlands Indies, Denmark, United Kingdom, Other Europe (except U.S.S.R.). Address: Bureau of Agricultural Economics, USDA, Washington, DC.

786. Burtis, E.L. 1950. World soybean production and trade: Historical summary (Document part). In: K.S. Markley, ed. 1950. Soybeans and Soybean Products. Vol. I. New York: Interscience Publishers or John Wiley & Sons. xvi + 1145 p. See p. 61-63. [17 ref]

• ***Summary:*** "World soybean production and trade have passed through three major stages of development. In the first phase, extending from prehistoric times to 1908, soybean production and trade were confined almost exclusively to eastern Asia. Uncultivated species of soybeans still grow wild in North China, Manchuria, and Korea. Apparently culture of soybeans as an agricultural crop originated in that area, and spread first to Japan, Formosa, southern China, Indo-China, Siam, the northern border districts of India, and the Netherland Indies.

"In North China, Manchuria, Korea, and Japan, soybeans have long been a major crop. They are mentioned in ancient Chinese writings as one of the five sacred grains. Farther south, soybeans are less important both in agriculture and in the diet.

"A lively coastwise trade in soybeans, soybean cake, and soybean oil was carried on between Manchurian and southern Chinese ports for centuries before Chinese ports were opened to foreign ships in the mid-1800's. Exports of soybeans and soybean products from Manchurian ports to Japan increased rapidly in the late 1800's, especially after China made special trade concessions at the end of the Sino-Japanese war in 1895. Japanese import demand for soybeans and soybean cake was strong, and the population of Manchuria was growing rapidly. Opportunities in Manchuria attracted a steady stream of agricultural workers from northern China after restrictions on immigration to Manchuria were relaxed by the Chinese government in the third quarter of the 19th century.

"The second stage of development in soybean production and trade, extending from 1908 to 1939, was marked by large exports of soybeans and soybean oil from Manchuria to Europe. The beginning of this trade was an indirect result of the Russo-Japanese War in 1904-1905. Food requirements for Japanese troops stationed in Manchuria had led to an increase in production of soybeans. When these troops were withdrawn, a surplus of soybeans developed. At the same time, the Japanese acquired a substantial interest in the Manchurian export trade through their lease of the South Manchurian Railway and development of the port of Dairen at the southern end of the railway.

"Japanese firms in 1908 made several shipments of Manchurian soybeans to England, where the soybeans were found to be a suitable source of oil for soap manufacture and meal for use in mixed feeds for livestock. Nearly all previous shipments of soybeans from the Orient to Europe had arrived in an unsatisfactory condition largely because of poor shipping practices. Exports of Manchurian soybeans to Europe increased rapidly after 1908. At first these shipments went to England, but by 1910 to other European countries also, especially Germany, Denmark, and the Netherlands. After an interruption during World War I, trade with Europe continued to grow, reaching a peak in the late 1920's and early 1930's. Soybeans were one of the leading materials processed by the expanding oilseed-processing industry in Europe.

"Large exports of soybean oil from Manchuria to Europe also developed, beginning about 1910 and reaching a peak in 1926. Soybean-processing capacity in Dairen grew along with this trade; the oil mills in Dairen produced largely for export and by 1924 accounted for about half the total soybean-processing capacity located along Manchurian railroads. Exports of Manchurian soybean cake also were large in the 1920's and 1930's, but the cake was too high in oil and water content to stand the tropical sea voyage to

Europe and therefore went mainly to Japan, Formosa, and Korea.

"The growth of imports of Manchurian soybeans and soybean oil into Europe was the natural consequence of an active European import demand for fats and oils and protein concentrates, and a vast immigration from China into the relatively empty but fertile Manchurian farmlands during the 1920's.

"The third and present stage in the world history of soybeans is marked by the pre-eminence of the United States in production and processing of soybeans for oil and meal. This phase began in 1940 when war disrupted the trade between Manchuria and Europe. Exports of soybeans from Manchuria to Europe had not been resumed by 1948, except for small quantities moving through northern China ports.

"Soybeans were very little grown before 1910 as an agricultural crop in the United States. Production first began to assume commercial importance during World War I; it showed a steady upward trend in the 1920's and early 1930's, expanded rapidly after 1936, and in 1942 rose sharply to a new high level in response to strong wartime demand for domestic sources of fats and oils and oilseed meal. Soybean acreage and production were well maintained through 1948. Soybeans are well adapted to the climate and soils of the Corn Belt and to the crop rotations and mechanized farming practiced in the Corn Belt.

"Since the early 1920's the soybean-processing industry in the United States has actively carried on research to improve methods of processing soybeans and soybean products and to develop new uses and markets. Mill capacity has always been ample for the increasingly large output available for processing, except early in World War II, when steel and other materials needed for new additions were reserved for more urgent war uses. The United States soybean-processing industry now stands first in the world in size and in technical knowledge and ability." Address: Bureau of Agricultural Economics, USDA, Washington, DC.

787. Coorengel, G.B. 1950. Katjang kedelai [The soybean]. Jakarta: Balai Pustaka. 34 p. 20 cm. [Ind]
Address: Jakarta, Indoensia.

788. Heyne, K. 1950. De nuttige planten van Indonesië. 2 v. [The useful plants of Indonesia. 2 vols.]. The Hague, Netherlands: W. van Hoeve. 1660 + ccxli p. Tables. 25 cm. [Dut]*

• ***Summary:*** Contents: Ontjom. Dagé. The soybean (Sojaboon, Kedele). Cultivation. Seeds. Use: Témpé, tao hoe, tao koan, tao tjo, soja (ketjap).

Note: This book by K. Heyne was formerly published under the title *De Nuttige Planten van Nederlandsch Indië.* This is not a new edition; only the title has been changed.

Address: Hoofd van het Museum voor Economische Botanie te Buitenzorg (Bogor).

789. INEAC. 1950. [Soybeans: Selection, cultural methods, and experimental techniques]. *Institut National pour l'Etude Agronomique du Congo Belge, Rapport Annuel (Gembloux, Belgium)* 306 p. For the year (l'exercice) 1949. See p. 114, 120, 165-66, 262, 285, 291, 296.

• ***Summary:*** In the Section of Agronomic Research (p. 88+), in the subsection on Division of Food Plants *(Plantes Vivrières)* (p. 109+) a table (p. 114) mentions trials with rice, maize, Job's tears *(Coix lacryma-Jobi),* soja, *Phaseolus angularis* [probably azuki beans], and sunflowers (Helianthus). A longer subsection on soybeans (p. 120, *G. soja, Soja hispida)* discusses hybridization, varietal trials, and selection. A table shows the results of a trial comparing 8 soybean varieties. For each is given the variety name, its main ancestor, the yield (the highest was S.H. 105, from Otootan, at 1,320 kg/ha of seeds; 6 varieties yielded more than 1,000 kg/ha), seed color, duration of vegetation, protein content, and lipid content. A second, similar table shows the results of a trial comparing 7 soybean selections. The two highest yields came from Jubittan 109 (1,253 kg/ha) and Java 3334 (1,234 kg/ha).

In the section on the Eastern Sector, at the Experimental Station of Nioka (p. 157+), the subsection on soybeans (p. 165) has a table showing the results of a trial comparing 13 varieties. One column shows the percentage of plants with nodules (ranging from 11% to 75%) and another shows the yield; Tarruel was the highest at 907 kg/ha of seeds. A note at the end (p. 166) states that some recent introductions seem to be attracting interest.

The section on the Cotton Selection and Experimentation Service, Experimental Station of Gandjika (p. 224, 247+). the subsection on Edible legumes–Other edible legumes (p. 262) states that for 16 varieties of white soybeans *(soja blanc),* the yields ranged from 200 to 1,200 kg/ha of seeds, whereas for 8 varieties of black soybeans *(soja noir),* the yields ranged from 250 to 700 kg/ha of seeds.

The section on the Sector of Katanga, Station of Trials at Kiyaka (p. 271, 281+) has a subsection titled Various edible plants (p. 285) which states that 66 varieties and lines of soybeans produced very poor yields.

The section on the Stations of Ruanda-Urundi [Rwanda-Burundi], Station of Trials at Rubona [in today's Rwanda] (p. 290+), the subsection on Food Plants–soybeans (p. 291) states that in a comparative trial of 20 varieties, the yields ranged from 700 to 850 kg/ha of seeds.

The section on the Station of Trials at Kisozi, also in Ruanda-Urundi (p. 295+), the subsection on Various edible plants has a table (p. 296) which shows that the soybean variety Tokyo Yellow gave a theoretical yield of 520 kg/ha, which was the lowest of the nine seeds shown in the table.

Peanuts *(Arachides),* bambarra groundnuts *(Voandzou; Voandzeia subterranea),* rice, maize, and Job's tears *(coix)* are also discussed in this annual report.

790. Mahyudin, R. 1950. Chasiat kedele dan tomat: Sebagi makanan rakjat [The use of soybeans and tomatoes as foods]. Jakarta: Pustaka Rajkat. 42 p. [Ind]
Address: Indonesia.

791. Morse, W.J. 1950. History of soybean production. In: K.S. Markley, ed. 1950. Soybeans and Soybean Products. Vol. I. New York: Interscience Publishers or John Wiley & Sons. xvi + 1145 p. See p. 3-59. [59 ref]
• ***Summary:*** Contents: 1. Origin. 2. Ancient history. 3. Modern history. 4. Description of soybean plant. 5. World distribution. 6. Climatic adaptations. 7. Soil preferences. 8. Soil erosion and practices. 9. Varieties and variety improvement. 10. Fertilizer and lime requirements. 11. Inoculation. 12. Cultural methods: Preparation of seedbed, methods of seeding, time of seeding, rate of seeding, depth of seeding, cultivation. 13. Rotations. 14. Mixture with other crops. 15. Hay production. 16. Seed production. 17. Soil improvement. 18. Diseases. 19. Insect enemies. 20. Other enemies (rabbits, pigeons, pheasants).

This chapter contains many original, interesting photos and a map. Figures (photos unless otherwise indicated) show: (1) Wild soybeans, cultivated soybeans, and *Glycine gracilis.* (2) Unloading soybeans from farm carts and storing the seed in osier bins in a Chinese merchant's storage yard–Manchuria. (3) Map of the principal soybean seed producing areas and countries of the world. (4) A soybean grain market in Korea. (5) "Fertilizer used for soybeans by Manchurian farmers is compost placed in piles in the field and scattered between rows of previous year's crop just before planting soybeans." (6) Roots of soybean plant (2 photos) showing abundant development of nodules. (7) Ordinary grain drill (pulled by a tractor) may be used in sowing soybeans in rows or close drills. (8) Soybeans sown by hand on ridges in rows about 21 inches apart in Manchuria. Two horses pull a wooden plow. (9) Korean woman planting soybeans along ridged rows. (10) Soybeans planted along edges of rice paddies in Japan, China, and Korea are used for home consumption. (11) Cultivating soybeans in rows, using a tractor-pulled rotary hoe, weeder, or harrow, in the Corn Belt. (12) Hand-cultivation of soybeans in Manchuria. (13) A field of plants: "The Korean farmer grows many other crops with soybeans: millet, mung beans, buckwheat, sesame, susu, or castor beans." (14) A field of soybeans and Kaoliang in China planted in alternate hills. (15) The combine has been one of the most important factors in the economic production of soybeans in the United States. (16) Harvesting soybeans by hand methods in Manchuria. (17) Threshing soybeans in Manchuria using a stone roller pulled over the plants by horse or donkey. (18) Primitive wind method of separating soybean seed from threshed plant material in Manchuria. (19) Korean farmers threshing soybeans with bamboo flails on the home threshing ground. (20) Japanese farmers turning under soybeans in a rice paddy for soil improvement. Address: 6809 Fifth St. N.W., Washington, DC; formerly Principal Agronomist, Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, USDA, Beltsville, Maryland.

792. Morse, W.J. 1950. History of soybean production: 5. World distribution (Document part). In: K.S. Markley, ed. 1950. Soybeans and Soybean Products. Vol. I. New York: Interscience Publishers or John Wiley & Sons. xvi + 1145 p. See p. 10-14.
• ***Summary:*** "The production of soybeans, which for many centuries was confined to the countries of Asia, spread rapidly after World War I to the western world, and since World War II practically all leading nations have become more and more interested in the culture and production of the crop. Agricultural experiment stations throughout the world have become engaged in the development of varieties suited to their soil and climatic conditions through introduction, selection, and hybridization. Successful results have been obtained in many countries and, in a few, acreage and production have increased to the extent that the crop has become an important factor in that nation's agriculture. This is especially true of the United States, Netherland Indies, Rumania, U.S.S.R., Austria, Bulgaria, and Poland.

"The principal zones of soybean production in the Orient are China, Manchuria, Korea, and Japan. In Manchuria, the soybean occupies about 25% of the total cultivated area and is a dominating factor in the economic life of the country. As a cash crop it provides fully half the farm income in the north and more than half the total volume of freight handled by the railroads. It is estimated that from one- to two-thirds of the production of soy beans is exported; 15 to 20% is utilized for food, feed, and planting, and the remainder is used for oil extraction.

"In China, the soybean is one of the principal and most ancient of crops, ranking fifth in extent of culture and occupying about 9% of the total cultivated area. Although grown everywhere in China, about 60% of the soybean acreage is confined to three northern provinces, Shantung, Kiangsu, and Honan. China consumes practically all of her production, estimates indicating more than 50% for food, 27% for oil extraction and other purposes, 10% for stock feed, and 8% for planting.

"Korea occupies third place among the soybean-producing countries of Asia. Acreage and production are confined largely to central and northern Korea, as southern Korea, which grows principally cotton and rice, seems to be less suited to the successful production of soybeans. The

entire Korean production is used for food, stock feed, planting and export, and none is used for oil extraction.

"Japan, although a large producer of soybeans, has consumed all her production and has imported large quantities from Manchuria and Korea. Acreage and production of soybeans in Japan have decreased since World War I and greater emphasis has been placed on increased production of rice. The proportions of soybeans used by Japan for various purposes are: 'miso' (soybean-rice fermented paste), 22%; soy sauce, 22%; oil and oil cake, 21.5%; soybean curd [tofu], 15.5%; confections, 7.2%; forage, 6.2%; green manure, 2.5%; seed, 1.8%; green vegetable beans, 0.8%; and miscellaneous, 0.5%.

"In the Soviet Far East, the soybean is said to be one of the chief industrial crops and in some districts constitutes 20% of the cultivated area. Acreage and production have increased markedly since 1926, especially in Khabarovsk territory, the largest seed-producing area.

"South of China, the soybean is cultivated to some extent in the Netherland Indies, India, Siam, Cochin China, Philippines, and Australia. Until 1932, tbe production of soybeans in the Netherland Indies was not sufficient to meet the domestic demand. Since then, acreage and production have gradually increased until soybeans began to be exported to Holland about 1936. The soybean has been widely cultivated for a long time by the natives of the hilly regions from the borders of Afghanistan eastward to Burma, to northern Siam, and French Indo-China. The crop in India has been grown for its forage and food value rather than for commerce. Although successful results have been obtained in some of the provinces with varieties of good oil content, the growing of the crop as an oil seed does not appear to have been popular with the native farmers. In Australia successful results with American varieties have greatly increased acreage and production, especially in the states of Queensland, New South Wales, and Victoria.

"Although attempts to grow soybeans in European countries have extended over many years, it is only within the past few years that there has been any appreciable production. At present, production is confined largely to European U.S.S.R., Bulgaria, Yugoslavia, Austria, Rumania, and Czechoslovakia, production being largest in Rumania, Bulgaria, and Yugoslavia. In the development of adapted varieties, some progress has been made in Sweden, Poland, Netherlands, and Hungary. Because of the economic importance of the soybean, scientists of the U.S.S.R. have carried on extensive experiments with it, especially in the development of adapted varieties and utilization. At present, the principal areas of production are Ukraine, Moldavia, and certain regions in the North Caucasus.

"Experiments have been conducted with the soybean in nearly all regions of Africa but as yet it is an unfamiliar crop to the majority of African farmer. It has been grown successfully in the upland, midlands, and coastal districts of Natal [South Africa] and throughout Gambia, Nigeria, Egypt, the Gold Coast Colony, and also in the corn- and cotton-growing districts of the Belgian Congo.

"Although the soybean has been the subject of considerable experimental work in practically all countries of the Americas, little progress has been made in commercial culture except in the United States and Canada."

Note: This is the earliest document seen (Dec. 2007) that clearly refers to soybeans in Afghanistan, or the cultivation of soybeans in Afghanistan. This document contains the earliest clear date seen for soybeans in Afghanistan, or the cultivation of soybeans in Afghanistan (long before 1950). The source of these soybeans is unknown. Address: 6809 Fifth St. N.W., Washington, DC; formerly Principal Agronomist, Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, USDA, Beltsville, Maryland.

793. Morse, W.J. 1950. History of soybean production: 9. Varieties and variety improvement (Document part). In: K.S. Markley, ed. 1950. Soybeans and Soybean Products. Vol. I. New York: Interscience Publishers or John Wiley & Sons. xvi + 1145 p. See p. 17-23.

• ***Summary:*** "Varieties of soybeans are very numerous [especially in East Asia], no doubt because of the fact that the soybean seems to be peculiarly sensitive to changes of soil and climatic conditions." Differences in behavior of the same pure-line variety in different locations are often so striking that it is difficult to believe that the variety is the same.

In China, soybean varieties are quite numerous and "are classified according to color, size, shape, time of planting, method of planting and use. The local names of varieties differ in different localities so that it is very difficult to obtain a variety which is widely known." There has not been much organized research on soybean varietal improvement in China. "The University of Nanking has done more work of this kind than any other organization."

Although many soybean varieties are grown in Manchuria, only three types are distinguished: yellow, green and black. This has apparently been found adequate for commercial purposes. In detail, these three groups are:

(1) Hwang Tou–yellow beans. (a) Pei Mei (white eyebrow, pale hilum). (b) Chin Huang (golden yellow or golden round). (c) Hei Chi (black belly), dark hilum. These three varieties are highly prized for the quality of their oil, but Pei Mei and Chin Huang are also valued for the soybean curd [tofu] made from them.

(2) Ching Tou–green beans. (a) Green with yellow germ or cotyledon. (b) Green with green germ or cotyledon. The green bean with the yellow germ yields more soybean curd but of an inferior quality compared to that of the

yellow varieties. The green bean with the green germ is preferred for making sprouts.

Hei Tou or Wo Tou–black beans. (a) Ta Un Tou (large, black), green germ. (b) Hsia Un Tou (small, black), yellow germ. (c) Puen Un Tou (flat, black), yellow germ. The Ta Un Tou is used for oil, the Hsia Un Tou for oil and Horse feeds, and the Puen Un Tou for salted fermented soybeans [soy nuggets].

"Most of the varieties grown by Manchurian farmers consist of a mixture of varieties of which more than 90% are yellow-seeded types." The distribution throughout Manchuria of the various types is discussed. Native Korean soybean are classified into eight different groups.

Since 1898 the USDA had brought into the United States more than 10,000 introductions from China, Manchuria, Korea, Japan, India, Netherland Indies [Indonesia], South Africa, and several European countries.

Table 1 (two pages) shows the "Characteristics of soybean varieties most generally grown in the United States," arranged into seven groups from very early to very late maturity. For each variety in every group is given: Seed color (black, brown, green, olive or greenish yellow, straw yellow), hilum color (black, brown, dark brown, light brown, pale), seeds per lb., oil %, protein %, iodine value (range: 119 to 140), pubescence color (gray, or tawny), flower color (purple, white, or purple & white), shattering (little, medium, or much), and use (commercial {grain or oil and meal}, forage, or vegetable). The groups are: (1) Very early: Agate, Capital, Cayuga, Flambeau, Goldsoy, Habaro, Kabott, Mandarin, Mandarin 507, Mandarin (Ottawa), Minsoy, Ontario [developed in USA], Pridesoy, Sac.

(2) Early: Adams, Bansei, Earlyana, Hawkeye, Illini, Kanro, Lincoln, Manchu, Manchu 3, Manchu 606, Manchukota, Mendota, Montoe, Richland, Seneca.

(3) Medium Early: Chief, Dunfield, Hokkaido, Hongkong, Jogun, Mandell, Mingo, Mukden, Scioto, Viking.

(4) Medium: Aoda, Boone, Funk Delicious, Gibson, Kingwa, Macoupin, Mount Caramel, Patoka, S100, Virginia, Wabash, Wilson.

(5) Medium late: Arksoy, Arksoy 2913, Haberlandt, Laredo, Ogden, Ralsoy.

(6) Late: CNS, Mamloxi, Mammoth Yellow, Palmetto, Roanoke, Tanner, Tokyo, Volstate, Woods Yellow.

(7) Very late: Acadian, Avoyelles, Gatan, Otootan, Pelican, Seminole, Yelnando.

"Varieties now grown in the United States may be divided into three general groups, namely commercial (grain), vegetable, and forage. Varieties for commercial seed production are preferably yellow-seeded and are used largely for processing for oil, meal, and soybean flour, but these varieties may also be used for forage purposes if heavier rates of seeding are used. The varieties used principally for forage and green manure are the black- and brown-seeded varieties, which for the most part are low in oil but yield a finer and heavier forage than the commercial and vegetable varieties.

"The term 'vegetable varieties' has been applied to varieties introduced from oriental countries where they are used solely as green vegetable or dry, edible soybeans. In extensive tests of the quality of the green and dry beans made by the Bureau of Human Nutrition and Home Economics, Department of Agriculture, and by departments of home economics of various agricultural colleges, the vegetable varieties have proved much superior to the field or commercial varieties in flavor, texture, and ease of cooking. Many of these vegetable types have been found through experiments to be superior to commercial types for soybean milk, soybean flour, soybean curd, salted roasted soybeans, and other food products. (See Chapter XXV). The varieties used for processing and forage purposes usually do not cook easily and have a raw 'beany' flavor. Nearly all vegetable varieties cook easily and have a sweet or bland nutty flavor. The most suitable vegetable varieties are those with straw-yellow, greenish-yellow, or green seed, although a few black, brown, and bicolored varieties do have superior qualities as green shelled beans. Vegetable varieties, ranging in maturity from 75 to 175 days, have been developed for all soybean-producing areas in the United States.

"Several commercial companies have canned large packs of the green shelled beans of the vegetable varieties. Quick-frozen green shelled beans alone and in succotash have been placed on the market by several companies, the frozen product being highly satisfactory in color, texture, and flavor. For canning or quick freezing in the green stage, the yellow- and green-seeded varieties make a more attractive product than the black-, brown-, or bicolor-seeded varieties. Vegetable varieties have also become quite popular with the home gardeners and many seedsmen in various sections handle two or more varieties" (p. 22).

Listed from very early to very late, vegetable varieties include: Agate, Sac, Bansei, Kanro, Mendota, Hokkaido, Jogun, Aoda, Funk Delicious, and Seminole. Address: 6809 Fifth St. N.W., Washington, DC; formerly Principal Agronomist, Div. of Forage Crops and Diseases, Bureau of Plant Industry, Soils, and Agricultural Engineering, USDA, Beltsville, Maryland.

794. Bening, W. 1951. First published report on soybeans. It was written in Germany in 1712. *Soybean Digest.* March. p. 20-22.

• ***Summary:*** This book was the *Amoenitatum Exoticarum* ("Exotic Novelties") by Engelbert Kaempfer. The book, itself, is located in a locked glass case at the Engelbert Kaempfer Museum, in the dreamy medieval town of Lemgo, Germany, where Kaempfer was born on 16 Sept. 1651. When he died, he left behind his extensive diaries, drawings, and manuscripts, some of which are still among

the rare materials of the British Museum in London. Kaempfer had a lifelong desire to travel abroad and an "unbelievable capacity for learning foreign languages... An amateur in almost all fields of science, with profound knowledge in medicine, botany, and pharmaceuticals, at the age of 32 Engelbert managed in 1713 to be engaged as secretary to the Royal Swedish Ambassador Extraordinary on a special mission to Persia. And some years later, after many story book adventures, he was assigned as surgeon in the colony of the Dutch East India Company in Japan."

The author then gives an English-language translation of what Kaempfer wrote about the soybean. "This [Dutch East India] company operated at that time the only European colony in Japan. It was licensed by the emperor of the country. The colony was hermetically sealed from the country and its inhabitants. Laws were extremely severe on foreigners as well as the natives.

"Kaempfer, whose only wish was to study the country and its population, despaired. Yet under these hard circumstances, he wrought the masterpiece of his life. His open character and untroubled friendliness to all, and his extraordinary gift of learning languages overnight, opened to him the minds and hearts of the Japanese people...

"Engelbert Kaempfer in those prison years on the little island of Deshima, laid the foundation of western science in Japan.

"When Engelbert returned to Lemgo 10 years after he had left home, he wrote his *Amoenitates Exoticae* in the difficult Latin language of those times."

Photos show: (1) Kaempfer's book, opened to the illustration of a soybean plant. (2) Dr. W. Bening, "a German nutritionist and soya expert, who has been connected with the program for improvement of the German diet with soy foods." (3) The outside front of the Engelbert Kaempfer Museum near Lemgo. Address: PhD.

795. Nagata, Tadao. 1951. Daizu ni okeru hashu-ki ni yoru keichô no henka no hinshu kansai ni tsuite [On the varietal difference of the mode of change of stem length due to seeding periods in soy beans]. *Nippon Sakumotsu Gakkai Kiji (Proceedings of the Crop Science Society of Japan)* 19(3-4):279-82. March. [5 ref. Jap; eng]
Address: Nara Gakugei Daigaku, Nara, Japan.

796. Hirano, Mitsuo. 1951. Complaint from Japan [Crushers dissatisfied with quality of U.S. soybeans] (Letter to the editor). *Soybean Digest.* Nov. p. 38.
• ***Summary:*** Notes that in 1951, Japan purchased about 270,000 tons of soybeans from the USA on a commercial basis–in part because it was difficult to import soybeans from China and Manchuria after World War II and because of the "Korean incident." Japanese processors have expressed their dissatisfaction with the quality of these U.S. soybeans. The beans were purchased on the basis of Yellow No. 2, but it is the common opinion in Japan that they are of lower quality, and in fact are "much inferior to Manchurian soybeans." The U.S. soybeans contained a much higher percentage of foreign material (such as corn, cottonseed, broken stems, sand, and splits) and damaged kernels than Manchurian soybeans. American exporters should pay more attention to the quality of the soybeans they export from Japan.

A table shows Japanese imports of soybeans by country of origin from 1946 to 1951. The USA was the main source every year except 1950, when China was. In 1948 Japan imported 6,158 tons from Java, and in 1951 about 100 tons from Siam [Thailand]. Address: President, Assoc. of Fat and Oil Manufacturers, Tokyo, Japan.

797. Calma, Valeriano C.; Rosario, Candido V. 1951. A study of the adaptability to Los Baños [Philippines] conditions of eleven varieties of soybean. *Philippine Agriculturalist* 35(7):375-78. Dec. [8 ref]
• ***Summary:*** Trials were conducted using the following eleven soybean varieties introduced from the USA: Arksoy, Creole, Georgian, Hongkong, Mamredo, Monetta, Nanking, Palmetto, Pennsoy, Roanoke and Seminole. In dry-season plantings, Seminole gave the highest yields, followed by Monetta and Creole. The seed yield in the wet season varied from 645.83 to 1,739.58 kg/ha. Seminole had the largest seeds and Palmetto, the smallest. Address: Dep. of Agronomy, College of Agriculture at Los Baños, Philippines.

798. *Federation of Malaya, Annual Report of the Department of Agriculture (Kuala Lumpur).* 1951. Soyabean trials. 87 p. For the year 1949. See p. 56-57. *
• ***Summary:*** Pages 56-57 discuss soybean trials.

799. Rodrigo, P.A. 1951. Brief directions for growing soybeans (Leaflet). Manila: Bureau of Plant Industry, Dep. of Agriculture and Natural Resources, Manila. 2 p. [Eng]*
• ***Summary:*** Another edition was published in 1955. Address: Chief, Horticulture Research Section, Bureau of Plant Industry, Philippines.

800. INEAC. 1951. [Soybean: Selection, varieties and varietal trials]. *Institut National pour l'Etude Agronomique du Congo Belge, Rapport Annuel (Gembloux, Belgium)* 392 p. For the year (l'exercice) 1950. See p. 171-72, 179, 265, 319, 356, 371, 379. [Fre]
• ***Summary:*** In the section on Division of Food Plants *(Plantes Vivrières)* (p. 156+), the subsection on soybeans (Soja, p. 171-72) discusses genetic research, a collection of varieties (63 total), and selection. A table gives details on 22 selections, including variety, origin, yield, weight of 100 seeds (in gm), duration of vegetative phase (days), and seedcoat color. The subsection on local trials (p. 179) gives

the yield of four varieties (incl. Otootan ad Palmetto) in 1948 and 1949.

In the section on the Lower Congo, Experimental Station of Vuazi (p. 257+), the subsection on Edible plants–soybeans (p. 265) gives the yield of five varieties; Otootan had the highest yield (1,013 kg/ha of seeds).

The section on the Cotton Selection and Experimentation Service, Experimental Station of Gandjika (p. 285, 307+). the subsection on Edible plants–soybeans (p. 319) gives, from a collection of 39 varieties, the seed color and yield of 11 varieties; the highest was 1,300 kg/ha of seeds.

The section on the Sector of the South, Station of Trials at Kiyaka (Kwango) (p. 350+), notes that in a group of 62 soybean varieties, the best yields were obtained, in the first season, with the Rhodesian variety Jubittan (729 kg/ha of seeds) and, in the 2nd season, with the variety Java 3334 (1,946 kg/ha).

The section on the Stations of Ruanda-Urundi [Rwanda-Burundi], Station of Trials at Rubona (p. 364+) [in today's Rwanda], the subsection on Food Plants–soybeans (p. 371) states that from a group of 16 varieties, the highest yields were obtained from the varieties Imperial, Easy Cook, and Jagun [Jogun].

The section on the Station of Trials at Kisozi, also in Ruanda-Urundi (p. 376+), the subsection on soybeans (p. 379) gives the yields (in kg/ha of seeds) of: Tokyo Yellow 902, Mansoy 480, Haberlandt 363, Harbinsoy 327.

Peanuts *(Arachides)*, bambarra groundnuts *(Voandzou; Voandzeia subterranea),* rice, maize, and Job's tears *(coix)* are also discussed in this annual report.

801. Institute of Nutrition. 1951. Food composition tables recommended for use in the Philippines. Institute of Nutrition, Dept. of Health, Manila, Handbook No. 1, 1st edition. 46 p. 2nd ed., 1957. 61 p. *

802. Ray, Georges. 1951. Technologie laitière. 2e éd. [Dairy technology. 2nd ed.]. Paris: Ed. Dunod. vii + 743 p. See p. 703-09. Illust. Index. 25 cm. [Fre]

• ***Summary:*** The chapter on "Milk substitutes" (p. 696+) contains a subchapter titled "Soymilk *(Lait de soya)"* (p. 703-09), which has the following contents: Introduction. General rules to follow in the preparation of soymilk. The North Vietnamese *(Tonkinoise)* method. Method used in dairies in the Far East: Castagnol process. Modern methods for the preparation of soymilk. Composition of soymilk. Properties of soymilk. Fermented soymilk (using *Bacillus acidophilus,* British patent No. 441,574, 22 Jan. 1936). Concentrating / condensing and drying soymilk. Soymilk curds *(Caillebotte de soya).* The future of soymilk.

Contains two full-page ads by Alfa-Laval for dairy milk equipment. Address: Honorary Prof. (Tunis, Rennes, Grignon), former Head of Technical Services, International Institute of Agriculture, Rome (Ex-Chef du Service Tecnique, a l'Institut d'Agriculture de Rome).

803. Smith, Dean A.; Woodruff, M.F.A. 1951. Deficiency diseases in Japanese prison camps. *Medical Research Council (London), Special Report Series* No. 274. p. 192. (HMSO Privy Council, G.B.).

• ***Summary:*** This comprehensive report discusses the effects of an inadequate, unbalanced, and unaccustomed diet, maintained over a period of years, on thousands of mean, women and children, prisoners in the hands of the Japanese in Hong Kong and Singapore.

One section is titled "Preparation of Tempe." British and Dutch prisoners of war in Changi, a Japanese prisoner of war camp in Singapore, survived on tempeh. "Soya beans first appeared in Changi in May, 1943, as a purchase by the Camp Messing Fund; from December of that year onwards, they were occasionally issued to the camp by the Japanese in place of a certain amount of rice... The beans were first simply boiled, but in this form they were rather unpalatable and exceedingly indigestible, and many men passed unaltered beans in their stools. Some Dutch prisoners of war suggested that this difficulty could be overcome by converting the beans into a substance known in the Netherlands East Indies as *tempe,* as product which... occupies a very important place in the diets of those who live in central and east Java." A description of the tempeh-making process is given. "The original culture of fungus was obtained from the withered petals of the *Hibiscus* plant... At Changi, *tempe* was made part of the general issue when available and was used to treat protein and vitamin deficiencies, and was given to diabetics for whom the ordinary rice diet was unsuitable."

Note: According to *The Defining Years of the Dutch East Indies, 1942-1949,* by Jan A. Krancher (McFarland & Co. 1995), upon their invasion of Java in 1942, the Japanese began a process of Japanization of the archipelago. Over the next 3 years, more than 100,000 Dutch citizens were shipped to Japanese internment camps, and more than 4 million *romoeshas,* forced Indonesian laborers, were enlisted in the Japanese war effort. The Japanese occupation stimulated the development of Indonesian independence movements. Headed by Sukarno, nationalist forces declared their independence on August 15, 1945. For Dutch citizens, Dutch-Indonesians or "Indos," and pro-Dutch Indonesians, Sukarno's declaration marked the beginning of a new wave of terror.

804. Grant, M.W. 1952. Deficiency diseases in Japanese prison camps. *Nature (London)* 169(4290):91-92. Jan. 19. [1 ref]

• ***Summary:*** "... many attempts were made to make soya beans palatable and digestible, the only satisfactory method proving to be one common in Indonesia, involving

inoculation with a fungus [to make tempeh]. Otherwise, these beans were liable to give rise to much digestive disturbance when used in any quantity, even if first reduced to a fine meal."

805. *Times (London).* 1952. U.N. work for children: Substitutes for milk. Dec. 16. p. 7, col. 2.
• ***Summary:*** From a correspondent in Rome, Italy. The United Nations International Children's Emergency Fund (Unicef) has just finished a meeting at the Food and Agriculture Organization [FAO] headquarters in Rome to consider methods by which to improve child nutrition. Mr. Pate, Unicef's executive director, emphasized at a press conference, "that children suffer severely where animal milk is not available. which is the case in most countries in southern Europe, the Near East, and Asia, where there is not enough milk to supply 1 per cent. of the real needs of the children. Malnutrition was, in fact, the primary problem facing Unicef."

Since Unicef was created 6 years ago, Unicef has assisted more than 60 million children and expectant mothers throughout the world. Since taking over the work among children previously done by Unrra (United Nations Relief and Rehabilitation Administration) it has helped to feed 6 million children in Europe alone, 1.3 million of them in Italy.

One problem facing Unicef is how to increase supplies of local protein-rich foods that could serve as a substitute for milk where local livestock were insufficient. FAO "had been considering what assistance could be given to increase the production of pulses, including the soya bean, and progress had been made toward establishing a plant in an unspecified country in south-east Asia for the production of milk from soya bean flour."

Note: In 1957, Saridele, a dried nondairy milk based on soybeans, was introduced. Made in Yogyakarta, Indonesia, it was the result of a joint program by FAO and UNICEF.

806. Ankersmit, G.W. 1952. Life history and control of the soya bean leaf beetle *Phaedonia inclusa* (Stal). *General Agricultural Research Station, Bogor, Contribution* No. 129. 34 p. *

807. De, S.S. 1952. Report to FAO on trials conducted in Indonesia with a milk prepared from soya, groundnut, and malt. Rome, Italy: FAO. *
Address: Dr., FAO.

808. Harmsen, L. 1952. Betreffende melk in Indonesia [On milk in Indonesia]. *Hemera Zoa (Bogor, Indonesia)* 59:514-16. [Dut]*
• ***Summary:*** Preceding Title: Nederlandsch-Indische bladen voor diergeneeskunde en dierenteelt.

809. **Product Name:** Beanvit (Soyabean Milk. Later Renamed Yeo's Soyabean Drink).
**Manufacturer's Name:** Yeo Hiap Seng Ltd.
**Manufacturer's Address:** 23, 7 M.S. Bukit Timah Rd., Singapore.
**Date of Introduction:** 1952.
**Wt/Vol., Packaging, Price:** Sterilized bottles.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 22. "Southeast Asia as a market for U.S. soybeans and vegetable oils." In Singapore 2 companies are engaged in the production of pasteurized soybean milk, which is sold as a soft drink. They use about 100 tons of soybeans a month for this purpose. One product is marketed as "Beanvit" soybean milk. Page 37 states that the address of Yeo Hiap Seng is 23, 7 M.S. Bukit Timah Rd. The manager is Alan Yeo. The company uses about one ton of Mainland Chinese soybeans daily.

*Soybean Digest.* 1970. Nov. p. 3. "A Southeast Asia soy food firm." In 1952 Yeo Hiap Send Ltd. successfully launched its first soy milk in bottles. "This is marketed as a food beverage known as 'Beanvit' and retailed at the same price as other soft drinks." In 1968 Yeo Hiap Seng Ltd. successfully introduced a modern, one-way, tetrahedron-shaped container to pack its soy milk. The container is lined with kraft paper and polyethylene coated aluminum foil. The product is sterilized before filling, being heated to 142ºC for 4 seconds.

E. Orr. 1972. Tropical Products Inst. G73. The use of protein-rich foods for the relief of malnutrition in developing countries: an analysis of experience. p. 15. "A soya milk, Beanvit, has been produced in Singapore and Malaysia since the early 1950s by Yeo Hiap Seng Ltd. of Singapore and its Malaysian subsidiary. The company's main business is in the soft drink, food processing (canned meat) business. More recently a form of Beanvit, with vitamin and mineral additives, called Vitabean has been on sale along with Beanvit. The trend of sales is said to be satisfactory and the company has plans to expand production."

Soya Bluebook. 1981. p. 61. No brand name given; Soyfoods magazine. 1981. Winter. p. 29. A photo shows a Tetra-Pak carton (tetrahedronal in shape) labeled Beanvit (Soya Bean Milk), with Chinese characters above it.

Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 101. This rather sweet soymilk, introduced in Singapore in 1954 and sold like a soft drink in sterilized bottles, was marketed in Singapore and Malaysia, where it was the first product of its type. The address is now 950 Dunearn Rd., Singapore.

Note: This is the earliest known commercial soy product made in Malaysia.

810. Dacanay, Jose Q. 1952. From the Bureau of Agriculture to the Bureau of Plant Industry. In: A Half-

Century of Philippine Agriculture. Manila, Philippines: Liwayway Publishing. xix + 463 p. See p. 3-9.
• ***Summary:*** Gives a good history, overview, and description of the structure of the work of this organization in the Philippines. On 8 Oct. 1901 the United States-Philippine Commission created the Insular Bureau of Agriculture under the Department of the Interior. F. Lamson-Scribner arrived in Manila from New York on 22 April 1902. His title was chief of the Insular Bureau of Agriculture, and he had a small staff. For many years before that he had been chief agrostologist at the U.S. Department of Agriculture. On July 14, 1902 the staff was increased by the addition of an expert in seed and plant introduction. On 1 Jan. 1930 the Bureau of Agriculture was split into the Bureau of Plant Industry and the Bureau of Animal Industry. In 1932 the Home Economics Division of the Bureau of Science was transferred to the Bureau of Plant Industry and became the Division of Plant Utilization with the function of industrialization of plant products. The Bureau is now operating 13 experiment stations and seed farms in the Philippines. Address: Chief, Agricultural Reference Section.

811. International Nutrition Products, Inc. 1952. Compliments of Soyalac. "The wonder vegetable milk" (Ad). In: A Half Century of Philippine Agriculture. Manila, Philippines: Liwayway Publishing. xxvii + 463 p. See p. 433.
• ***Summary:*** This is a quarter-page ad with no illustrations. Address: 41 Nagtahan St., Manila, Philippines. Phone: 6-62-71.

812. Manas y Cruz, M.; Rozul, Juan B. 1952. Plant production and exploration. In: A Half-Century of Philippine Agriculture. Manila, Philippines: Liwayway Publishing. xix + 463 p. See p. 154-69, especially p. 157-58. Published for the Bureau of Agriculture Golden Jubilee Committee by Graphic House. [18* ref. Eng]
• ***Summary:*** "Only a few species of our cultivated plants are indigenous to this country... Plant introduction work in the Philippines was started as far back as the Spanish regime... Between 1521 and 1815 approximately 200 species of economic plants of American origin were introduced into the Philippines." Plant introduction became a major project of the Bureau of Agriculture after it was established in 1902. Its first chief, F. Lamson-Scribner, laid the basic foundation for the introduction and exploration work.

Direct introduction of hybrid strains, such as soybeans, has saved much time compared to "the development of native varieties by the processes of selection and hybridization. For instance, it must have taken its American breeders from 7 to 12 crop seasons to produce the hybrid strain of soybean, Mis 28 EB strain 3910. When tested here for 2 or 3 crop seasons, it proved to be a very suitable variety of soybean for commercial growing in the Philippines."

The section titled "Vegetable Crops" notes: "In general, the introduction of vegetable crops has been very successful. Practically all the vegetable crops grown commercially here [including soybeans]... are the products of plant introduction work... Of the soybean, *Glycine max,* we are now commercially growing introduced varieties and strains both suitable for the rainy and dry season culture. Of over a hundred varieties and strains introduced from China, Japan, U.S., Hawaii and India, only few have been selected as the most adapted to certain regions of the islands. The most successful introductions recommended for commercial planting are: Mis 33 Dixi, Head Green and Mis 28 EB Strain 3910, all adapted to rainy and dry season cultures, and Yellow Biloxi hybrid, only adapted to rainy season culture. They gave yields of from 15 to 25 cavans of seeds per hectare" Note: 1 cavan, a unit of weight in the Philippines = 44 kg or 50 kg. Thus, 15 to 25 cavans/ha = 0.66 to 1.25 tonnes/ha.

"Unfortunately, our detailed Plant Introduction records of the past years were practically all destroyed or lost during the last World War operations, so it has been quite difficult to reconstruct them from memory or from whatever literature the authors were able to ransack within the short time available."

On page 398 is an ad for Cenvoco Vegetable Lard, made by the Central Vegetable Oil Manufacturing Co. of Manila. This shortening was probably made from coconut oil rather than soy oil.

Note 1. This is the earliest English-language document seen (Feb. 2008) that uses the term "Vegetable Lard" to refer to vegetable shortening.

Note 2. This book was written by men of the Philippine Bureau of Agriculture and its successors, the Bureau of Plant Industry, the Bureau of Animal Industry, and the Fiber Inspection Service. Address: Bureau of Plant Industry.

813. Merino, Gonzalo. 1952. Introduction. In: A Half Century of Philippine Agriculture. Manila, Philippines: Liwayway Publishing. xix + 463 p. See p. ix-xix + 8 unnumbered pages of photos of directors of the Bureau of Agriculture, the Bureau of Plant Industry, and the Bureau of Animal Industry.
• ***Summary:*** Gives a good history and overview of agriculture in the Philippines, and of the Bureau of Agriculture, the Bureau of Plant Industry, and the Bureau of Animal Industry. Contents: Introduction. Exit the Spaniard, enter the American (The archipelago was visited by Portuguese navigator Magellan in 1521. The Spanish founded Manila in 1571. Spain ceded the islands to America for $20 million in 1898 after the Spanish-American War. The Bureau of Agriculture was founded by Americans in 1902). The Commonwealth years (from 1935). Agriculture

under the Japanese (who occupied the country during World War II). Postwar agriculture. Our agriculture in terms of pesos (soybeans are listed as one of 20 major field crops [not including fruits] worth a total of more than 200 million pesos in 1938). Farmers have changed for the better. Youth and agricultural education. Other government agricultural services. The farmer and today's world. Address: Director of Plant Industry.

814. Petelot, Alfred. 1952. Les plantes médicinales du Cambodge, du Laos et du Vietnam [The medicinal plants of Cambodia, Laos, and Vietnam. Vol. 1]. *Archives des Recherches Agronomiques au Cambodge, au Laos et au Vietnam* No. 14. 408 p. See p. 276-81. [20 ref. Fre]
• ***Summary:*** The section on the soybean *(Soja hispida* Moench, p. 276-81) includes the vernacular names: Vietnamese: *Dau nanh. Dau tuong, Dau hon, Dau xa.* Cambodian: *Sandek sieng.* Laotian: *Mak toua kon, Ta ton.*

Discusses: Whole dry soybeans, green vegetable soybeans *(Elles peuvent... être consommées à l'état jeune à la façon des flageolets,...),* soymilk *(elles donnent une sorte de lait mousseux et crémeux,...),* nutritional composition, tofu *(le graines sont utilisées pour la préparation d'un fromage, le Teau-fou des Chinois, le dau-phu des Vietnamiens),* composition of fresh and moisture-free tofu, soy oil and its properties (In Europe, above all in England, this oil is used to make soap and margarine. Its drying properties enable it to be used to make paint), soybean cake (used as animal feed; it is rich in lysine), lecithin, vitamin B, the Agronomic Institute of Ankara, Turkey, has found soya to be superior as an animal feed to all other legumes cultivated in Turkey, defatted soybean meal, useful in diabetic diets, Haberlandt of Vienna suggests use as human food, fermented soy products and rice koji, natto, miso, shoyu, *Tsao Yu* of China, tuong dau of Vietnam, Japanese natto, MSG. Address: Chargé de Cours à la Faculté Mixte de Médecine et de Pharmacie de Saigon [Vietnam].

815. De, Sasanka S. 1953. Report to the government of Indonesia on supplementary feeding of children with soya-bean preparations. Rome, Italy: FAO. ETAP Report no. 78. 19 p. Jan. *
• ***Summary:*** Based on a study of 1,000 subjects in Indonesia, Dr. De believes that soymilk made from soy flour could be a valuable, low-cost addition to the local diet. Also discusses the use of peanut presscake as a supplementary food for children. Address: Dr., FAO.

816. *Soybean Digest.*1953. 23 million meals of Multi-purpose food. March. p. 19.
• ***Summary:*** "Nearly 23 million 3-cent meals of the 'Multi-Purpose' food have been distributed on the hunger fronts of the world, according to a report issued by the non-profit Meals for Millions Foundation, Los Angeles...

"More than 1¼ million meals, the report states, have gone to feed Korean refugees (813,000 meals since last June). Shipments to India total 3,880,000 meals of which nearly a million have been shipped since June. Popularity of the food has been enhanced by development of special native recipes printed in the Korean and Tamil languages.

"Significant shipments have gone to the Middle East, Hong Kong, Formosa, Burma, Africa, Arabia, Japan, Philippines, Latin America, Europe, and Caribbean and South Pacific Islands.

"World-wide distribution has been through 133 American relief and religious agencies and health departments of foreign governments...

"For further information or to make contributions contact Meals for Millions Foundation, 648 South Broadway, Los Angeles 14, California."

Note: This is the earliest document seen (Dec. 2007) concerning soybean products (soy flour) in Arabia [this term usually refers to the Arabian Peninsula, but in this case it may well refer to Saudi Arabia]; soybeans as such have not yet been reported. This document contains the earliest date seen for soybean products in Arabia (March 1953); soybeans as such had not yet been reported by that date.

817. Whyte, R.O.; Nilsson-Leissner, G.; Trumble, H.C. 1953. Legumes in agriculture. *FAO Agricultural Studies* No. 21. 367 p. April. [97 ref]
• ***Summary:*** Contents: Part I. 1. Economic botany of legumes. 2. Ecological and biotic relationships. 3. Relation to soil fertility. 4. Alternate Husbandry. 5. Association with grasses. 6. Use as animal feed. 7. Tropics and sub-tropics. 8. Poisonous plants and weeds. 9. The significance of symbiotic nitrogen fixation. 10. Plant introduction and exploration. 11. Adaptation, strain variation and breeding. 12. Investigation and testing of improved strains. 13. Production of seed.

Soyabeans and the genus *Glycine* are discussed in detail on pages 275-78; they are grown in the Philippines, Siam, India, the East Indies, Natal, Transvaal, Argentina (incl. the northeastern province of Corrientes), Uruguay. "The most widespread species is *Glycine javanica* (East Indies, Manchuria, tropical Asia, Abyssinia [Ethiopia], tropical East Africa, and parts of South Africa). In Queensland, this perennial slender species is an outstanding slender legume among more recent introductions, possessing all the characteristics of a good pasture species, since it makes good growth, is palatable, and seeds prolifically. It has also shown great promise in Paraguay. In Africa, it is an excellent substitute for kudzu with similar climatic requirements. It does not yield so much, but sets seeds readily and is therefore easier to propagate... *Glycine falcata* is a herb occurring in the semi-arid grasslands of Queensland and is considered a promising pasture plant. It produces underground pods."

Soyabeans are discussed briefly at a number of countries where they are grown, including in the tropics and sub-tropics. In Jamaica (p. 105), soyabeans are recommended in a 1-year rotation with maize in higher lands with terra rossa. In Nicaragua (p. 108) soyabeans appear to be well adapted. In El Salvador (p. 108-09) the National Centre of Agronomy recommends soyabeans as a source of fodder. In Northern Nigeria (p. 119) the soyabean is used as young green fodder; its composition is given. In South Africa (p. 138-39) soyabeans have been well-established since 1926, when A.R. Saunders at Potchefstroom began a breeding program. "Hitherto, soyabean production has been approximately 700 short tons per annum. Imported and locally produced seed are used in the diet of native mine labourers and more particularly by convalescents. The oil content is too low for profitable extraction by ordinary crushing methods which leave about 6 per cent of oil in the cake. Facilities for the solvent extraction and fractionation of vegetable oils have led to a greater demand for soyabeans.

"Soyabeans are frequently grazed or used as hay... It is an important hay crop, but difficult to cure." Apart from lupins *(Lupinus albus, L. luteus,* and *L. angustifolius)* planted in late summer, soyabeans are the best annual legume used at the Dohne Research Station.

In Madagascar (p. 142-43) soyabeans have given good results at the Station agronomique du Lac Alaotra. In Pakistan, in East Bengal (p. 145) soyabeans are being grown on an experimental basis. A number of improved varieties have been developed and are being distributed to growers. In Burma (p. 148) and in Thailand (p. 149) soyabeans are cultivated.

"Plant introduction in Australia (C.S.I.R.O.): Almost immediately after the establishment of the Division of Plant Industry (then the Division of Economic Botany) in 1928, a Plant Introduction Section was formed to rationalize the introduction and testing of plants for all parts of Australia.

Among the many other plants discussed are peanuts (Arachis, p. 254-55), milk vetches (Astragalus, p. 255, incl. Genge), Derris (= Deguelia, p 268), kudzu (Pueraria, p. 317-21), including long sections on regular kudzu *(P. thunbergiana = P. hirsuta = P. triloba = Dolichos japonicus = Pachyrhhizus trilobus)* and on tropical kudzu or puero *(P. phaseoloides = P. javanica),* and Voandzeia (the Bambarra groundnut, Madagascar peanut, Juga bean or earth pea; Voandzeia subterranea is a native of Africa). Address: Plant Production Branch, Agriculture Div., FAO, Rome, Italy.

818. Costello, Michael. 1953. Meals for Millions: This crusading Californian is showing how the problem of world hunger can be licked. *Reader's Digest* 63:126-28. July. Condensed from *The Christian Century,* 70:602-04, May 20,1953.

• ***Summary:*** The colorful story of Clifford Clinton (an illustration shows his portrait), Henry Borsook, Multi-Purpose Food (based on soybean grits), and Meals for Millions Foundation, Inc. To aid the Foundation and its humanitarian work, "Clinton donates office space in one of his Los Angeles cafeteria buildings (located at 648 S. Broadway, Los Angeles 14, California). To reach it one passes through a dim 'landscaped' dining room with pools, grottos, singing birds and organ music, then up innumerable stairs, through a bakery and a carpentershop, and arrives finally in a bustling, crowded office. Here orders come from individuals, churches, social and governmental agencies. The Multi-Purpose Food business is handled by a small staff is headed by a bouncy, enthusiastic woman named Florence Rose."

"Four million Multi-Purpose meals have gone to India, three million each to China and Japan, two million each to Germany and Korea, one million to France." Some 333,000 people in Lebanon, 250,000 people in the Philippines, and several hundred thousand in Austria and Greece have been saved from hunger by Multi-Purpose meals. Shipments have gone to the Vatican for distribution to Italian poor, to migrant labor camps in California and Arizona, to the Navajo and Hopi Indian reservations. The largest buyer and distributor is the Roman Catholic Church, followed by the Friends Service Committee.

Note: This is the earliest document seen (Feb. 2001) concerning soybean products (Multi-Purpose Food containing soy grits) in the Vatican; soybeans as such have not yet been reported.

819. Lo, K.S. 1953. The story of soybean milk. *Far Eastern Economic Review.* Oct. 29. p. 568-69.

• ***Summary:*** In 1936 the author, a resident of Hong Kong, happened to be in Shanghai, where he read a newspaper article about a talk given by a Dr. Webb [actually by Julean Arnold; see letter from K.S. Lo, 3 Nov. 1989] on the nutritional value of the soybean. He was very impressed. A year later, the invasion of China by Japan brought a steady flow of refugees into Hong Kong, and with them problems of food supply and malnutrition. Lo recalled the article he had read about soybeans and began to think about the idea of making soybean milk to be sold to the working classes at the lowest possible price. He took his idea to Hong Kong's new director of Medical Services, Dr. P.S. Selwyn-Clarke, who was known for his progressive ideas, his untiring energy for work, and his concern for the poor. "He at once offered me his moral support were I to embark on this scheme. It was through his personal encouragement and moral support that eventually I was able to bring it to fruition. He was also later to become my strongest supporter and advocate of soybean milk. A modest factory was built at Causeway Bay and it was opened for business in March, 1949 [actually 7 March 1940]. The equipment used was

simple and crude and the method adopted for the making of this milk was modeled after the dairy industry. On the day of its opening, I can still remember that the total business done was 9 bottles sold."

"After two years of hard struggle, we were beginning to make some headway in our sales. At this point the Pacific War intervened and brought our activities to a stop. The factory was occupied by the Japanese, and what little equipment we had in it was lost. After the war was over we tried to restart it, and once again Dr. Selwyn-Clarke came to our rescue."

"Much to our surprise, the post-war public took to soybean milk without being coaxed. All of a sudden it became very popular, especially among the working classes." A larger and more modern factory was built at Aberdeen, and completed in 1950. After this a product that did not require refrigeration was developed; sales increased ten-fold. "Today we are able to produce from 3000-5000 cases (24 bottles each) of soybean milk a day; distributed over the territories of Hongkong, Kowloon, New Territories and Macao with a fleet of 18 trucks."

The company has "succeeded in producing a nutritious and wholesome food and putting it within the reach of the masses." The price has been kept down to 20 cents (H.K.) per bottle. The soybean milk is also extremely high in vitamin B, and because of the large amount consumed by the public daily, this has a beneficial nutritional effect. The company is now also working actively with UNICEF [United Nations International Children's Emergency Fund] in promoting similar projects in Asia. "Already we know for certain that a factory similar to ours has been put up in Djakarta by the Indonesian Government in conjunction with UNICEF."

"We are, however, not resting on our laurels. Our technicians have been busy experimenting on condensed soybean milk, which we hope to put on the market sometime next year. Then we will move onto soybean milk powder, and other forms of soya food products."

Note 1. This is the earliest document seen (April 2004) that describes UNICEF's awareness of the attractions of Vitasoy as a high protein soy beverage for use in developing countries, and joint efforts by UNICEF and Vitasoy to promote similar products in Asia. Note 2. When Vitasoy was launched in March 1940, it was fortified with vitamins, calcium, and cod liver oil. Now, in 1953, it appears not to be fortified at all.

820. *New York Times.*1953. F.A.O. sees gains in 52 countries: Report for 1952-53 tells how experts gave help in varied projects. Nov. 2. p. 16.

• ***Summary:*** The United Nations Food and Agriculture Organization is at work on projects totaling $6,700,000 in 52 countries. In Indonesia, through the work of an FAO nutrition specialist, children are starting to get soybean milk to improve their diets; it is a substitute for dried dairy milk supplied by UNICEF. Trials in orphanages and schools over 3 months proved its acceptability. Now the Indonesian government has asked UNICEF to help in establishing a plant for large-scale production.

In Bombay, India, a revolution in dairy methods has produced cleaner milk for a population of 3 million. In the Thana district, where cows used to roam the streets, a colony of 13,000 buffaloes has been established. The milk is bottled and distributed in hygienic form.

821. Reumpol-Haemer, F.H.; Soedarmo, P. 1953. Pembikinan susu kedelai [Soyamilk]. *Horticultura* 2(1):25-31. [Ind]*

822. David-Perez, Enriqueta. comp. and ed. 1953. Recipes of the Philippines. Philippines: Published by the author. Printed by Capitol Publishing House, Inc. (Philippines). 124 p. Illust. by S. Serna. No index. 23 cm.

• ***Summary:*** Almost all the recipes in this book have Filipino names, with no English translation of those names. A surprisingly large number contain soyfoods, especially *toyo* (soy sauce). The glossary (p. 121-23) states: Misu is miso–a paste made of fermented rice and soy beans. Tajure is "fermented soy beans, caked" [fermented tofu]. Tausi is "fermented [black] soy beans" with salt [soy nuggets]. Tokua is "soy bean curd" [tofu]. Toyo is Filipino-style soy sauce. Recipes followed by an asterisk (*) call for toyo.

Soy-related recipes include: Chicken relleno–I * (p. 15). Chicken pastel * (p. 27). Lengua (with soy sauce, p. 20). Morcon * (p. 21). Pancit molo * (p. 22). Adobo * (p. 24). Arroz caldo with chicken (with 3 tbsp. patis or soy sauce, p. 28). Bañgus en tocho–I (with 1 cube tajure, p. 34), Bañgus en tocho–2 (with 2 tbsp. each tajure and tausi, and 1 cake tokua cut into pieces 3/4 inch long and 1/8 inch wide, p. 35). Bulanglang–1 (with 1 cup tokua, cubed and fried, p. 38). Burong isda (with 1 tbsp. angkak–fermented red rice, p. 39). Sauce for pipi-an (with 1 small jar peanut butter, p. 41). Escabecheng apahap (with 4 pieces tokua, p. 46). Escabeche–Macao style * (p. 71). Escabeche with papaya * (p. 48). Fritada * (p. 50).

Kari-karing pata (with ½ cup ground toasted peanuts or peanut butter, p. 51). Lengua estofada * (p. 53). Lumpia labong–Bamboo shoot (with 5 bean cakes–tokua, p. 55). Lumpia sauce (with ½ cup toyo sauce, p. 56). Lumpia with papaya * (p. 56). Lumpia with peanuts (with 2 squares tokua–diced, 2 tbsp. toyo–soy sauce, and 1 cup ground peanuts, p. 57). Lumpia with ubod–2 (with 2 cakes tokua, and toyo to taste, p. 58). Meat balls with "sotanghon" * (p. 59). Menudo de rabo * (p. 60). Misu-tomato sauce (with 2 tbsp. misu–soy bean paste, p. 61). Paksiw na pata * (p. 64). Paksiw–pork (with soy sauce, p. 64). Paksiw na lechon (with 3 tbsp. soy sauce, p. 65). Pancit guisado * (p. 65). Pancit "luglug" (with ½ cup soy bean cake–tokua–cut into

small cubes, p. 66). Pork tapa * (p. 72). Umba (with 2 tbsp. toyo and 1 heaping tbsp. tausi, p. 80). Pastillas de mani (with 1 can ground peanuts, p. 89).

A glossary at the end contains brief definitions of uncommon ingredients. Definitions of the soy-related ingredients above are taken from this glossary. Angkak is "red-colored grains of rice used as coloring for fermented fish."

Note 1. This is the earliest English-language document seen (Feb. 2009) that uses the word *tajure* to refer to fermented tofu, or the word *misu* which refers to miso.

Note 2. On the title page is printed "4th printing–May 1956." Address: P.O. Box 3288, Manila, Philippines.

823. **Product Name:** Beanvit (Soya Milk).
**Manufacturer's Name:** Yeo Hiap Seng Ltd. (Malaysian Subsidiary).
**Manufacturer's Address:** Malaysia.
**Date of Introduction:** 1953?
**Wt/Vol., Packaging, Price:** Sterilized bottles.
**New Product–Documentation:** E. Orr. 1972. Tropical Products Inst. G73. The use of protein-rich foods for the relief of malnutrition in developing countries: an analysis of experience. p. 15. "A soya milk, Beanvit, has been produced in Singapore and Malaysia since the early 1950s by Yeo Hiap Seng Ltd. of Singapore and its Malaysian subsidiary. The company's main business is in the soft drink, food processing (canned meat) business. More recently a form of Beanvit, with vitamin and mineral additives, called Vitabean has been on sale along with Beanvit. The trend of sales is said to be satisfactory and the company has plans to expand production."

824. Tung, Golo. 1954. Two Indonesian soya bean experts study production methods [at Hongkong soya bean factory]. *Hongkong Standard.* Aug. 23. [Eng]
• ***Summary:*** "Thousands of children and expectant mothers in Indonesia are awaiting the return of two of their countrymen who are here on a one-week research work at a soya bean milk factory as part of their survey tour of soya bean production methods in Europe and United States.

"The two persons are Messrs. Soeroengan Nasoetion and Suwardi Wirratmadja. They will not only transform their native resource of soya bean into nutrition-concentrated food but will provide their young generation and other needy persons free soya bean milk powders... UNICEF decided to set up a soya bean milk plant in Indonesia after seeing the local plant."

This research is funded by the FAO Expanded Technical Assistance Programme. A photo shows K.S. Lo, Managing Director of the Hongkong Soya Bean Products Company Ltd. with the two Indonesian men plus two other men. Address: Hong Kong.

825. Autret, Marcel; Behar, Moisé. 1954. Síndrome policarencial infantil (kwashiorkor) and its prevention in Central America. *FAO Nutritional Studies* No. 13. 81 p. Oct. Also published as "Le Syndrome de Polycarence de l'Enfance en Amérique Centrale (Kwashiorkor)" in Bulletin de l'Organisation Mondiale de la Sante No. 11, p. 891-966. [108 ref. Eng]
• ***Summary:*** This was one of the surveys made by United Nations agencies in the late 1940s and early 1950s which showed the prevalence of protein-calorie malnutrition. Pages 61-63 discuss the soybean as a rich source of protein that may be prepared in a variety of ways. A brief review is given of work with soy in Uganda, Mexico City, India, El Salvador, and Guatemala.

"Acceptability tests with soybean milk were carried out successfully in 1951 in schools and community dining rooms in Mexico City, under the supervision of the Institute of Nutrition (according to a 1951 personal communication from J. Calvo de la Torre and J. Diaz Barriga). The milk was prepared from non-bitter varieties of soybeans developed by the Agricultural Research Department of the Ministry of Agriculture, with the assistance of the Rockefeller Foundation, and cultivated in Mexico under the direction of the Maize Commission, which plans to grow soybeans in rotation with maize" (p. 62)

"The Government of Indonesia, with the financial aid of UNICEF and the technical assistance of FAO, plans to construct a plant for the preparation of an infant food made from dried soybean milk. Other countries, such as Thailand and the Philippines, are now considering similar projects" (p. 62).

The fortification of tortillas with soybeans or soy flour looks very promising. "In an attempt to modernize tortilla making, the Industrial Research Department of the Bank of Mexico has set up a pilot plant to make powdered dried *nixtamal* from suitably treated maize. When this powder is reconstituted with water, it gives the *masa* or dough which can then be rolled out into cakes and baked at home. In addition to several economic and hygienic advantages, the new technique makes it possible to incorporate either whole or partly fat-free soy flour in the *nixtamal* powder. Experiments carried our on this product have been seen by one of the authors; the *tortilla* with 10% soy flour added was still excellent.

"In towns, where *tortillas* are the staple food, there will be no difficulty in introducing soybean once the preparation of *nixtamal* is concentrated in a few large industrial plants instead of scattered among thousands of mills. However, if the Government were to make soybean-maize mixture obligatory now, control would be difficult. In the rural areas the preparation of *tortillas* is a family operation, and it will be necessary to teach the women to add soybeans to the maize grains in the preparation of the *tortillas* by giving practical demonstrations. This will be a long-term and

exacting task, but it must be undertaken because mature soybeans cannot be used in the same way as other beans, as they require prolonged cooking.

"The use of the classic fresh soybean curds [tofu] calls for long education of the public, as does that of certain special preparations such as *tempeh* (fungus-fermented soybean cheese), the preparation and nutritive value of which have been studied by Van Veen" (p. 63).

"This Study is being published in French in the Bulletin of the World Health Organization for November/December 1954, and in Spanish in the Bulletin of the Pan-American Sanitary Bureau."

Note: This is the earliest document seen (Nov. 2002) concerning world protein shortages. Address: 1. D.Pharm., Senior Nutrition Officer, Nutrition Div., FAO, Rome, Italy; 2. M.D., Assoc. Member of INCAP.

826. *Quincy Herald-Whig (Illinois).*1954. Soybean meal from Quincy is shipped abroad: Will be used in Europe and Southeastern Asia. Nov. 12. p. 18.
• ***Summary:*** The meal from the Quincy Soybean Products Co., shipped down the Mississippi River to New Orleans [Louisiana], will be used to carry livestock through the winter. The company bought 1,500,000 bushels of soybeans from area farmers this year.

Many thousands of bushels of soybeans have been loaded on barges at the Farmers co-operative elevator at Meyer, and shipped down the river for export this fall.

827. Anderson, Edgar. 1954. Plants, man & life. London: Andrew Melrose Ltd. 208 p. Illust. Index. 23 cm. [10* ref]
• ***Summary:*** Chapter 10, titled "A roster of our most important crop plants and their probable origins" (p. 133-59) includes the following sections: Fibres and oil plants–Cotton (various species of *Gossypium,* incl. Old World cultivated species *G. arboretum* and *G. herbaceum,* and New World cultivated species *G. hirsutum* and *G. barbadense;* See key monograph by Hutchinson et al. 1947), flax *(Linum usitatissimum),* and weed flax *(Linum angustifolium),* Hemp *(Cannabis sativa),* olive *(Olea euorpaea),* peanut *(Arachis hypogaea),* sesame *(Sesamum orientale),* sunflower *(Helianthum annuus).* Forage plants–Alfalfa *(Medicago sativa),* bluegrass *(Poa pratensis),* cowpea *(Vigna sinensis.),* Vegetables–Broad bean *(Vicia faba),* cabbage *(Brassica oleracea;* the cabbage vegetables {kohlrabi, cauliflower, kale, Brussels sprouts, etc.} are the European counterpart of the Asiatic mustards. They were originally grown for their oily seeds), chick-pea *(Cicer arietinum,* called "garbanzo" in America), jack bean, sword bean and various other species of *Canavalia* beans, common or kidney beans *(Phaseolus vulgaris),* lentil *(Lens esculenta),* lima bean *(Phaseolus lunatus),* mung bean *(Phaseolus aureus),* the mustards (several species and varieties of *Brassica, Eruca sativa),* pea *(Pisum sativum;* the garden pea and closely related field pea are known only as cultivated plants), pigeon pea *(Cajanus cajan),* scarlet runner *(Phaseolus coccineus* L.; *Phaseolus multiflorus* Lam.), soybean *(Glycine max;* "Of great antiquity in the Orient. The commonly cultivated sorts have a malformation of the stem and inflorescence which changes them from a trailing vine to a stiff upright plant. Varieties with the original trailing habit are still grown for forage and food in India and Java"), squashes and pumpkins (various species of *Cucurbita),* tomato *(Lycopersicon esculentum),* turnip *(Brassica rapa),* urd bean *(Phaseolus mungo;* Another common pulse of India, where it is grown in great variety and is an important element in the daily food of the common people. Probably originated in India).

Chapter 11, titled "Sunflowers–the one native American crop" gives a fascinating, in-depth discussion of this plant's origins. "No world crop originated in the area of its modern commercial importance." This is mainly because, in the area of its origin and domestication, "there are the maximum number of pests and diseases which have evolved to prey upon that particular kind of plant" (p. 160-61). An illustration (p. 166) shows a sunflower from the herbal of Mattiolus, 1586.

Chapter 3, "The greater paradox," discusses the surviving fact that "the commonest plants are the least known... Most taxonomists do next to nothing with cultivated plants; many deliberately studying or even collecting them." The herbarium method works very well with most plants except those cultivated by man. The most eminent American taxonomist is Dr. E.D. Merrill, "a scholar of great ability and world-wide reputation." The only professional taxonomist to concentrate on cultivated plants and to urge that their taxonomy be studied is Liberty Hyde Bailey. At Cornell University (New York) he has developed (almost singlehanded) the Bailey Hortorium, an "herbarium devoted to the classification of cultivated plants."

Cytologists, whose main tool is the microscope, have also found new evidence by studying cultivated plants. They have helped us to understand the complex history of cotton.

828. Baker Jones, E. 1954. Preparation of fermented soya bean curd (Tempe)* [in Southern Rhodesia]. In: Malnutrition in African Mothers, Infants and Young Children: Report of the Second Inter-African Conference on Nutrition. London: Her Majesty's Stationery Office. 398 p. See p. 278-79. Held 19-27 Nov. 1952 at Fajara, Gambia, under the auspices of the Commission for Technical Cooperation in Africa South of the Sahara (CCTA). [2 ref]
• ***Summary:*** The soya bean "can be grown in Southern Rhodesia where, however, no serious attempt has yet been made to process the soya bean so as to make it a popular human food.

Experiments in processing have been made in Southern Rhodesia in collaboration with an immigrant from Indonesia who is well acquainted with a product of processed soya bean, *tempé,* which was used in Changi [Singapore] Prisoner of War camp" [during World War II]. A method for preparing tempe is described, based on many trials plus helpful information supplied by Professor van Veen of the Food and Agriculture Organization (FAO).

Footnote 1 (p. 278), referring to the title of this article, states: *"A note by Dr. Baker Jones on the preparation of soya bean curd which was available to members of the Conference has now been revised in the light of information received from Mr. W. R. Carr, Food Technologist, Southern Rhodesia."

Footnote 2. "A letter dated June 1953 from Dr. Baker Jones says, 'The pilot plant for tempé production, constructed by our local Farmers' Co-op, is expected to come into operation in a week or two.'"

Note: The term "soybean curd" usually refers to tofu, so "fermented soybean curd" is a poor term for tempeh. Address: Dr., Secretary, Nutrition Council, Causeway, Salisbury, Southern Rhodesia.

829. Dupont, A. 1954. Essential amino acids in some Indonesian food constituents. Thesis, Fakultas Ilmu Pasti dan Ilmu Alam (FIPIA), Bandung, Indonesia. * Address: FIPIA, Bandung, Indonesia.

830. Huard, P.; Durand, M. 1954. Aliments et boissons (in connaissance du Viet-Nam) [Foods and beverages (known in Vietnam)]. Paris: E.F.E.O., Impremerie Nationale. See p. 189. [Fre]*
• ***Summary:*** Discusses fermented tofu.

831. Zain, Sutan Muhammad. 1954. Djalan bahasa Indonesia [Indonesian style]. Djakarta: Dharma. 117 p. See p. 10. 25 cm. [Ind]*
• ***Summary:*** This is a grammar of the Indonesian language. Page 10: tautjo [Indonesian-style miso], tauge [soy sprouts].

832. *Soybean Digest.*1955. Saving lives with soy. Jan. p. 18.
• ***Summary:*** A photo of Danny Kaye and S.S. De has this caption: "Film star Danny Kaye drank a glass of soybean milk on a recent trip to Bangkok [Thailand]. It was presented to him by Food and Agriculture organization's Dr. S.S. De, regional nutrition officer for Asia and the Far East. Danny, who was on tour as ambassador at large for UNICEF, was told how soybean milk is helping to improve the diets of many people who do not otherwise get enough protein."

833. *New York Times.*1955. Deaths: Mrs. Edwin C. Cort, Missionary in East. March 18. p. 27.
• ***Summary:*** Mrs. Mabel Gilson Court died on 15 March 1955 in Oakmont, Pennsylvania, at age 83–the widow of Dr. Edwin C. Court, who died in 1950. She had been a Presbyterian missionary in Siam (later called Thailand) from 1903 to 1949. Her husband was a physician and fellow missionary. Mrs. Cort was born in about 1872 in Zanesville, Ohio. She was married in 1910. In 1915 Dr. Cort took charge of McCormick Hospital in Chiengmai. Following a furlough of study at Johns Hopkins University, Mrs. Cort took charge of dietetics at McCormick Hospital. She developed a formula for "soybean milk that became standard in Thailand." In 1949, when they retired, Dr. and Mrs. Cort received high honors from Thailand.

834. Masamune, Genkei. 1955. Enumeratio Tracheophytarum Ryukyu Insularum (V) [Listing of the plants of the Ryukyu Islands. V.]. *Science Reports of the Kanazawa University* 3(1):101-82. March. See p. 136. [Jap]
• ***Summary:*** Reports two Glycine species: (1) *Glycine koidzumii* Ohwi is named *Miyakojima tsurumame* in Japanese. It appears to be endemic on Miyako Island, Ryukyu Islands. (2) *Glycine tomentella* Hayata is named *Hiro-ha yabu mame* (broad-leaved bush bean) in Japanese. It may be cultivated in Okinawa, and it grows in Taiwan, the Philippines, and China. Address: Lab. of Systematic Botany, Faculty of Science, Kanazawa Univ., Japan.

835. *Soybean Digest.*1955. 1954 world [soybean] crop hit new record. April. p. 20. [1 ref]
• ***Summary:*** According to the USDA Foreign Agricultural Service, world soybean production established a new record in 1954; 742.8 million bushels were harvested, up 14% over 1953. Over 80% of the increase was accounted for by the United States. Most of the remaining increase occurred in China-Manchuria. In 1953 China produced 198 million bushels and Manchuria produced 134 million. In 1954 Manchuria's production statistics were included with those of China, the total being 350 million bu. Canada also set a new record with 5.065 million bu harvested. Also mentioned (with production statistics for 1953 in bushels) are Italy (35,000), Yugoslavia (155,000 avg. 1945-49), Other Europe (565,000) USSR (NA), Turkey (125,000), Indonesia (10,839,000), Japan (15,777,000), South Korea (4,995,000), Taiwan (Formosa) (640,000), Thailand (743,000), Brazil (3,242,000), Tanganyika (25,000), Nigeria (the biggest producer in Africa with 140,000 to 150,000 bu for export), and the Union of South Africa (68,000).

In Brazil, soybeans are produced in the states of Rio Grande do Sul and Sao Paulo. Average soybean acreage (harvested acres) in Brazil: 1945-1949: 23,000 acres. 1953: 148,000 acres. 1954 (preliminary): 162,000 acres. Average soybean yield in Brazil: 1945-1949: 19.0 bu/acre. 1953: 21.9 bu/acre. 1954 (preliminary): 22.7 bu/acre. Average soybean production in Brazil: 1945-1949: 446,000 bushels.

1953: 3,242,000 bushels. 1954 (preliminary): 3,674,000 bushels. "Brazil's harvest at 3.5 million bushels was up 13% from the year before. Some 2.6 million bushels were expected to be available for either crushing or export. The much-publicized program to increase soybean planting in Sao Paulo has so far met with discouraging results. This reportedly is due to the farmers' dissatisfaction with the earnings derived from soybeans compared with cotton and some other crops and to a shortage in Sao Paulo of combine harvesters."

Note 1. This is the earliest document seen (Jan. 2005) that gives soybean production or area statistics for Brazil.

Note 2. This is the earliest document seen (Jan. 2005) concerning the USDA's Foreign Agricultural Service and soybeans.

836. Autret, M.; van Veen, A.G. 1955. Possible sources of protein for child feeding in underdeveloped countries. *American J. of Clinical Nutrition* 3(3):234-43. May/June. [7 ref]

• ***Summary:*** Soybeans can help fill protein needs but must be processed in well-controlled processing plants. FAO has long been associated with the "saridele" "soy milk" project in Indonesia. After the "saridele" project had been extensively discussed in the National Nutrition Council of Indonesia, the Indonesian government asked UNICEF and FAO to assist in establishing a "saridele" plant for the manufacture of this product for "mother and child welfare centers and hospitals." Why did the Government choose centralized manufacture rather than local manufacture in villages and households? "The reply is that whereas in many villages 'soy milk' is not unknown, 'saridele' from soybean and groundnut certainly is. Introducing a new, hardly known food or food mixture in a country like Indonesia is a difficult and slow process; demonstration through feeding schemes is one of the best ways. Processing on a village scale or locally for hospitals, etc. would certainly lead to numerous difficulties, such as unhygienic manufacture and distribution, lack of suitable containers, and adulteration of the product with water, etc.

"The total capital investment of the Government and UNICEF (who will supply the plant) is about 6 or 7 million Rupiahs (about &700,000); the plant will produce at least 300 tons of the dry product a year" (p. 235-36). Note: This is the earliest document seen (Sept. 2000) that mentions "saridele."

"Another well-known soybean product from Indonesia, *tempeh,* prepared by treating the cooked soybeans with a certain fungus, has drawn the attention of workers in Southern Rhodesia where soybeans are cultivated, but the local population is not much interested in consuming them. Tempeh has a high nutritive value and is highly digestible, but the manufacture is somewhat difficult to control when the product is manufactured under simple conditions. This and other considerations were the basis in Indonesia of the conclusion that soy milk would be preferred to tempeh in the manufacture of a soy product for infants, and children.

"FAO has been giving technical advice on the manufacture of tempeh in Southern Rhodesia, and it seems that the results of the large-scale experiments are very promising. It is to be hoped that these will be published, not only in connection with acceptability, but also concerning the technical problems, data on production costs, and so on." Address: 1. Pharm. D.; 2. PhD.

837. *Soybean Digest.* 1955. Soy plant in Indonesia. July. p. 20.

• ***Summary:*** "Establishment of a soybean milk plant in Djakarta [Jakarta], Indonesia, is under way, and may be the first of a number in that part of the world, reports the American Embassy, Djakarta. The project is one of the activities of the Food and Agriculture Organization of the United Nations (FAO)."

838. Meulen, J.G.J. van der. 1955. Beproeving van soja op de Kleigronden van de jonge kustvlakte [Soyabean trials on clay soils in the young coastal plain]. *Surinaamse Landbouw (De). Surinam Agriculture* 3(4):249-67. July/Aug. [6 ref. Dut]*

• ***Summary:*** The soybean proved to be one of the best crops for growing in rotation with rice; it can be grown for seed or as green manure. In Surinam, varieties imported from other tropical countries, especially Indonesia, give the best results. Generally, early planting gives a better stand than late planting; late-planted crops suffer from too much moisture. Application of fertilizers was not usually necessary, but phosphate may be needed in the long run. For the variety Vada, which seemed well suited to Surinam, 40 kg/ha of seed in rows 4.0 cm apart gave good results. When grown for seed, in rotation with rice, the yields of rice are likely to remain constant. When soybeans are used as a green manure for rice, nitrogenous fertilizers need not be applied. Yields of 800 to 1,000 kg/ha of seed are considered satisfactory, but 1,500 kg/ha can be attained under favorable conditions.

839. McLaughlin, Kathleen. 1955. Soy milk plant to aid Indonesia: Factory in Jogjakarta may build up nutritional values for all Southeast Asia. *New York Times.* Sept. 18. p. 21.

• ***Summary:*** Harry Miller, Jr., an American technician for the United Nations Food and Agriculture Organization, is supervising construction of a plant to produce soybean milk–in both liquid and powdered form, in Jogjakarta, Indonesia. The plant is expected to be in production by Feb. 1956, and by mid-year the dehydrated form should be available for domestic shipment.

More than 20 years ago, Mr. Miller's father, an American medical missionary in China, developed a good-tasting soybean milk there. By hard work, persistence, and ingenuity, he developed the equipment that is now being instaled in the Jogjakarta plant.

"By 1936, Dr. Miller had returned to Shanghai with his family, erected and equipped a factory, and was turning out 3,000 quarts of bottled soybean milk a day, at 7 cents (U.S.) a quart. Cow's milk cost 30 cents.

"Then the war with Japan erupted. In 1937, Japanese forces completely destroyed his plant and in 1938 the Millers left China for their home in the United States." In 1947 they returned briefly to China, then in 1948 they left again before the Communist advance.

Dr. Miller's patents have long since been relinquished to the public domain, with the exception of an interest retained in one soybean milk plant in California. As an F.A.O. expert, Harry Miller Jr. hopes to make his father's soymilk processing system as widely available as possible, especially in places like Indonesia, where it can offer the greatest benefits.

The United Nations Children's Fund [UNICEF], which has provided $350,000 worth of the Miller type equipment for the Jogjakarta plant, has agreed that half of the annual output of 600 tons of soybean milk, powdered or liquid, from this plant, will be distributed free of charge to Indonesians for the first 3 years.

840. *J. of Agricultural and Food Chemistry.* 1955. Soy milk in Indonesia. 3(10):807. Oct.

• ***Summary:*** "A soybean milk plant is going up in Jogjakarta, Indonesia and should be in production by February. The product, already tested with mothers and children, is expected to get enthusiastic response. Not only is it palatable, but it is more easily assimilated by the underfed than is cow's milk. It is also higher in protein. The UN Children's Fund has furnished $350,000 worth of equipment for the 600 annual ton plant being built under direction of Harry Miller, FAO technician whose father, a medical missionary, developed the process."

Note: The soy milk is named Saridele.

841. *Soybean Digest.* 1955. Strayer on special mission to Japan. Oct. p. 7.

• ***Summary:*** The USDA has announced "the appointment of Geo. M. Strayer, executive vice president of the American Soybean Association, as a marketing specialist in the fats and oils division on a temporary basis for a special agricultural mission in Asia,..."

"Strayer will leave in mid-October, will spend a minimum of a month in Japan, Hongkong and the Philippines surveying the market potential for American soybeans and soybean products.

"Japan has been the largest single buyer of U.S. soybeans the past two years. Strayer will contact buyers of soybeans and soybean oil meal, since the Japanese are also large buyers of the latter commodity, and will discuss the handling with them of soybean exports and the problems involved.

"He will be accompanied by Mrs. Strayer. They expect to return to the U.S. at the end of November."

842. Marshall, Eleanor M. 1955. Meals for millions. *American Mercury* 81:83-85. Dec.

• ***Summary:*** This is the story of Multi-Purpose Food, which can be sold for only 3 cents a meal. "Clifford Clinton is the man responsible for getting MPF experiments underway. He is the son of a missionary who worked in China... His work for the last eight years has been that of carrying out his boyhood dream of supplying cheap meals for hungry millions. His two Los Angeles cafeterias were the starting points in his battle.

"During the depression he contrived a meal costing five cents. It consisted of soup, meat, potatoes, and green vegetable and a pudding. This served to allay hunger for thousands of the jobless.

"Yet Mr. Clinton was not content. His next venture was to enlist the help of other suppliers in the area and to serve meals at a penny a portion. These consisted of a bowl of rice with a ladle of soup poured over it. He had rolls of tickets printed and sold them indiscriminately for one cent each.

"As soon as the government relief programs began operating, this penny restaurant was discontinued but the five-cent meal (without the ticket idea) continued to be served at Clinton's during afternoon hours. These meals were hash or beans, two vegetables, bread and butter, a beverage and a dessert.

"Although Mr. Clinton was running in the red with all such meals, he was just as determined as ever to find a way of supplying an adequate diet at a low cost. He knew much more about the problem now, for he had served nearly a million bowls of soup in less than six months! By the end of World War II he was ready to give $5,000 to California Institute of Technology in 1947 to start a project with these stipulations: 'I want a cheap food that is high in nutrition, can be easily shipped and will not spoil if stored for long periods. And it must not violate any religious or social food taboos.'

"Dr. Henry Borsook, one of the Institute's biochemists, agreed to undertake the work. He was able to cut the cost from the five-cent limit to three cents a meal.

"Borsook knew that soybeans are plentiful and contain much protein. He knew also that there is no scarcity of the solid vegetable matter called 'grits' that is left over from firms using soybeans to make margarine fats and cooking oils. So he used 90 percent soy grits and added minerals and

vitamins to produce the formula now known as Multi-Purpose Food...

"Norris E. Dodd, Director-General of Food and Agriculture Organizations of the United Nations, has said: 'I don't believe you can build a just or lasting peace in a hungry world.'

"One answer is the Meals for Millions Foundation, which in six and one-half years has had a total of $800,650.36 from contributions by individuals and purchases made by relief agencies. They have supplied from this: 250,000 meals to the Philippines; 330,000 to Lebanon; several hundred thousand to Austria and Greece; and many more thousand meals for the poor in Italy as well as for the Navajo and Hopi Indian reservations and the migrant labor camps in California and Arizona."

Note: This is an early record of soyfoods in Lebanon.

843. Plagnol, H. 1955. Sauces chinoises [Chinese sauces]. Saigon: Rapp. tech. Inst. Pasteur. See p. 50-51. [Fre]*

844. *Surinam [Dutch Guiana] Department of Agriculture, Animal Husbandry and Fisheries, Report.* 1955. Soyabeans. 108 p. For 1952. See p. 44-45. *

• ***Summary:*** A trial plot on clay soil, planted in December 1951, yielded only 630 kg/ha of seed. Another trial was planted in sandy soil in January 1952; from the best part, 1,660 kg/ha of seed were obtained, but a poorer section gave only 875 kg/ha. This poorer section was treated at different times after planting with Dow premerge at the rate of 12.5 liters in 800 liters of water per hectare for weed control. Emergence of the soybeans in the untreated plots was 84%; with spraying 0, 1, and 2 days after sowing, the emergence percentages were 79, 74, and 68 respectively.

Concerning varieties: Of 14 varieties from the USA, only Acadian and Palmetto showed satisfactory growth and yield. In a preliminary trial of 5 Indonesian varieties, Lawoe and No. 27 were more productive than Soembing.

845. Hardjohutomo, Harsono. 1955. Sedikit mangenai kecap [A little bit about kechap (Indonesian soy sauce)]. In: Pewarta Balai Teknologi Makanan III, Th. I. Djakarta, Indonesia: Publikasi & Dokumentasi Djawatan Pertanian Rakjat. See p. 20-30. [Ind]*
Address: Indonesia.

846. Ichiyama, Morio. ed. 1955. Noda Shôyu keizai shiryô shûsei [Economic and statistical data about the Noda Shoyu Co.]. Noda, Japan: Noda Shoyu Research Dept. 126 p. No index. 21 cm. [Jap; dut; eng+]

• ***Summary:*** Much of this information describes the development of Kikkoman and its predecessors during the Edo period. Pages 61-63 give information on early Dutch exports of shoyu from Japan. Bibliographic references are given for shoyu export documents, all written in old Indonesian Dutch (which is quite different from old Dutch of the same period), from 1668 to 1776 (Kanbun 8 to Anei 5) located at the Waran Bunsho-kan (Japanese-Dutch Document House at The Hague, Netherlands).

1. Copy of a letter dated 17 Dec. 1668, written by the governor, Balthasar Bort, and the Council of the Moluccas [Malacca? Malaccas?] near Ceylon to Ryklof van Goens. To: India, Southeast Coromandel area. To Coromandel: Sake 30 kegs *(taru)* and shoyu 12 kegs.

2. Copy of a letter dated 13 Feb. 1670 (Kanbun 10), written by the governor Antehong Pavilioen and the Council of Negapatonam. This is an order form for goods needed by the company, plus some other things. India, East Coast Ceylon island, northwest of opposite shore. Order from Japan: Sake 30 kegs, shoyu 12 kegs, miso 6 kegs.

3. Original general letter dated 13 Feb. 1677 by the Governor General and the Council of the Dutch East Indies from Batavia [today's Jakarta] (Northern part of India, east Coast Madras). To Coromandel: Palliacatta, Various types of Japanese shoyu 17 kegs.

4. Original general letter dated 13 Feb. 1679 (Enhô 7) by the Governor General and the Council of the Dutcb East Indies. (India west north corner Surat). To Surat: Shoyu 4 kegs.

5. Original general letter dated 11 Dec. 1679 by the Governor General and the Council of the Dutch East Indies, from Batavia. To Coromandel: Miso 1 keg, shoyu 10 kegs, oil 8 kegs. To Ceylon: Shoyu 20 kegs, sake 2 layered kegs–6 kegs, miso 2 layered kegs = 20 kegs.

6. Original general letter dated 29 April 1681 (Tenwa 1) by the Governor General and the Council of the Dutch East Indies, from Batavia. Coromandel: Shoyu large keg(s) (ôdaru)–half kegs (handaru). Ceylon: Shoyu large keg(s) (ôdaru)–three-quarter kegs.

7. Memorandum, dated 8 Jan. 1681, concerning a list of merchandise imported by ship [from Japan] on Chinese junks and ships from other foreign countries in Tonkin. Offerings to the former king: Sake 5 kegs, shoyu 10 kegs. Offerings to the assistant king (fuku-ô): sake 5 kegs, shoyu 10 kegs.

8. Copy of a letter dated 14 March 1683 (Tenwa 3) from the Governor and Commissioner, Jacob Joris Pitch, and the Council of Palliacatta near Batavia. Sake: large keg(s), half keg(s). Shoyu: large keg(s), half keg(s). Miso: 6 kegs.

9. Copy of a letter dated 20 Jan. 1699 from governor Govert van Hoorn and the Council of Malacca. Ceylon: Sake 2-layer kegs–6 kegs. Shoyu 2-layer kegs–8 kegs. Miso 2-layer kegs–2 kegs. Bengal: Shoyu 5 kegs, miso 5 kegs. Nagapatnam [probably Nagapatinam, a seaport town in southeast Tamil Nadu, in south India, on the Coromandel Coast 160 miles south of Madras]: Sake 2-layer kegs–3 kegs. Shoyu 3 kegs.

10. Thunberg's *Travels in Japan (Nihon Kiko)* published in 1796 noted in 1776 (Anei 5) that the Japanese do not export much tea to the surrounding countries since Japanese tea is quite inferior in quality to tea from China. However the Japanese make shoyu that is far better than Chinese shoyu, and many kegs of shoyu have been shipped to Batavia [Jakarta], India, and Europe. The Dutch in Japan discovered how to use heat to prevent over-fermentation of shoyu. They boiled the shoyu in an iron cauldron, then bottled it and sealed the mouth with painting pitch *(rekisei)*. Shoyu heat-treated in this way will retain its strength and can then be used in making various sauces.

Note: In various of the above reports, shoyu was written as Zoya or Soya; sake was written as Saky with an umlaut (2 dots) over the "y," and miso was written as Miso. These products were listed along with other Japanese goods. It is clear that these things were exported from Japan ports in India.

Also includes: Regulations of the Tokyo Shoyu Company (1881), p. 89-91. Address: Noda Shoyu, Noda, Japan.

847. Jelliffe, D.B. 1955. Infant nutrition in the subtropics and tropics. *World Health Organization Monograph Series (Geneva)* No. 29. 237 p. [313 ref]

• ***Summary:*** Contents: Introduction. 1. Evolution of infant feeding in the Western world. 2. Present infant-feeding practices in the subtropics and tropics. 3. Present status of nutritional disease among infants in the subtropics and tropics. 4. Methods of improving infant feeding in the subtropics and tropics. 5. Prevention of kwashiorkor. Acknowledgements. Annexes: 1. Summary of suggested methods of infant feeding in the subtropics and tropics. 2. Questionnaire for use in investigating methods of infant feeding. Illustrations. References. Index.

In the chapter titled "Prevention of kwashiorkor," pages 160-62 review and discuss the use of the soya bean to prevent protein deficiency in infant nutrition: (1) Soya-bean emulsion is "also known as soya 'milk.'" Work in the USA, Philippines, Hong Kong, Thailand, and Indonesia is discussed. (2) Soya-bean curd, "also known as soya 'cheese'" [tofu], is rich in calcium but is lacking in the vitamin-B complex. "Nevertheless, it can be an extremely valuable food, and, according to Platt (personal communication) is far superior to other soya products in infant feeding." (3) Fungus-digested soya beans or tempeh from Indonesia contains vitamin B-12 and is not expensive. It is very digestible and can be ground up and added to steamed rice for feeding older infants. (4) "Miscellaneous. Various other prepared soya products are of great nutritional value, but are probably unsuitable for infants." These include miso and soy sauce. "A simple method of preparation which requires further investigation is that of grinding the roasted beans into a flour, which can be added to gruels or soups. The roasted bean is certainly palatable but its digestibility for children is unknown, as is the effect of roasting on the trypsin inhibitor and on the amino-acid composition." Address: WHO Visiting Prof. of Paediatrics, All-India Inst. of Hygiene and Public Health, Calcutta. Formerly, Senior Lecturer in Pediatrics, University College of the West Indies, Jamaica. Nutrition Consultant, World Health Organization.

848. Noda Shoyu K.K. 1955. Noda Shôyu Kabushiki Kaisha Sanjugonen-shi [Thirty-five-year history of Noda Shoyu, Inc.]. Noda, Japan: Noda Shoyu K.K. 865 p. Illust. No index. 28 cm. [Jap]

• ***Summary:*** This is the second major history of Kikkoman, written largely by Mr. Morio Ichiyama. Concerning the Mogi Saheiji family line (p. 107): The third generation Mogi in this line started a shoyu brewing business in 1782. The trademark, first used in 1784, is identical to the Kikkoman trademark used today; it was designed by Manbei SARANUMA, who was a grain merchant. Earlier in 1784 another trade mark named Kikko-dai was used briefly.

In the section on exports (p. 560), subsection "Development of exports," it is written that shoyu was allowed to be exported during the period of Japanese isolation *(sakoku)* that started in the early 1600s (early Tokugawa period). According to Dr. Iwao, whose source of information was the Hague Library in the Netherlands *(Waran Haagu Bunshokan;* probably Nederlandse Vereiniging van Bibliothecarissen, Documentalisten en Literatuuronderzoekers (NVB)), in 1668 the Japanese sent 12 kegs of shoyu to Coromandel, India (a coast region of southeast India on the Bay of Bengal), in 1670 to the island of Ceylon, in 1677 to Coromandel again, in 1679 and 1681 to Surat in northwest India and to Coromandel, in 1681 to Tonkin (part of French Indochina from 1887, today in North Vietnam) where 10 kegs of shoyu were offered to both the ex-king and the vice-king, and in 1699 shoyu was shipped [by Dutch merchants] (together with sake and miso) to Ceylon, Bengal, and Nagapattinam (a seaport town in southeast Tamil Nadu, south India, on the Coromandel coast, 160 miles south of Madras). Shoyu was written as "Zoya" or "Soya." Sake was written as "Saky" with two dots over the "y." And miso was written as "miso." These exported products were sold at various places in India.

Pages 453-56 discusses the *Mankin Sangyotai* or *Bankin Sugiwai Fukuro* (1731 or 1732), noting that koji starter *(moyashi)* was now being made specifically for shoyu. Sake is made mostly during the cold season *(kanzukuri)*. Shoyu should be fermented during the summer *(dôyo shikomu)* and pressed at the end of fall.

Pages 529-30 discuss the size of the wooden kegs *taru* in which shoyu was shipped and retailed. During the Tokugawa or Edo period (1600-1868) the kegs typically had a capacity 8 *sho;* since 1 *sho* = 1.80 liters or 0.476 gallons, a

typical shoyu keg had a capacity of 14.40 liters or 8.568 gallons. And they typically contained 7.5 *sho* of high-class shoyu or 7 *sho* or regular/low-class shoyu. Starting in the year Meiji 1 (1868), a keg with 9 *sho* capacity was introduced. Then in Meiji 33 (1900) a larger size keg (called the *ô-dara-zumé)* was introduced; its capacity is not given. A keg of half this capacity (called the *ô-dara no handaru)* was also introduced. Contains many photos and illustrations.

Note 1. *Webster's New Geographical Dictionary* (1988) defines Coromandel Coast as a coast of southeast India from Point Calimere north to the mouths of the Krishna River. It has a low shoreline with no good harbors. The chief ports are Nellore, Madras, Pondicherry, Cuddalore, Tranquebar, and Nagapattinam.

Note 2. This document contains the earliest clear date seen (Jan. 2001) for soybean products (Japanese shoyu) in Ceylon (today's Sri Lanka; 1670), or Tonkin (today's North Vietnam; 1681); soybeans as such had not yet been reported. Address: Noda, Japan.

849. Rodrigo, P.A. 1955. Brief directions for growing soybeans (Leaflet). Manila: Philippine Dep. of Agriculture and Natural Resources, Office of Agricultural Information. 2 p. Revised ed. July 21. [Eng]

• ***Summary:*** The author concludes: "The soybean crop is ready to be harvested in 120 to 150 days after planting, depending upon the variety and the season when grown. For general purposes, the crop can be harvested when about 90% matured, especially when there is danger of bad weather. If intended for seeds, however, the crop should be thoroughly matured. In the absence of a binder the plants may be pulled off and tied into small bundles. These bundles may be set into stacks and threshed as soon as dry. The Japanese portable rice thresher is also an efficient soybean thresher. When there is danger of continuous rain the crop should be harvested and placed in the shade before it gets wet. At this stage, the soybean is easily spoiled; the beans rot with great rapidity. Soybean for seed purposes should be threshed as soon as practicable and the grains immediately and thoroughly dried. The seeds which should be completely air-dried are then stored in sealed containers. The straw and other by-products of threshing should be spread in the field for manurial purposes." Address: Chief, Horticulture Research Section, Bureau of Plant Industry, Philippines.

850. Sasmito, -. 1955. Pembuatan ketjap di Tanggerang [Making kechap in Tanggerang]. In: Pewarta Balai Teknologi Makanan IV, Th. I. Djakarta, Indonesia: Publikasi & Dokumentasi Djawatan Pertanian Rakjat. See p. 32-34. 25 cm [Ind]*

• ***Summary:*** Tanggerang (also spelled Tangerang) is a city in Banten, Indonesia, located about 20 km west of Jakarta. An industrial and manufacturing hub on Java, it is home to over 1,000 factories. Address: Indonesia.

851. Wilkinson, Richard James. 1955. A Malay-English dictionary (Romanised). 2 vols. London: Macmillan & Co. Ltd.; New York: St. Martin's Press. 26 cm. *

• ***Summary:*** "The Indonesian word for soya bean is *kedelai* (from Tamil)." Note: Antoinette Jones (1976 thesis) states that she has not found any mention of the word *kedelai* in Old Javanese inscriptions of the tenth century. Richard James Wilkinson lived 1867-1941.

852. Baens-Arcega, Luz; Marañon, Joaquin; Palo, Macario A. 1956. Proteolytic enzyme from a Philippine strain of *Aspergillus oryzae* (Ahlburg) Cohn. *Philippine J. of Science* 85(2):189-201. June. [7 ref. Eng]

• ***Summary:*** Strains of the mold *Aspergillus oryzæ* are used in Japan to make shoyu, miso, mizuame [rice syrup], and sake, and used in the manufacture of commercial enzymes such as Takadiastase, Polyzyme, Digestin, Oryzyme, and Kasiwagidiastase.

The authors isolated several protease-forming yellow-green molds. By repeatedly culturing the isolates in copra meal and rice bran media, one was found to produce protease of excellent digestive potency as evaluated by the Oshima and Church method. Optimum temperatures for protease production was 27ºC in copra meal and 22 to 27ºC in rice bran.

"The potency produced by the Philippine strain of *A. oryzæ* in copra meal is 3 times that of the most efficient *A. oryzæ* and 2 times that of the *Aspergillus effusus* type cultured in wheat bran by Oshima and Church." Address: Inst. of Science & Technol, Manila, Philippines.

853. **Product Name:** Nutribean (Soybean cocoa).
**Manufacturer's Name:** Manufacturer unknown.
**Manufacturer's Address:** Philippines.
**Date of Introduction:** 1956. July.
**Wt/Vol., Packaging, Price:** Can.
**New Product–Documentation:** Felix A. Pineda. 1956. Agricultural and Industrial Life (Manila) 18(July):8. "The economic value of soybeans and its manufacture for food products." The author is apparently a sugar agronomist, apparently in the Philippines. On page 8 he states: "The soybean cocoa is commercially sold in tin cans as Nutribean. One spoonful of nutribean dissolved in one cup of soyalac, or hot water and milk makes a nutritious and delicious drink in the morning and afternoon."

854. Pineda, Felix A. 1956. The economic value of soybeans and its manufacture for food products. *Agricultural and Industrial Life (Manila)* 18(June):8-9, 30; 18(July):8-9, 37.

• ***Summary:*** Contents: Introduction. Economic food value of soybeans. The manufactured food products from soybeans and their utilization. Methods of food preparation from soybeans: Soybean-rice, Soyalac or soybean milk, soybean cheese [fermented] or cheap meat, soybean cocoa or Nutribean, soybean coffee, toyo sauce or toyo [includes detailed instructions for making this Philippine-style soy sauce], salted beans or tau-si, "soybean flour or soyaflour," soybean sprouts, dried and green beans ("The green soybeans with pods can be used for gulay, like the green mongo."). Conclusion and recommendation.

"Soybean milk" is suitable for the diabetic. Its food value approaches cow's milk.

Note: This is the earliest English-language document seen (Oct. 2001) that uses the word "soyaflour." Address: Sugar Agronomist, Philippines.

855. Platt, B.S. 1956. The soya bean in human nutrition. *Chemistry and Industry (London)* No. 32. p. 834-37. Aug. 18. [25 ref]

• ***Summary:*** The author worked in China during the period in 1933-37, and there had "some experience of preparations made from the soya bean in infant feeding; also rarely a day passed in that period when I did not eat something of one or more of the Chinese soya bean food products–sauce, oil, bean curd or sprouts."

The author gives figures to refute the common misconception that "millions of Chinese have lived for centuries on a diet of rice and soya beans. For example (according to Buck 1938) in northeast China (Manchuria) where soya beans were used most, "very little rice was eaten, 25% of the calories in the diet came from wheat, and 5% from the soya bean... Only 2% of the calories in the Chinese farm diet were derived from vegetable oils which included oils from groundnuts, rape seed, sesame, and soya bean; the first three together occupy rather more than the acreage under soya bean crops. Learmonth (1956, p. 360) has stated that the soya bean has only been grown as an oil-bearing crop since the 19th century. There is, however, a Chinese work dated A.D. 1637 called 'The exploitation of the works of nature,' the second volume of which is devoted to oils and fats. From this work it may be deduced (according to information supplied by Dr. G.D. Lu) that the soya bean was grown for its oil as early as the third century A.D. According to Buck's data on most frequent yields, broad beans and field peas yield on average 18 bushels per acre compared with 14 bu/acre for soya beans. Peanuts or groundnuts give 64 bu/acre but it is not clear whether they are shelled or not.

"Anyone who, at a Buddhist feast, has eaten the delectable dishes made from the soya bean cannot but agree that, gastronomically, the merits of a wide range of soya bean products are outstanding. The 'vegetable' varieties of soya bean are, in fact, often simply immature ones. They are green and look like young lima beans but they have a richer and a distinctive and more delicious flavour... Soya bean curd (tou fu) is used in a variety of dishes. It is prepared from the mature beans, not usually in the home, but by the village 'specialist.'... With appropriate culinary treatment, it can be made to imitate a variety of meat dishes; traditionally it is given to young Chinese children."

The author also discusses soy sauce, tempeh, soy oil, and soya "milk".

"I recently had a visit from a professor of pediatrics at a hospital in Djakarta [Jakarta], Indonesia, who reported that about 50 infants put on a soya milk preparation, *all,* after two months, had some gastro-intestinal disturbances; none of them was thriving. In my view, it is still too early to replace human milk for infants and certainly not by a vegetable substitute for animal milk...

"In my own experience soya bean curd is a suitable product for feeding young children and I suggest that its superiority over soya milk may be the separation in the 'whey' of substances that have been shown to be toxic for animals.

The contents of this paper were first presented as a contribution to the discussion on "Soya in the Field of Nutrition" by E.M. Learmonth, published in *Chemistry and Industry* on 12 May 1956. The author mentions an ad for "Sun Spot" soya milk.

The article begins with a poem written by "a medical nutritionist and his wife": "'Little Soybean who are you / From far off China where you grew?' / I am wheels to steer your cars, / I make cups that hold cigars. / I make doggies nice and fat / And glue the feathers on your hat. / I am very good to eat, / I am cheese and milk and meat. / I am soap to wash your dishes, / I am oil to fry your fishes, / I am paint to trim your houses, / I am buttons on your blouses. / You can eat me from the pod, / I put pep back in the sod. / If by chance you're diabetic / The things I do are just prophetic. / I'm most everything you've seen / And still I'm just a little bean.'"

Note: This poem, written by Dr. and Mrs. J.W. Hayward, was first published in the *Proceedings of the American Soybean Assoc.* 1940. Aug. p. 6. Address: C.M.G., Ph.D., M.B., Ch.B., Human Nutrition Research Unit, Medical Research Council Laboratories, Holly Hill, London, N.W. 3.

856. Solpico, F.O.; Torres, J.P. 1956. Contribution of the agronomy horticulture division for the last twenty years. Two-and-a-half decades of public services to Philippine agriculture. Manila: Bureau of Printing. *

• ***Summary:*** "In 1939, improvement of promising varieties through hybridization was initiated by the BPI [Bureau of Plant Industry] with the use of introduced varieties: Dunfield, Yellow Biloxi, Bilomi 1 & 3 (Ami x Yellow

Biloxi) and Bilofield (Yellow Biloxi x Dunfield). The first two hybrids had superior protein and oil contents."

857. Chen, Philip S.; Chen, Helen D. 1956. The work of Dr. Harry Miller with soy milk (Document part). In: P.S. Chen and H.D. Chen. 1956. Soybeans for Health, Longevity, and Economy. South Lancaster, Massachusetts: The Chemical Elements. 241 p. See p. 14-15. [24 ref]

• ***Summary:*** Chapter 1, "Protein," begins: "The soybean is best known for its high protein content (p. 7). It then discusses the work of Dr. Harry Miller (p. 14-15): "The one who has done more with soy milk than any one else is Dr. Harry W. Miller, Director of Research, International Nutrition Research Foundation. He began his work with soy milk shortly after 1925 when he was in China as a medical missionary and saw the need of making a preparation for the feeding of babies and children. Referring to his work with soy milk, he said,'I regarded that work as of far greater importance than the building up of the sanitarium because it had to do with the preservation of thousands of lives that otherwise would be lost if they did not have a proper substitute for mother's breast milk, because cow's milk is beyond the economic level of the Chinese people and almost all the Oriental races. We used this milk extensively and a long period of experimental work was carried on. Studies were made of the development of babies and children as to their weight gains, their height gains, their disposition, their skin texture, their hair development, their dentition and bone development. We finally published the article in the Chinese Medical Journal in 1937.'

"Dr. Miller was the first to put out a true soy milk, one that is homogenized and built to any formula. Finally he made it into a powdered milk by spray drying. Both 'Soyagen' and 'Soyalac,' which he perfected according to his patented process, are now widely used by infants and children who are allergic to cow's milk, as well as by grown-ups who prefer a vegetarian diet.

"Besides his factory in this country, Dr. Miller has established soy milk plants in Japan and Formosa [Taiwan], and has helped the United Nations build a plant in Indonesia. His formula is used by three large soy milk companies in Hong Kong, one of which puts out 75,000 bottles a day." Address: 1. Prof. of Chemistry, Atlantic Union College, South Lancaster, Massachusetts; 2. National Science Foundation Fellow, Cornell Univ.

858. *Overseas Food Corporation, Annual Report and Statement of Accounts.*1956. For the year ended 31 March 1955. 183 p.

• ***Summary:*** Soya beans are discussed throughout this report from Tanganyika. At Urambo (p. 7-8) in 1953-54, 98 tons of soya beans were produced. Acreages of soya planted at Urambo by year were: 1951-52–2,561 acres; 1952-53–1,035 acres; 1953-54–602 acres; and 1954-55–341 acres. "In view of the failure of this crop during the previous year it was only planted for local consumption."

At Nachingwea, located in the Southern Province of Tanganyika, the main variety planted was Dixie, but one farm grew Hernon 247. The average yield in 1953-54 was 430 lb/acre, but the highest yield was 658 lb/acre. Acreages of soya planted at Nachingwea by year were: 1950-51–218 acres; 1951-52–468 acres; 1952-53–3,089 acres; 1953-54–2,388 acres; and 1954-55–1,402 acres.

In the chapter on "Cropping," pages 76-79 discuss the following about soya beans: Introduction ("The results obtained from this crop at Urambo and Nachingwea have been somewhat disappointing"), soil preparations, time of planting, method of planting, fertilizing, cultivation, harvesting, pests and diseases.

The chapter on "Scientific and Experimental Work" has a section on soya (p. 127-29) including agronomy, soil fertility, and pests and diseases. In 1948 a wide variety of soya bean varieties were tested at Kongwa and Urambo. In 1951 and 1951 the best yields were obtained from the variety Malaya (1,637 lb/acre at Urambo). American varieties grew 6-8 inches high and yielded poorly; this was considered to be a response to tropical day length which is short in comparison with that of summer days in the regions of the USA where soya is grown. Two Batavian varieties [from Indonesia], however, grew 18 inches high and then flowered all down the stem. Their yields were not very high (500-840 lb/acre), but were considered promising. Varieties introduced from the Philippines, Rhodesia, and Nigeria showed more promise, especially at Urambo.

Pages 179-83 give economic data on soya beans. They are one of 2 crops that come nearest to complete mechanization. But because of low yields, and difficulties in cultivation and harvesting, they cannot yet be grown at a profit. The report also discusses cultural practices of peanuts, and other crops. Weed control, disease control, and yields of peanuts are also discussed. Address: Dar-es-Salaam, Tanganyika.

859. Soetan, Sanif. 1956. Kedelai [Soybeans]. Jakarta: Dinas Penerbitan Pustaka. 23 p. [Ind]

• ***Summary:*** Contains descriptions of the preparation of tempeh, tautjo (Indonesian-style miso), ketjap (soy sauce), and tahu (takoa; tofu).

Note: This is the earliest English-language document seen (Feb. 2009) that uses the word "tautjo" to refer to Indonesian-style miso. Address: Indonesia.

860. Vialard Goudou, A. 1956. Recherches sur quelques plantes alimentaires du Sud Viet-Nam et de l'Asie tropicale: Soja [Research on some food plants of South Vietnam and tropical Asia: Soya]. PhD thesis in science, Bordeaux. See p. 67-68, 134-35. [Fre]*

• ***Summary:*** Lots about Vietnamese soyfoods. Address: Bordeaux, France.

861. *Soybean Digest.* 1957. Soybean Lab in study of tropical plants. May. p. 35.
• ***Summary:*** Nine species of tropical plants closely related to soybeans are being studied at the University of Illinois by research workers at the U.S. Regional Soybean Laboratory. Most of the plants are perennial vines. A photo shows Richard Bernard examining one of the plants. The plants, which have come from the Belgian Congo, South Africa, Southern Rhodesia, Kenya, Nigeria, Australia, Formosa [Taiwan], and Malaya, may have disease resistance that might be bred into regular soybeans. The leaves and flowers of these plants are similar to those of regular soybeans. The seeds form in pods but are much smaller than regular soybeans.

Note: These are probably wild perennial Glycine species.

862. Walley, Ersel. 1957. Soybeans around the world. It would take 400 million bushels of soybeans to meet minimum needs of babies and growing children alone in the Orient. *Soybean Digest.* Sept. p. 30-32.
• ***Summary:*** The author made a world tour studying soybeans, including visits to Hawaii, Japan and other parts of Asia, and Italy. He studied production of soy milk in Taiwan, Hong Kong, and Bangkok (Thailand). In Taiwan he visited a soya milk plant which was established "by our good friend and American Soybean Association pioneer, Dr. H.W. Miller. In Hong Kong, the 'peek hole' and gap in the Bamboo Curtain, we found many small soya food producers and no doubt the largest and most successful soya milk plant to be found anywhere [Hong Kong Soya Bean Products Co. Ltd., makers of Vitasoy]." Hong Kong is the place where competition between soybeans from Red China and the USA is said to meet head-on. "May I voice my conclusion that Red China needs in its domestic economy more soybeans than it can possibly produce.

"A trip to southeastern and south Asia included good and sufficient visits to Thailand (Siam), Burma, India, and Pakistan. Of these countries, Pakistan is the only one that has soybean production of mention and here the total production is less than 1 million bushels per year."

A photo shows Walley. Address: Part president and chairman of Market Development Committee, American Soybean Assoc.

863. *Manchester Guardian (England).* 1957. Bean curd maker sentenced. Nov. 2. p. 5.
• ***Summary:*** Ipoh [Malaysia], Nov. 1–"Chay Mun (64), a bean curd maker, was to-day sentenced to five years' imprisonment for having coffee powder 'which raised a reasonable presumption that it was intended for terrorists.'

Mr. Justice Shepherd in the High Court told him he was an enemy of society. The coffee powder was found wrapped in paper inside a bucket of cement on his bicycle–Reuter.

Note: Malaysia attained independence from British colonial rule in 1956-45. The terrorists referred to here were the Communists.

864. Masefield, G.B. 1957. The nodulation of annual leguminous crops in Malaya. *Empire J. of Experimental Agriculture* 25(98):137-50. [4 ref]*
• ***Summary:*** In a 1956 trial, the degree of nodulation of soybeans and other crops growing in ordinary soil was very low compared with legumes in the temperate zone, and low compared with the same crops growing in some other tropical countries. Much higher weights and numbers of nodules were attained where these crops were growing in soils with a high water table.

865. **Product Name:** Saridele (Spray-Dried Soymilk with Sesame).
**Manufacturer's Name:** Saridele Ltd. (Sarihusada Co. after 1964).
**Manufacturer's Address:** Yogyakarta, Java, Indonesia.
**Date of Introduction:** 1957.
**Ingredients:** Soybeans (made into soymilk), dehulled sesame seeds, cane sugar and/or corn malt, vitamin A, calcium carbonate, ascorbic acid, vitamin B-12, vanilla and/or chocolate.
**Wt/Vol., Packaging, Price:** 10 kg or 1 lb cans, or 250 gm polyethylene bags.
**How Stored:** Shelf stable.
**Nutrition:** Per 100 gm.: Protein 30 gm, fat 22 gm, carbohydrate 40 gm, ash 5 gm, moisture 3 gm, calcium 450 mg, iron 3.7 mg, vitamin A 2000 I.U., thiamine 0.7 mg, riboflavin 1 mg, ascorbic acid 15 mg, vitamin B-12 1 mcg. The PER is 2.48 versus 2.80 for cow's milk.
**New Product–Documentation:** Indian Council of Medical Research, Special Report Series No. 31. 1955. p. 3. "Recently, the F.A.O. and the UNICEF have jointly initiated a programme in Indonesia for the large-scale production of a properly fortified soya milk chiefly for use in feeding infants and growing children. This project is largely based on a process developed under the auspices of the Food Ministry and the Indian Council of Medical Research in India."

Saridele Ltd. 1958. Saridele leaflet. FAO Nutrition Meetings Report Series. 1959. No. 22. Report on the FAO-UNICEF Regional School Feeding Seminar for Asia and the Far East.

G.C. Mustakas et al. 1964. "Production and nutritional evaluation of extrusion-cooked full-fat soybean flour." *J. of the American Oil Chemists' Soc.* Sept. p. 613. "Proposed Clinical Testing. A 1,000-lb lot of the milled soy flour has been forwarded to the P.N. Sarihusada Co., Jogjakarta,

Indonesia, where it will be formulated and packaged for acceptability testing in the areas now supplied by the plant with the dried water-extracted soya milk formulation. Clinical and acceptability

Belden, et al. 1964. The Protein Paradox. "The other approach is the Saridele project in Indonesia, which we include primarily because it is frequently mentioned when protein-rich food projects are discussed, being one of the older projects" (p. 53). "One of the longest developing projects has been that of Saridele, a soy-flour based product in Indonesia... After the Second World War, the Indonesian government became interested in the manufacture of soymilk on a more efficient basis, since soybeans were available in the country and cow's milk supplies were very limited. In 1952 FAO sent to Indonesia Dr. S.S. De, who had been working in India on a more palatable soymilk product that incorporated peanut and malt. Dr. De recommended testing a mixture of soymilk, peanut milk, and malt in Indonesia. To avoid the association with milk, the name Saridele (meaning 'essence of the bean') was selected for the mixture in Indonesia.

"After testing a mixture made from 60% soybeans, 20% peanuts, and 20% malt on 240 children, Dr. De suggested that FAO and UNICEF provide assistance for a Saridele plant in Indonesia, with UNICEF supplying the equipment. The FAO sent experts to Indonesia for further study of the problem and pilot plant experiments were undertaken in Holland and the United States to develop the spray-drying manufacturing process. A plant was finally built in Indonesia with UNICEF's assistance and it went on-stream in the middle of 1957. Since then there has been continual study of the process along with development of new formulations.

"The process produces a fairly expensive product of high nutritive value... Unfortunately, the retail price is too high for those needing it most" (p. 57). This comment presumably refers to the original process and ingredients. The new dry process and reduction of sesame may lead to a decrease in price. "Saridele has been developed in Indonesia using the traditional method of water extraction... It sells for about 50 cents a pound, a rather expensive product. The Indonesian plant, which has a capacity of about 1 ton per day, used sesame seed along with the soy initially. Only soy is used today because the sesame seed's contribution to the biological value of the product was not worth its additional cost. The process does not appear suited for broad application because of its high cost" (p. 70).

Orr and Adair. 1967. Tropical Products Institute Report G-31. "The production of protein foods and concentrates from oilseeds." p. 69. Manufacturer: P.N. Sarihusada, Jogjakarta, Indonesia. "Date of Start of Production: 1957. Form of Product: Soya 'milk,' spray dried. Sold unflavoured for use by infants and young children, and flavoured with vanilla and chocolate for use by adults. Intended to be used as a beverage, after reconstituting with water, as a replacement for conventional soft drinks. Can also be used in powder form as a replacement for 'sagon,' a local food-stuff."

"Form of Packaging: (a) Originally packed in cans of 10 kg and 1 lb capacity but now part of the production is sold in 250 gm capacity polyethylene bags. (b) Shelf-life of product: 2½ years in cans and 3-4 months in bags. Channels of Distribution: 75 per cent retail trade; 25 per cent institutions. Assistance from Government/International Agencies: (a) The Government supplied the land and buildings for the factory and has undertaken to buy 300 tons of the product per year and distribute it free through institutions. (b) International agencies have been closely associated with the project from its inception. UNICEF donated some of the machinery and equipment and FAO provided technical experts to put the plant into operation and train staff. Promotion: There has been a considerable promotional effort over the years, particular emphasis being placed on offering samples at reduced prices to the public at exhibitions, etc. Promotion is estimated to cost about 3 per cent of total annual sales value. Trend in Consumption: Rising: arrangements have been made to expand production. Profitability: Satisfactory. Problems: Processing problems (see below): initially consumer prejudice, which the practice of giving low-priced samples has helped to rectify; and the high cost of cans which are made from imported tin plate and which were said at one time to account for 25 per cent of the retail price.

"The process used originally for making the product was basically the traditional Oriental one, although the product was spray dried and sold as a powder, not in liquid form. It is understood that the process has now been altered... to a 40 per cent increase in the utilisation of the bean and to the elimination of the 'beany' taste, it may be that the Oriental process is no longer used. It is also said that the new process reduces equipment requirements considerably... 'Saridele' was originally made from 4 parts soya bean and one part sesame seed, but the latter was found to be too expensive. 'Saridele' appears to have 2 distinct markets: as a food for infants and young children and as a soft drink for adults. The chocolate flavoured product is the more popular and it is believed that this is partly due to the high prestige value of chocolate in Indonesia where its high price limits its use by low income groups."

De 1971; E. Orr. 1972. Tropical Products Inst. G73. The use of protein-rich foods for the relief of malnutrition in developing countries: an analysis of experience. p. 13; Steinkraus 1976;

Shurtleff & Aoyagi. 1979. Tofu & Soymilk Production. p. 197-98, 228. "Production was discontinued in 1966 because of the irregularity of soybean supply and marketing

and equipment problems." Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 108.

Note: This is the earliest known commercial soy product made in Indonesia. However tofu, tempeh, soy sauce, and other soyfoods had been made and sold by cottage industries in Indonesia for many centuries prior to this time.

866. Rawi, I. el; Shihombing, G. 1957. Cassava-soya food formulas. Djakarta: Lembaga Rakjat. *

867. Sebrell, W.H., Jr.; Hand, D.B. 1957. Protein malnutrition as a world problem. In: William H. Cole, ed. 1957. Amino Acid Malnutrition. 13th Annual Conference on Protein Metabolism. New Brunswick, New Jersey: Rutgers Univ. Press. xi + 98 p. See p. 47-59. Illust. 24 cm. Held at Rutgers, New Jersey. Series: Annual Conferences on Protein Metabolism. [14 ref]

• ***Summary:*** Contents: Introduction. Amino acid deficiencies. Kwashiorkor. World food production. New dietary preparations.

This is about kwashiorkor and world protein malnutrition. We increasingly recognize the importance of good nutrition to health and well being. "There are still only a relatively few people in the world, however, who understand that the food supply must do more than satisfy hunger if normal child development is to take place and health is to be maintained. The world's agriculture is still mainly concerned with crop yields in bushels or tons per acre and with price per unit of weight rather than with nutritional needs and nutritive values. Citrus fruits and tomatoes are neither produced nor sold on the basis of their vitamin-C content" (p. 47).

"Kwashiorkor has so captured the medical and scientific attention in the past few years that there is a tendency to assume that kwashiorkor and protein or amino acid deficiency are completely synonymous. This is not the case. Kwashiorkor is one form of protein malnutrition" (p. 48).

"The modern world's nutrition is based largely on a few staple foods... the principal ones are wheat, rice, corn, millet, and cassava. Cassava ranks second only to rice in the amounts consumed in the underdeveloped areas of the world as a staple food and source of calories and it is without a doubt the poorest in nutritive quality" (p. 49).

Table 7 shows "Production of protein-rich plant foods in selected countries" in 1,000 metric tons (Source: Yearbook of Food and Agricultural Statistics, FAO, 1956). Major producers of soybeans among developing countries are Indonesia (400), Brazil (113), and Turkey (4).

"Therefore it would appear that the answer to the world's protein supply must be sought in animal products, pulses, and oil seeds" (p. 54). Table 9 shows the "Protein and calorie content of selected supplemental foods" of these three types." Under oil seeds are listed soybean seeds (34.9% protein) and soybean flour (38.4% protein). Table 10 shows the "Essential amino acid content in selected foods," including soybean meal and soybeans (Laredo variety).

The author's conclude that the United Nations Children's Fund (UNICEF), the Food and Agricultural Organization (FAO), and the World Health Organization (WHO), all agencies of the United Nations, "working in close cooperation, can bring to bear on the problem of protein malnutrition, talent and resources that have never been available before" (p. 59).

Note: By about 1979 the idea that the world's food problem was primarily a protein problem had been largely disproved and abandoned. The main cause of malnutrition was now poverty and lack of food. Address: Williams-Waterman Fund for the Combat of Dietary Diseases.

868. Boedijn, K.B. 1958. Notes on the Mucorales of Indonesia. *Sydowia (Annales Mycologici)* 12(1/6):321-62. March 25. [101* ref]

• ***Summary:*** Gives details with illustrations on many Rhizopus species of molds including *Rhizopus oligosporus* Saito (which in Bogor can always be isolated from tempeh, and can also be isolated from "Bungkil" (cattle cakes) and fermenting tobacco), *Rhizopus stolonifer, Rhizopus chlamydosporus,* etc. Address: s'Gravenhage, Netherlands.

869. *USDA Plant Inventory.* 1958. Plant material introduced January 1 to December 31, 1953 (Nos. 204341 to 212042). No. 161. 299 p. April.

• ***Summary:*** Soybean introductions: *Glycine max* (L.) Merrill. Fabaceae.

204651-204653 (p. 17). "From Germany. Seeds presented Plant Breeding Institute, Weihenstephan bei Freising. Received Jan. 13, 1953." Varieties: Dieckmann's Heimkraft. Von Burklin-Wolf's Wachenheimer. Strengs Weihenstephaner Schwarze.

205083-205092 (p. 32). "From Israel. Seeds presented by the Ministry of Agriculture and Development, Agricultural Research Station, Rehovoth. Received Feb. 2, 1953." Names of varieties [all having Japanese names]: Akasaya, Ginshiro, I-Higo-Wase, Kumusume-Sai-I-go, Naruto-Hadaka, Norin-I-go, Norin-II-go, Sango-Waso, Shiro-Daizu, Shirohana-Sai-I-go.

205384 (p. 45). "From Pakistan. Seeds presented by the American Embassy, Karachi. Received Feb. 16, 1953."

205899-205915 (p. 63). "From Thailand. Seeds presented by the American Embassy, Bangkok. Received March 10, 1953. Varieties: Laheng. Lobpuri. Ma Kam Lung A. Ma Kam Lung B. Ma Kam Lung C. Mae Rim. Mae Tang. Ringgit No. 317. San Patong Tung Farbut. Sri Samrong. Sumbing No. 452. Taklee. Tung Tam. USA-ARD-A. No. 27. No. 29. No. 520.

206258 (p. 75). "From the Philippines. Seeds presented by H.K. Hayes, University of the Philippines, Laguna. Received Mar. 23, 1953." Variety: Headgreen.

207643 and 207644 (p. 123). "From the Philippines Islands. Seeds presented by Ivan H. Miles, Manila. Received Apr. 16, 1953. Varieties: No. 1. No. 2.

207654 (p. 124). "From the Philippines Islands. Seeds presented by the Director of Plant Industry, Bureau of Plant Industry, Manila. Received Apr. 17, 1953. Varieties: Bilomi No. 3.

20823 and 20824. "From Colombia. Seeds presented by the Universidad Nacional, Palmira. Received May 5, 1953. Varieites: Aksarben, Java.

208429-208440 (p. 156-57). "From Nepal. Seeds collected by G.V. Bowers and Goran Knutsson, TCA, Kathmandu. Received May 12, 1953." Descriptions of varieties: Black from Kathmandu Valley, Black from Marysyandi Khola, Brown from Thonje, Chocolate brown early variety from Kathmandu Valley, Chocolate brown late variety from Kathmandu Valley, White late variety from Kathmandu Valley, Mixed from Nalma (2), From Pokhara (4=No. 9-12). 208781-208789 (p. 168). "From Japan. Seeds presented by the Hyogo Agricultural College, Sasayawa. Received May 22, 1953. Varieites: Akazaya. Gin-Daizu. Kaikon-Mame. Kiyozi. Kosa-Mame. Tamanishiki. Tanbba-kuro-daizu. Tookichi. Zyuninyoshi.

209331-209340 (p. 191). "From Japan. Seeds presented to Tomio Nakane, Sapporo, Hokkaido. Received June 16, 1953." No. 1 through No. 10.

209831-209839 (p. 210). "From India. Seeds presented by G.V. Bowers, American Embassy, New Delhi. Received May 12, 1953." Selections made at the Bureau of Plant Industry, Soils, and Agricultural Engineering, Beltsville, Maryland, gave seeds that were brown, green, yellow, and black.

209908 (p. 213). "From the Union of South Africa. Seeds presented by A. A. Pitout, Nylstroom, Transvaal. Received Aug. 12, 1953." Variety has no name.

209940 (p. 214). "From India. Seeds presented by Krafft Freiherr v. Crailsheim, Jr., Amerang, Bavaria, Germany. Received Aug. 1953." One variety, unnamed. "Grown at Darjeeling, Bengal."

210016-210027 (p. 218). "From India. Seeds collected by Walter N. Koelz, Agricultural Explorer, Buraeu of Plant Industry, Soils, and Agricultural Engineering, Beltsville, Maryland. Received Aug. 26, 1953. From Kolasib, North Lushai Hills, Assam." Variety No. 210022 is local No. 11808.

210162-210164 (p. 224). From Burma. Seeds collected by Ishom Deshotels, American Embassy, Rangoon. Received Sept. 15, 1953." No. 1, No. 2, No. 3.

210178-210181 (p. 224). "From Taiwan. Seeds presented by Chia Huang, Ithaca, New York. Received Sept. 18, 1953." Two varieties: Seedcoat black. Seedcoat yellow.

210348-210353 (p. 229). "From Mozambique. Seeds presented by Reparticao Tecnica de Agricultura, Lorenco Marques. Received Oct. 7, 1953." Names of varieties: Dr. Sander's Soja, Jubiltan 65, Jubiltan 67, Jubiltan 77, Mammoth Yellow, Potchefstroom 184. Note: This entry shows that soybeans were in Mozambique by 7 Oct. 1953. They were probably being cultivated in Mozambique by that time, but we cannot be sure. Address: Washington, DC.

870. Miller, Harry W. 1958. Soybeans meeting nutritional needs in undeveloped countries. *Soybean Digest.* Sept. p. 68-73.

• ***Summary:*** Photos show: (1) Dr. Miller. (2) A "factory at Jogjakarta in central Java that produces a ton of soy milk [Saridele] every 7 hours. It is a cooperative venture between FAO, UNICEF, and the Indonesian government. Construction was supervised by H.W. (Bill) Miller, son of the author."

871. Nagata, Tadao. 1958. Studies on the flowering and fruiting of summer vs. autumn soybean types. V. Effects of the day length after flower primordia initiation upon the flowering process with reference to the adaptation to planting time in autumn soybean type. *Nippon Sakumotsu Gakkai Kiji (Proceedings of the Crop Science Society of Japan)* 27(1):87-90. Sept. [11 ref. Eng; jap]

• ***Summary:*** Adaptation of soybean to planting time has been of great interest to human beings since ancient times, when it was discussed in the *Lu-shi chun tsiu* (ca. 250 B.C.).

"In the temperate zone of Asia such as Central and South China and South Japan, the differentiation between summer vs. autumn soybeans–the former is a short season crop planted in April, and the latter a full season crop planted from June to July–is a well known fact as recorded in many old documents in China, such as *Ch'i-min yao-shu,* and *Tien-kung kai-wu,* and in Japan, such as *Nogyo zensho, Seikei zusetsu* and *Honzo zufu."*

The author has already reported the following: (1) For autumn soybean types, the variation of seed yield corresponding to a given planting time depends on the flowering process rather than on the ratio of pods to flowers. (2) Autumn soybean types had more flowers of moderate duration when they were planted in June, but fewer flowers that were too long in duration when they were planted in April.

In this experiment a typical autumn soybean type (also called a "late flowering soybean"), Akazaya-shirodaizu, belonging to class VII, was planted on May 5 in 1954 and April 25 in 1955. Some plants were given short day treatment before and after flowering primordia initiation. The author found an important new relationship between the planting time and the day length after flower primordia initiation. He found that the day length after flowering primordia initiation controls the flowering duration and the

**HARRY WILLIS MILLER HONORARY LIFE MEMBER 1958**

Dr. and Mrs. Miller and Madam and Generalissimo Chiang Kai-shek.

Dr. H. W. Miller in Libya, 1957.

number of flowers per day. If the autumn soybean in planted at the proper time, it will bear abundant flowers in a comparatively short duration and have a high seed yield. Thus planting time is the key to high yield and this is primarily a phenological response to the variation in day length. Address: Hyogo Agricultural College, Japan.

872. *Soybean Digest.*1958. Harry Willis Miller honorary life member [of American Soybean Association] 1958. Sept. p. 10-11.

• ***Summary:*** "Dr. Harry Willis Miller, director of the international Nutrition Research Foundation [INRF], Arlington, California, was born 79 years ago in Ludlow Falls, Ohio. Although renowned as one of the world's leading thyroid surgeons, he also has spent many years in soybean research and has done much to perfect and promote soybean food products on the American market.

"As a medical missionary sent to pioneer the work of Seventh-Day Adventists in China from 1903 to 1911, he wondered how he could aid the millions of undernourished Cbinese children–hundreds of infants dying daily from malnutrition.

"After years of investigation and practical experimentation with one of the most staple foods in China, he discovered a method of 'milking' soybeans and perfected a palatable formula suitable for both infants and adults.

"The response to the product was spectacular. To meet the immediate demand machinery was shipped to China, and under Dr. Miller's management the first modern vegetable milk plant in the world was put into operation. Until the outbreak of war in Shanghai in 1937, fresh soybean milk was delivered daily to hundreds of homes in Shanghai.

"For the service he rendered to the people of Free China in saving the lives of countless thousands of infants with the use of soybean milk and for his untiring efforts in establishing a dozen or so sanitariums-bospital clinics in the Orient, he has received National China's higbest bonor. In 1956 Dr. Miller was decorated witb the Brilliant Blue Star by Generalissimo Chiang Kai-shek bimself.

"Although Dr. Miller has certificates to practice medicine in nine of the 49 states and 11 foreign countries, and even at his age retains a steady hand for surgery cases,

he continues to devote much time to the development and perfection of soybean foods.

"Despite his full life as a general medical practitioner, and many years spent superintending numerous Chinese sanitarium-hospitals, serving as president of the Seventh-Day Adventist mission in prewar China, managing and editing the Chinese Signs of the Times, authoring many medical books and articles and lecturing around the world, he has managed to continue his soybean research and experimentation whatever his location.

"From 1939 to 1950, while medical director of the Mount Vernon, Ohio, sanitarium and hospital, he opened a research laboratory where he developed a new improved soy milk, soy-olive sandwich spread, and numerous other nutritious foods made from soybeans and grains, and initiated the International Nutrition Laboratory of America which later became the INRF which he has heavily endowed.

"In 1951 he sold his growing soybean food industry to the Loma Linda Food Co. and came to Arlington, California, where he now makes his home and spends as much time as possible in the new laboratory placed at his disposal by Loma Linda. Two years ago, the World Health Organization became interested in Dr. Miller's progress in developing a superior soy milk and modeled a million-dollar factory in Indonesia after the Loma Linda food factory which he had pioneered in Mount Vernon, Ohio. At the present time WHO is also providing $30,000 for an intensive 2-year infant nutrition research program at a leading U.S. hospital using his soy milk formula.

"Since his appointment as director of the INRF, has laboratory and experimental work have been frequently interrupted to answer please for help from his medical colleagues in foreign lands. From 1954-1956 he went to Penang [Malaysia] and Formosa to serve as medical director and surgeon for the hospitals there, took a similar post for 2 months in Trinidad in 1956, another in Libya in 1957, and he is now filling the post of medical director and surgeon at the Tokyo Sanitarium-Hospital in Japan during a 6-month leave of absence by an SDA medical-missionary.

"Despite his present busy daily routine at the sanitarium he is continuing his work with soybeans and has a nearby tofu shop deliver soy milk daily to the sanitarium in 5-gallon containers. Since his arrival he has introduced soy whipping cream for daily use at the sanitarium and routinely prescribes soy milk to allergic Chinese infants. He writes that he was surprised to find that the soy milk he helped perfect for the Loma Linda Food Co. is now obtainable by military personnel at the U.S. army post exchanges in Japan.

"While other men have rightly taken up golf, fishing, or other hobbies, Dr. Miller has devoted most of his spare time to research and development of vegetable foods. 'Soybeans have been my lifetime hobby,' he declares. Small wonder he is known from East to West as the man who gets 'milk from an iron cow.'

"Over the years Dr. Miller has been among the most active supporters of the American Soybean Association. He was chosen an honorary life member of the Association at the Des Moines convention. The award was made in his absence in Tokyo during the annual banquet."

Photos show: (1) Dr. and Mrs. Miller with Madam and Generalissimo Chiang Kai-shek. (2) Dr. Miller in Libya in 1957–standing outdoors and dressed in his plain white doctor's outfit. (3) "C.G. Simcox presents honorary life membership award to C.P. Miles, manager Loma Linda Food Co., Mt. Vernon, Ohio, in behalf of Dr. H.W. Miller. Award will be formally presented to Dr. Miller in Tokyo by Shizuko Hayashi, managing director of the Japanese American Soybean Institute."

873. Nagata, Tadao. 1958. Daizu no mugen shinikusei no ikushugakuteki igi. V. Tônan Ajia o shu to suru sekai ni okeru mugen shinikusei hinshu no bunpu [Studies on the significance of indeterminate growing habit for breeding soybeans. V. Distribution of the indeterminate soybeans in the world with special regards to that in East-South Asia (Abstract)]. *Ikushugaku Zasshi (Japanese J. of Breeding)* 8(3):196. Dec. [Jap]

874. **Product Name:** Vitamilk (Soymilk).
**Manufacturer's Name:** Green Spot (Thailand) Ltd.
**Manufacturer's Address:** 79 Mu 4 Patanakarn 3 Rd., Bangkok 10240, Thailand. Phone: 3775-088-91.
**Date of Introduction:** 1958.
**Ingredients:** Soymilk, 25-30% whole dried cow's milk, coconut fat.
**Wt/Vol., Packaging, Price:** 200 ml or 210 ml bottles.
**How Stored:** Shelf stable.
**New Product–Documentation:** Soya Bluebook. 1981. p. 61. 79 Mu 4 Klongton-Hua Mark Rd., Bangkok. Soy beverage; Brian Fitzpatrick. 1982. Soya Milk in Asia. p. 261. States that Green Spot Bangkok launched this soymilk in 1960; Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 105. Thailand's earliest commercial soymilk. "By 1973 the company was producing 33 million 200-ml bottles of Vitamilk a year, by 1978 about 120 million bottles."

Letter from Anders Lindner of STS. 1984. March 9. "Green Spot (Thailand) is partly owned by Mr. C.C. Cheung (Executive director–General manager, business card enclosed) and partly by 'Hong Kong Investors.' Cheung also bottles Green Spot orange soft drink but Green Spot California has nothing to do with the soymilk product 'Vitamilk' and does not have ownership in the Thailand operation." An enclosed photocopy of a page from a market study of unknown origin states that Vitamilk, a bottled beverage, is marketed as a soft drink product. "Producers tone their products with SMP to more closely approximate

natural milk flavour. The best available estimate of current soymilk production in Thailand is 18.7 million 210 cc bottles per month, equivalent to 47,000 metric tons per year, with Vitamilk holding by far the largest market share, probably 85% of the total produced. We have been unable to verify these figures. Channels of distribution for soyabean milk are the same as for UHT milk. Vitamilk (210 cc) wholesales for 2.29 bhat/bottle and retails for 3,00 bhat." Business card lists Green Spot, F&N [probably Fraser & Neave], and Vitamilk as company brands.

Soya Bluebook. 1986. p. 104. Address: 79 Mu 4 Pattanakarn Extension Rd., Bangkok 10240. STS. 1985. Containers for Soymilk. Shows bottle. Red letters on white oval. Color photo sent by Anders Lindner of STS. 1987. Nov. 14. Tetra Brik carton. 250 ml. Red, blue, and yellow on white. Shows large yellow soybeans. 2007. 7th international soy symposium: Role of soy in health and disease prevention. Program and abstracts. Page 6: Green Spot Co. Ltd. (Thailand's pioneer and leading soymilk maker with over 45 years of experience. Produces a wide range of soymilk products under the Vitamilk, Vitamilk Champ, and V-soy trademarks).

Note: This is the earliest known commercial soy product made in Thailand.

875. Keleny, G.P. 1958. Report to the Government of Indonesia on the development of leguminous crops. *FAO Report* No. 1094. 48 p. [33 ref]*

• ***Summary:*** The author visited Indonesia from Oct. 1956 to March 1958 to advise the government of that country on a program of research and demonstration work with legumes. He visited the islands of Java, Sumatra, and the Lesser Sumba. His recommendations concerned mainly soybeans and groundnuts, but they also included legumes for fodder and green manure. Discusses the climate of Java and the cultivation of soybeans, groundnuts and legumes for green manure and fodder in Indonesia, as well as trials to test many introduced varieties of soybeans and groundnuts, many of which yielded more than the local varieties.

876. **Product Name:** [Flower Brand Sweet Soy Sauce].
**Foreign Name:** Ketjap Benteng Manis.
**Manufacturer's Name:** Vanka-Kawat.
**Manufacturer's Address:** Dr. Augustijnlaan 40, 2283 CH Rijswijk Z.H., Netherlands.
**Date of Introduction:** 1958.
**Ingredients:** Extract of soy beans, sugar, salt.
**Wt/Vol., Packaging, Price:** 115 ml, 250 ml, 500 ml, 1 liter bottle.
**How Stored:** Shelf stable.
**New Product–Documentation:** Form filled out and labels sent by Marianne Westra of Vanka Kawat. 1990. July 2. This product was introduced in 1958. Labels: 4 sizes. Red, yellow, black, and white. In Dutch: Soja Saus Zoet. In German: Soja Sosse Gesuesst. "Superior quality. Used as seasoning and also as ingredients by Chinese/Indonesian cooking."

877. Auckland, A.K. 1958. Southern region: Regional Research Centre, Nachingwea–Plant Breeding. *Tanganyika Department of Agriculture, Annual Report.* For the year 1957. Part II. p. 62-69.

• ***Summary:*** Contents: Soya beans: General, selection, breeding (F3 and F4 generations crossing). Sesame. Sorghum and sunflower. Cashew, rice, and kudzu (Mahiwa). Table II lists the characteristics of 11 soya bean varieties including the source (Nigeria, Southern Rhodesia, Belgian Congo, Philippines, USA), yield per acre (best is 1,996 lb/acre), habit (indeterminate, determinate, or intermediate), days to maturity, and seed colour. Table II gives nutritional analyses of the seeds of each variety. Table IV gives the results of a spacing and variety trial using Hernon 237 and Light Speckled. Address: Botanist.

878. Dean, R.F.A. 1958. Use of processed plant proteins as human food. In: A.M. Altschul, ed. 1958. Processed Plant Protein Foodstuffs. New York: Academic Press. xv + 955 p. See p. 205-47. Chap. 9. [99* ref]

• ***Summary:*** Contents: General considerations: Early sources of protein for human food, competition for food between man and his domestic animals, vegetarianism and vitamin B-12, protein requirements (of children, of adults). Plant proteins now in use: Foods that can be prepared in the home (cereals, legumes {incl. groundnuts, soybean}, sunflower seed, sesame), plant foods used after factory processing (cereals, legumes, sunflower seed meal, cottonseed meal). Other forms of plant food: Plankton, algae, food yeast, leaf proteins (p. 237-38). Future extensions of the use of plant proteins: The theoretical basis of selection, assessment of the value of foods intended for human consumption, practical measures for the future.

In 1957 some 160,000 tons of soybeans were used to make tofu in Japan. "Magnesium or calcium salts are the precipitants of the curd from the soybean milk; the product is eaten by nearly every family in Japan with its breakfast miso-soup."

During World War II, the attempt was made to introduce soya as a food crop to Uganda. But "no instruction was given in the necessary details of preparation, with the result that the crop was very reasonably declared inedible by the Africans. They retain a violent prejudice against it and are suspicious that it has been added to any food, such as yellow corn meal, that they find distasteful.

"One of the most interesting methods for making soya edible has evolved in Indonesia and was described in full by Van Veen and Schaeffer (1950). It takes advantage of the ability of the mold *Rhizopus oryzae* to grow on the bean and alter its constituents... The product made from soya is called

*tempeh kedelee* (kedelee = soybean)." Details of the production process are given. A description of natto and its composition is also given (p. 218).

The section on algae gives detailed information on chlorella, a type photosynthetic single-cell protein. As early as 1954, Morimura and Tamiya in Japan were experimenting with the used of powdered *Chlorella ellipsoidea* in foods. Note: This is the earliest document seen (Aug. 1997–one of two documents) that mentions the use of algae or other photosynthetic single-cell protein as food.

The section on leaf proteins (p. 237-39) begins: "Protein synthesis is one of the chief activities of the leaf, and proteins are comparable to animal proteins in their amino acid composition (Lugg 1949). The young leaf is especially rich in protein..." Pirie (1953) has suggested a process for recovering the leaf protein from the fibrous residue left after mechanical separation; the protein is usually very difficult to free. Pirie (1953) has also described the likely structure of an efficient plant. "There are also obvious possibilities in such abundant and little-used material as the leaves of sugarcane, cassava, and bananas" (p. 238-39).

The section titled "Sesame" (p. 219-20) states that the Zande people of southwestern Sudan steep the seeds in water for a few minutes, then pound them lightly to loosen the outer coat. They then dry the seeds and the outer coat is sieved or winnowed away. The seeds are then roasted and ground to a paste, which is sometimes used to make a sauce (Culwick 1950). "The use of sesame as a sweetmeat or condiment is fairly widespread in the Near East. A sweetmeat called *tahinya* or *tahina* is made in the Gezira [Sudan] by cooking the roasted seeds in sugar; sometimes the seeds are crushed before the cooking, and sometimes not" (Culwick 1951). Describes how to make the condiment. Address: Medical Research Council, Mulago Hospital, Kampala, Uganda.

879. Ford, Herbert P. 1958. The life story of Dr. Harry W. Miller. Unpublished manuscript. 169 p. Unpublished manuscript. 28 cm.

• ***Summary:*** This manuscript is the slightly edited second draft of the transcript of a single 7-8 hour interview that Mr. Ford did with Dr. Miller in 1958 in Chicago. According to Mr. Ford, Dr. Miller later gave a copy of the manuscript to Raymond S. Moore PhD, a Seventh-day Adventist educator, with the understanding that Moore would use it as the basis for a book. The book, titled *China Doctor,* was published in 1961. Dr. Miller was not very happy with the way the book turned out.

Pages 122-35 give a much more detailed account and history of Dr. Miller's work with soy milk, tofu, yuba, other soyfoods, meatlike products, and wheat gluten than is found in the finished book, *China Doctor.*

Concerning wheat gluten: Dr. Miller's company in Mt. Vernon, Ohio, International Nutrition Laboratory, "had protein foods in which they used wheat gluten and made meat patties and various kinds of stews, sprouted the green soybeans and made a chili with them and wheat gluten." They also developed a vegetarian wiener [Veja Links] containing raw vital wheat gluten, soy flour, seasonings, and flavors. They stuffed these into wiener casings, submitted them to a smoke house and to cooking, then peeled off the casings/skins and canned the wieners. He developed these at the Mt. Vernon slaughterhouse.

"Soy milk manufacture in the U.S.A. (p. 131). In 1939 Dr. Miller returned to the United States having been so thoroughly convinced that soy milk was destined to have world-wide acceptance... His son, Harry Willis Miller, Jr. had returned preceding his father and had started a small soy milk plant in Utica, New York, where he made and bottled soy milk and also made and canned some of the protein foods out of wheat gluten for which they had developed recipes. This plant was later moved to Mt. Vernon, Ohio, after they started the soybean plant at Mt. Vernon. The plant was rather small at first as their capital was very limited. They had to build up the food plant out of his surgery earnings. As these products were mostly for export, the firm was called the International Nutrition Laboratory. It was called International because they didn't think of having any particular market for soy milk in the United States but anticipated making and packing soy powder which they could ship over to China, Japan, Korea, and other fields. Since the United States is a dairy country, they just thought they would have all kinds of difficulty getting it introduced over in America. They gave their attention largely in the early part of the work to making some products that went over quite well, which could be sold locally such as meat patties–vegaburgers. They would take the wheat flour, wash the starch from it, and make gluten patties. They actually built up a very fine product that was netting them earnings. The earnings of that, together with Dr. Miller's medical and surgery fees, to finally get together a spray dryer which they built with the aid of the know-how assistance of the Rogers Company, who sold these spray dryers... and through this home-made outfit they daily spray dried considerable powdered soy milk and placed it on the market. They made some ice cream mixes and they shipped out in barrels to the Philippines soy milk powder and also shipped consignments of the powder to Shanghai where they had formerly introduced a soy milk to the Shanghai Settlement. Thus they kept soy milk going up until the time of the world war in 1941 which cut them off from shipping to the Orient."

In the United States they found "an interest on the part of doctors in feeding babies that were covered with various kinds of rashes which they called atopic dermatitis. Many of these babies had asthma, diarrhea, projectal vomiting,

nervous irritability and were unhappy babies, all because of the allergy to cow's milk formula." Doctors began to realize that babies with allergies and other sicknesses responded well to soybean milk; the market soon increased. Eggs and milk are the chief causes of allergy, but some vegetable proteins like wheat, corn, and some legumes also cause allergic reactions in some cases. Then doctors began to ask for evidence that the milk was safe. They suggested that it be submitted to the American Medical Association [AMA]. So at once Dr. Miller contacted Dr. Earl Baxter, Professor of Pediatrics at the Ohio State University Medical School, and he agreed to conduct some feeding experiments with soy milk. These studies showed that "babies could be nourished as well on soy milk." In Tokyo, Dr. Choei Ishibashi (later president of the Japan Medical Society) also did meticulous feeding tests with infants, using the powdered soy milk Dr. Miller had sent after World War II. Over a period of many months, he compared the blood, measurement, and growth records of babies fed soy milk with those fed animal milk [cow's milk]. Then Dr. Miller took the results of the studies in Japan and at Ohio State and submitted them to the Council on Food and Nutrition of the American Medical Association. The Council has 15 members, the very best scientists on food and nutrition. "They examined the [soy] milk, examined the claims for it, looked over the research, and then gave the seal of approval which was placed on every can of soymilk thereafter."

"Now that they had this seal of approval, they went to medical conventions and canvassed the doctors; the sale of soy milk grew very rapidly." The plant began to get larger; it made great demands and there were many details to look after. These facts and his lack of capital to carry on this work adequately made Dr. Miller realize that he must do one of two things. He must either organize a corporation, issue stock, and enlarge the company greatly, or he must dispose of the plant and give his time and attention to research.

During this time, Dr. Miller received valuable help from the U.S. Department of Agriculture [USDA]. Dr. J.A. LeClerc (Senior Chemist, Agricultural Chemical Research Division) and Mr. L.H. Bailey, who investigated the use of "soybean milk in making breads" and made the results and analyses available to Dr. Miller. "Thus they got themselves very well established in this country as having a milk for people who did get along with cow's milk."

However the secretary of the AMA told Dr. Miller that he should not claim or advertise that his soy milk was a good alternative to cow's milk for all babies, but only "for those babies who do not do well on cow's milk." However he added: "If you can take care of babies that cow's milk does not take care of, there is no reason why you could not take care of the other babies that cow's milk does agree with too." This was his diplomatic way of counseling them not to make unfriendly comparisons with cow's in a dairy country–even if those claims are valid. By following his advice, Dr. Miller was able to work well with the dairy industry without any conflicts.

The Loma Linda Food Company in California showed an interest in acquiring Dr. Miller's company in Ohio. "They had been making some soy milk in the liquid form, but they were interested in getting an Eastern branch." So in 1950 they purchased the [soy] milk plant in Mt. Vernon and have been operating since that time. This took a great burden off Dr. Miller's shoulders and left him free to do medical and nutritional research work. "It was then decided to start the International Nutrition Research Foundation and Dr. Miller was asked to be the Director of this Foundation. He placed a larger part of the purchase price of the factory into this Foundation, which would be devoted to food research only. From the day this research institution was started it has attracted a great deal of attention from all parts of the world; among those interested parties has been the World Health Organization of the United Nations. They came to the conclusion that soy milk had great possibilities in countries of low economic conditions where they could not afford to buy imported [cow's] milk," and in protein-deficient countries. They came to Mt. Vernon to investigate both the soy milk plant and the experimental research. Dr. Miller educated them on the many benefits of using protein from soybeans instead of from animals. As a result, the United Nations constructed a large soy milk plant in Djojakarta [Jogjakarta / Yogyakarta] Indonesia. It was built with the advice of Dr. S.S. De (who has headquarters in Bangkok, Thailand) and the support of the Government of Indonesia, FAO, UNICEF, and WHO.

880. Johnston, Anthony. 1958. A note on fungicidal seed dressing of soya bean, groundnut and long bean. *Malayan Agricultural Journal* 41(3):152-55.

• ***Summary:*** In a pot trial (at the Federal Experiment Station, Serdang), soybean and groundnut seeds were treated with fungicidal dusts including Agrosan GN (a mercurial preparation), Mergamma B, Spergon, Fernasan, and Flit 406. Germination percentages were increased considerably. The most successful treatments resulted in increases in germination of 53% for soybeans and 33% for groundnuts. Treatment of long bean *(Vigna sinensis)* [cowpea] seed gave little benefit.

Photos show germination of untreated soya beans in a pot, and of soya beans treated with Captan. Address: Formerly Senior Pathologist.

881. Philippines, Bureau of Commerce. 1958. Directory of industrial establishments in the Philippines. Manila, Philippines: Bureau of Commerce, Philippines. See p. 140. *

• ***Summary:*** Page 140: Temple brand salted black beans.

882. Zain, Sutan Muhammad. 1958. Djalan bahasa Indonesia. 7th ed [Indonesian style]. Jakarta / Djakarta, Indonesia: Grafica. 148 p. See p. 8. 21 cm. [Ind]*
• ***Summary:*** Page 10: tautjo [Indonesian-style miso], tauge [soy sprouts].

883. *FAO Monthly Bulletin of Statistics.*1958—. Serial/ periodical. Rome, Italy: Food and Agricultural Organization of the United Nations. Yearly. ca. 350 p. *

884. *FAO Production Yearbook.*1958—. Serial/periodical. Rome, Italy: Food and Agricultural Organization of the United Nations. Yearly. ca. 350 p. Supersedes the Yearbook of Food and Agricultural Statistics, Part I (1947-1957), which was superseded by Production Yearbook (1958-1975).
• ***Summary:*** Under soybeans, gives region/continent and nation, then statistics for soybean area, production, and yield for each soybean producing nation during the following time periods: 1948-1952, 1955, 1956, 1957. Regions and nations listed in the 1958 edition are: Europe: Czechoslovakia, Hungary, Italy, Romania, Yugoslavia. U.S.S.R.

North and Central America: Canada, United States.

South America: Argentina (in 1948-52 1,000 hectares produced on average 1,000 metric tons of soybeans per year. This remained unchanged in 1955-1957), Brazil (in 1948-52 53,000 hectares produced on average 57,000 metric tons of soybeans per year. Production rose to 115,000 metric tons in 1955, 122,000 in 1956, and 132,000 in 1957).

Asia: Cambodia, China-Mainland, China-Taiwan, Indonesia-total (Java and Madura, Other islands), Japan, Korea-South, Philippines, Ryukyu Islands, Thailand, Turkey.

In 1948-52, Turkey produced 2,000 metric tons of soybeans on 2,000 ha; yield: 860 kg/ha. Production in Turkey increased to 4,000 metric tons in 1955, then 5,000 metric tons in 1956. Note: This is the earliest document seen (Dec. 2007) that gives soybean production or area statistics for Turkey or for the Middle East. This document contains the earliest production or area statistics seen for Turkey or the Middle East.

Africa: Belgian Congo (production in villages), Ethiopia and Eritrea (Fed. of Ethiopia) (starting with 5,000 tonnes {metric tons} in 1948-1952), Nigeria (Fed. of), Rhodesia and Nyasaland (Fed. of Nyasaland), Ruanda-Urundi (production in villages), Tanganyika, Uganda (recorded sales), Union of South Africa (farms and estates).

World total (excluding U.S.S.R.). Regional totals: Europe, North America, Latin America, Near East, Far East, Africa.

Note that statistics for given years (e.g. 1948-52) may change as time passes; apparently this yearbook is periodically updating its statistics.

885. **Product Name:** [Tempeh].
**Foreign Name:** Tenpe.
**Manufacturer's Name:** Firma E.S. Lembekker.
**Manufacturer's Address:** c.v. Alkemadestraat 61, Amsterdam 1065, Netherlands. Phone: 020-151-480.
**Date of Introduction:** 1959. January.
**New Product–Documentation:** Soyfoods Center Computerized Mailing List. 1981. Jan. 22. Address is now given as 61 Corn V Alkemadestraat, 1065 Amsterdam, Netherlands. Phone: 020-151-480.

Letter from Sjon Welters. 1982. April 16. "We have some big Indonesian tempeh-makers who are producing first class tempeh, sold refrigerated. Fa. Lembekker (c.v. Alkemadestr. 61, Amsterdam), one I know personally, makes the best tempeh I ever ate. It's made with a fast fermentation and it keeps for 10-14 days just by keeping it cool." Form filled out by Fa. Lembekker. 1982. Aug. They started to make tempeh in 1959. They now make an average of 3,000 lb/week of tempeh. The owner believes that ENTI was the first tempeh shop in the Netherlands, started in April 1946; but it has already disappeared–It was sold to Mrs. Duson of Zevenhuizen, Netherlands. The owner believes that Van Dappern is the largest tempeh manufacturer in Europe.

Shurtleff & Aoyagi. 1985. History of Tempeh. p. 28. This was Europe's second earliest commercial tempeh company, founded in January 1959.

886. Deck, E.M. 1959. Potential markets for U.S. edible oils and proteins. *Soybean Digest.* May. p. 12-15.
• ***Summary:*** "Mr. Deck was a member of the survey team sent to Asia last fall to determine potential markets in a number of Asiatic countries for U.S. oil crops and their products. he survey was made under a contract of the Soybean Council of America, Inc. with the Foreign Agricultural Service of the USDA. "The team making the survey was composed of George Strayer, executive director of the Soybean Council of American, Inc.; Volorus H. Hougen, fats and oils marketing specialist of the Foreign Agricultural Service; and the writer, representing the National Cottonseed Products Association, Inc.

"Prior to World War II, the United States was a net importer, but currently we are the largest exporter of edible fats and oils in the world. This is due mainly to the great increase in the production of soybeans."

Contents: Introduction. Hong Kong, Thailand, Singapore, Malaya, Burma, India, Pakistan, Summary.

"With the exception of Thailand, none of the Southeast Asian countries will be able to increase their production of oilseeds significantly.

"There is a continually expanding potential market for large quantities of edible fats, oils and proteins in Southeast

Asia. The rate of development of this market will depend on (a) lower ocean shipping rates to keep prices competitive, (b) U.S. dollars available in these countries (more exports to the United States are needed to obtain dollars), (c) the competitive prices of the cottonseed or soybean oil, and (d) aggressiveness of U.S. suppliers to keep products competitive and trade development work to develop techniques for handling and use.

"The indications are that the United States has the largest surplus and is the largest exporter of edible oils in the world today, and will probably continue in this role for some time."

A photo shows the members of the U.S. survey team and members of the Pakistan Oilseed Crushers Association in Kurachi [Karachi], West Pakistan. Address: Feeds Div., Anderson, Clayton, & Co., Dallas, Texas.

887. Callan, Mary Ann. 1959. Meals–Aid to millions. *Los Angeles Times.* June 7. Part IV. The Family. p. 1, D. Sunday.
• ***Summary:*** A dynamic little woman, Miss Florence Rose, operating with a small work force out of an unpretentious office on 7th street in Los Angeles, is busy making friends overseas for the United States. Miss Rose is the executive secretary of the Meals for Millions Foundation, and she works at their national headquarters. In 12 years the Foundation has shipped more than 56 million 3-cent meals to 100 countries abroad.

Multipurpose Food, developed by Caltech is now produced in the USA in Oxnard, California, primarily from soybean meal. The funds for sending the food abroad now comes from donations. India has produced MPF from peanut meal.

"Overseas women's groups in Brazil, Ethiopia, Greece, India, Japan, Korea, the Philippines, Taiwan, and Viet-Nam have received the friendship food for distribution–in quantities from 500 to 100,000 tons."

Note: This is the earliest article on soy seen (Aug. 2002) in the *Los Angeles Times.* Address: Times staff writer.

888. Davies, Lawrence E. 1959. Women's world: Hawaii. Mainlander shopping in Honolulu market likely to think she is on the mainland. *New York Times.* Aug. 13. p. 31.
• ***Summary:*** Hawaii's population of 645,000 is composed racially of 32% Japanese (persons of Japanese ancestry), 30% Caucasian, 17% Hawaiian or part Hawaiian, 11% Filipino, 6% Chinese, and 4% other races.

889. Nagata, Tadao. 1959. Studies on the differentiation of soybeans in the world with special regard to that in Southeast Asia. II. Origin of culture and paths of dissemination of soybeans as considered by the distribution of their summer vs. autumn soybean habit and plant habit. *Nippon Sakumotsu Gakkai Kiji (Proceedings of the Crop Science Society of Japan)* 28(1):79-82. Sept. Summarized in Soybean Digest, Feb. 1962, p. 26. [24 ref. Eng]
• ***Summary:*** Contents: Introduction. Clines established on combination of the summer vs. autumn soybean habit and plant habit. Ecotypes identified by the habits and their distributions in the world. A consideration on the origin of soybean culture. Some considerations on the paths of dissemination.

To illustrate the soybean's paths of dissemination, the author first establishes a system of four clines, based on the assumption that origin of soybean culture was in north and central China and moved into Manchuria, Japan and Southeast Asia (fig. 1). Each cline is identified by including summer vs. autumn soybean habit and plant habit (vining vs. nonvining). (1) The Manchurian cline (soybeans moved northward from China into Manchuria) is characterized by an increasing occurrence of special nonvining types which have a long relative flowering period and long relative growing period. (2) The Japanese full-season crop cline (soybeans moved from north China into Korea, and from there they were subsequently disseminated to central and northern Japan) is characterized by soybeans of the normal type having a short relative flowering period and a long relative growing period. Called *Aki-daizu* (autumn type), these soybeans are cultivated as a full-season crop in these regions and belong, more or less, to the short-day type. Historically we note that Korea had direct contact with China Proper, and especially with North China, during the Han dynasty (200 B.C. to the 3rd century A.D.). (3) The Japanese short-season crop cline (soybeans moved from central and south China, through Formosa [Taiwan] and Loochoo [Ryukyu Islands, incl. Okinawa]) is characterized by soybeans of the normal type having a short relative flowering period and short relative growing period. These short-season soybeans are designated as *Natsu-daizu* (summer type), since they are sown in the spring, mature early, and occasionally show very high protein content. However another (and more likely) path of introduction of short season crop soybean to Japan would have been directly from central China to south Japan, especially to Kyushu. Historically, we note that Japan had frequent contact with China before and during the Nara period (6th to 8th century A.D.). Recently soybean seeds were found in the *Shôsô-in,* which was established during the Nara period to store important materials (including medicinal herbs introduced from China). Moreover, these soybeans were identified as the short-season summer type akin to those grown in Kyushu and the Ryukyu Islands. (4) The Indo-Chinese cline (soybeans moved from central and south China, down through Southeast Asia [Vietnam, Laos, Thailand, Cambodia, Malaysia] to Indonesia) is characterized by an increasing occurrence of consistent vining types. Address: Hyogo Agricultural College, Japan.

890. Claiborne, Craig. 1959. Use of native spices adds interest to unusual cuisine of Balinese: Variations of native dishes possible. Rare ingredients are available here. *New York Times.* Oct. 8. p. 46.

• ***Summary:*** "One of the most fascinating of the many Far Eastern restaurants here is A Bit of Bali, 242 East Fifty-eighth Street." Describes a visit with four recipes. The recipe for Sate kambing Madura (Skewered broiled lamb) calls for ½ cup soy sauce. A note at the bottom of this recipe states: "Indonesian soy sauce is available at A Bit of Bali."

891. Richard, C. 1959. Le chao: Fromage de soja fermenté, salé et alcoolisé [Chao: A fermented soy cheese, containing salt and alcohol]. *Societe des Etudes Indochinoises, Bulletin (Saigon)* 34(3):317-24. Oct. [14 ref. Fre]

• ***Summary:*** Contents: Introduction and types of soyfoods in Vietnam. Preparation of Chao. Chemical composition. Culinary uses of Chao: In vegetarian diets, in regular diets. Summary.

*Chao,* a "cheese analog," is widely consumed in Vietnam. It is prepared as follows: Coagulate soymilk with vinegar or nigari. Press the tofu well, cut it into cubes or parallepipeds from 2 to 4 cm on a side, and let it dry on mats for 20-24 hours. Salt it and leave it for 24-48 hours. Then wash the tofu cubes to remove the excess salt. Put the cubes in pots of glazed stoneware with rice wine; leave for 20 days. Photos show: (1) Tofu in its earthenware pot. (2) Overhead view of the cubes of chao surrounded by the brining liquor. Note: The author makes no mention of fermentation, but it probably happened while the tofu.

A table gives the chemical composition of five samples of Chao sold in South Vietnam. They contain on average: moisture 76%, salt 11%, alcohol 5%, protein 7%, oil 3.5%.

Culinary uses: In Vietnam, Chao–a true food condiment–serves to season various dishes and to aromatize or perfume *(aromatiser)* certain sauces. Because of its slightly tart and salty taste, it is much prized by vegetarians, for this soya cheese *(fromage de soja)* contains only vegetable proteins *(protéines végétales).* In vegetarian diets, it is incorporated into rice dishes and rice-based soups, and often accompanies various vegetables–such as cucumbers. Because of its low price, it is often used in place of *tuong* sauces–which are also made by enzymatic fermentation of soybeans. Among the upper classes in Vietnamese society, Chao is mixed with pimento, vinegar, sugar, and oil to make a tasty condiment called *Chao tói ó't,* which is used to enhance the taste of dishes that contain no meat or fish. On the 1st and 15th days of each month, when Buddhists eat no meat, garlic, or onions, they enjoy this tasty condiment.

In regular diets, one usually adds sugar, salt, oil, and pimento. The condiment thus obtained is used to add aroma to roasted or broiled meats, rice noodles, and various legumes. Sometimes it is used as a basting sauce for small pieces of chicken or pork. Address: Docteur en Pharmacie, Chef de Laboratoire, Institut Pasteur de Saigon.

892. *FAO Nutrition Meetings Report Series.*1959. Report of the FAO/UNICEF Regional School Feeding Seminar for Asia and the Far East. No. 22. 53 p. Held 10-19 Nov. 1958 at Tokyo, Japan. [5 soy ref]

• ***Summary:*** UNICEF stands for the United Nations International Children's Emergency Fund. Appendix 3 (p. 48-51) titled "Data on some nutritious food products that have been developed in Asia and the Far East," discusses Saridele, groundnut extract curd [tofu made from peanut milk], Indian Multipurpose Food (MPF, developed by CFTRI), miso, natto, and tempeh.

"'Saridele' is the name that has been given to a spray-dried soybean extract combined with an extract of sesame, or peanut, with or without the addition of malt. Vitamins and calcium are added to saridele in order to make its nutritive value similar to that of cow's milk or to enhance its nutritive value. Flavorings such as vanilla or chocolate are also used, which make the product highly acceptable.

"A plant having a capacity of about 800 kg./day has been erected in Indonesia with the financial assistance of UNICEF and the technical assistance of FAO. Saridele is manufactured from a mixture of soybeans and decorticated sesame in the proportion of 4:1. Malt extract from maize may be used to replace 50% of the cane sugar used. Soybean and sesame are soaked for about six hours and then disintegrated finely, together with 7 volumes of hot water. The slurry is stirred vigorously and then filtered. The filtered liquid is heated under pressure for 10 minutes at 120ºC., then flashcooled and formulated with Vitamin A, in oil solution, and malt, if desired. The formulated liquid is homogenized, concentrated in a vacuum evaporator to about 22% solids, then spray-dried. The powder finally is sifted and blended with finely ground cane sugar, and calcium carbonate, riboflavin, ascorbic acid and Vitamin $B_{12}$ added; the mixture may be flavored with vanilla or chocolate." A table compares the nutritional composition of whole dried cow's milk and Saridele (based on a leaflet from Saridele Ltd., Indonesia). Address: FAO, Rome.

893. Nakano, Masahiro. 1959. FAO Ajia chiiki shokuhin kakô kaigi ni shusseki shite [Attending the FAO Asian food processing conference]. *Nosan Kakko Gijutsu Kenkyu Kaishi (J. for the Utilization of Agricultural Products)* 6(6):292-302. Dec. [Jap]

• ***Summary:*** Discusses Korean meju and soy sauce, Indonesian tempeh (tenpe), ontyom (onchom) and pongrek [sic, bongkrek], and Vietnamese nuoc-mam. Address: National Food Research Inst., Shiohama 1-4-12, Koto-ku, Tokyo, Japan.

894. **Product Name:** Soymilk.

**Manufacturer's Name:** Mountain View College.
**Manufacturer's Address:** Mindanao, Philippines.
**Date of Introduction:** 1959.
**New Product–Documentation:** Letter from Eric C. Fehlberg, Director, International Health Food Assoc. 1990. May 24. This organization no longer makes foods.

895. Soedarmo, Poorwo. 1959. Vegetable protein as cow's milk substitute. In: Proceedings of the 15th General Assembly, Japan Medical Congress. See vol. 1, p. 492. *
• ***Summary:*** Orr and Adair (1967) state that the author presented an undated paper by this title at the "Symposium on Problems of Nutrition in Asian Countries." Includes a discussion of Saridele, a spray-dried soy milk made in Indonesia. "The equipments are highly technical, the receiving country is technically not well-developed, and this arouses problems in the selection and the ordering, the transportation, the installation and the exploitation of the equipment."

Tempeh is an Indonesian preparation. It may be eaten on its own, after roasting or frying, or used in soups. It is also used in a dry form. It is said that about 60 million of the 90 million inhabitants of Indonesia include tempeh in their daily menu.

896. Cai Tinglan. 1959. Hainan zazhu [Miscellaneous notes from the southern seas]. Taipei, Taiwan: Taiwan Yinhang Yinshuaso. See p. 55. [Chi]
• ***Summary:*** Cai Tinglan was director of an academy on the island of Penghu in the Taiwan Straits. In 1835, while returning to the Island from the port of Xiamen in Fujian province, China, he was blown off course by a typhoon. After landing in central Vietnam, he traveled overland to China, recording everything of interest to him along the way.

Commenting on what was lacking in Vietnamese culinary habits, he stated: "They do not have soy sauce. Instead they use 'fish sauce,' which has a real stench to it."

Note: Cited in "Batavia Through the Eyes of Vietnamese Envoys," at www.hawaii.edu.

897. FAO (Food and Agricultural Organization of the United Nations), Plant Production. 1959. Tabulated information on tropical and subtropical grain legumes. Rome, Italy: FAO. xiv + 367 p. 28 x 21 cm.
• ***Summary:*** This publication was compiled from the replies of questionnaires submitted to agricultural stations, or other organizations, in tropical and subtropical countries. Information is given on morphology and habit, uses, yield, and quality of grain and/or forage. Among the many species considered are soybeans, peanuts, winged beans, and bambarra groundnuts *(Voandzeia subterranea).* An appendix gives the geographical location of the contributing stations and countries, together with data on local temperature, precipitation and soil type. This work is in English, only, but French and Spanish equivalents of the headings are given.

Page vii shows the various countries from which information on the cultivated soybean was collected. At least one page is devoted to the soybean in each of these countries, as follows: (1) Angola (p. 90). Local name: Soja Preta. Station submitting information: Estacao Agricola Central, Vila Salasar. Seed yield: 1,400 kg/ha. Uses: Green manure, human consumption, livestock feed, oil extraction. Angola #2 (p. 107). Station submitting: Estacao de Melhoramento de Plantas, Nova Lisboa for variety Medium Yellow. Seed yield: 500–2,500 kg/ha. Uses: Human consumption, livestock feed, oil extraction. (2) Belgian Congo (p. 91). Station submitting: I.N.E.A.C. Station, Gandajika. Seed yield: 260-850 kg/ha. Use: Human consumption. (3) Jamaica (p. 92). Station submitting: Department of Agriculture, Kingston. Seed yield: 1,080 kg/ha. Uses: Green manure, human consumption, livestock feed. (4) Puerto Rico (p. 93). Local names: Habichuela Soya, Haba Soya. Station submitting: U.S. Federal Agricultural Experiment Station, Mayaguez. Seed yield: 1,620–2,160 kg/ha. Uses: Green manure, human consumption, livestock feed, oil extraction.

(5) Southern Rhodesia (p. 94). Station submitting: Agricultural Experiment Station, Salisbury. Seed yield: 1,500 kg/ha. Uses: Human consumption, livestock feed. (6) Thailand (p. 95). Local names: Tua Luang, Tua Nao, Tua Mei Tai. Station submitting: Mehjo Agricultural Experiment Station, Mehjo. Seed yield: Not given. Uses: Human consumption, livestock feed, oil extraction. (7) Belgian Congo (p. 96-98, 100, 102, 104, 105, 108, 109, 112, 113). Local names: Soja. Stations submitting: I.N.E.A.C., Yangambi for varieties 37/S/38/345/666 (introduced from South Africa), Atootan (Otootan; introduced from Brazil), Jubitan 109 (introduced from Southern Rhodesia), Palmetto (introduced from Brazil), and Trinidad (introduced from Nigeria), I.N.E.A.C. Station, Nioka, Ituri for varieties Atootan SH. 030 and Herman SH. 02 (both introduced from USA), INEAC Station, Bambesa for varieties E.35 and S.H.E. 43, I.N.E.A.C. Station, Keyberg, Elisabethville for variety K 92/6/2/2/1, I.N.E.A.C. Station, Mont Howa, Ituri for variety Mammoth, I.N.E.A.C. Station Rubona, Ruanda for variety Palmetto. Seed yields: 1,000–1,500 kg/ha (2 varieties at Yangambi), and 500 kg/ha at Nioka. Uses: Green manure, human consumption, livestock feed, oil extraction. (8) Australia (p. 99). Station submitting: Department of Agriculture and Stock, Brisbane, Queensland for variety Clemson Non-shatter. Source of crop: Introduced from the USA. Seed yield: Not given. Uses: Human consumption, livestock feed, oil extraction.

(9) Morocco (p. 101). Station submitting: Centre de Recherches Agronomiques for variety Gibson S.C. 335. Seed yield: 400-500 kg/ha. Uses: Green manure, human

consumption, livestock feed, oil extraction. (10) Brazil (p. 103). Station submitting: Instituto Agronomico, Campinas, Sao Paulo. Variety name: I.A.455. Seed yield: 1,200–1,600 kg/ha. Uses: Erosion control, green manure, human consumption, livestock feed, oil extraction. (11) India (p. 110). Station submitting: Department of Agriculture, Nagpur, Madhya Pradesh for varieties S.B. 5 and S.B. 8. Seed yield: 1,486 and 1,172 kg/ha. Uses: Livestock feed. (12) Ceylon (p. 114). Station submitting: Agricultural Research Station, Maha Illupallama for variety Yellow (introduced from India). Seed yield: 860–1,080 kg/ha. Uses: Green manure, livestock feed, oil extraction. Address: Rome, Italy.

898. Keleny, G.P. 1959. Report to the government of Indonesia on the development of leguminous crops. *FAO Expanded Technical Assistance Program, Report* No. 1094. 48 p. 9 tables. Proj. INS/AgP. [26 ref. Eng]
• ***Summary:*** Focuses on soybeans and groundnuts. The author's research was conducted in Indonesia from 13 Oct. 1956 to 31 March 1958. Address: Legume Agronomist.

899. Winkel, Johanna G. 1960. Recipes from Asia: Indonesian rijsttafel favorite dinner. *Christian Science Monitor.* Jan. 25. p. 4.
• ***Summary:*** Have ready beforehand: "Babi ketjap: This is made by dicing pork and rolling it in a mixture of asem (tamarind), garlic, salt, and *ketjap benteng* (concentrated sweet soy sauce)."

Note: This is the earliest document seen (Sept. 2008) in all major U.S. newspapers digitized by ProQuest that uses the term "ketjap" to refer to Indonesian-style soy sauce. The new term appears in 43 articles between 1960 and the present, including five in the 1960s, 16 in the 1970s, etc.

An illustration shows a "wadjan," a Javanese frying pan, which looks exactly like a Chinese wok.

900. Palo, Macario A.; Vidal-Adeva, L.; Maceda, Leticia M. 1960. A study on ang-kak and its production. *Philippine J. of Science* 89(1):1-22. March. Plus 6 unnumbered pages of plates at end. [16 ref]
• ***Summary:*** "Ang-kak is variously known in the literature as red rice, Chinese red rice, ang-khak, ankak, anka, ang-quac, beni-koji, and aga-koji. It is produced by growing on rice a mold known as *Monascus purpureus* Went.

The authors show that corn, as well as rice, may be used as a substrate to produce the red color. All varieties of rice are suitable except the glutinous ones which are unsatisfactory because the rice becomes gluey and the grains stick together.

The authors studied various conditions of the fermentation, finding that the optimum temperature for pigment formation is about 27ºC. Growth will occur as low as 20ºC and as high as 37ºC, but at these extremes poor pigmentation results. The mold will produce the pigment over a wide range of pH values (3 to 7.5). Address: National Inst. of Science and Technology, Manila.

901. Lee, Elinor. 1960. UNICEF develops protein sources: New foods for children. *Washington Post.* April 2. p. B5.
• ***Summary:*** The new foods include "milk [Saridele] made in Indonesia from soya powder."

902. Tiner, Hugh M. 1960. Meals for Millions: A 3-cent 'lunch' fights hunger and malnutrition. *Rotarian (The)* 96:51. May.
• ***Summary:*** Tells the story of Clifford Clinton, Meals for Millions, and MPF (Multi-Purpose Food). Describes how many different Rotary Clubs in the USA have sent MPF overseas for use in relief and rehabilitation projects in Costa Rica, Portugal, Greece, Korea, Mexico, Ceylon, Hong Kong, and India. "Last year $247,000 poured into the Foundation's headquarters on Seventh Street in Los Angeles and sent 'meals' on their way to the hungry.

"But the chief aim of the Foundation is to aid Governments in developing their own versions of MPF, using food products of their regions. An Indian version, based on peanuts, is already in production, and the building of nine plants has been authorized for this purpose. A soy-based MPF is being produced in Brazil. Research is going ahead in the Philippines to develop MPF-type food with fish and coconut meal, in Mexico with soy, in Iraq with sesame and dates, and in the South Pacific with coconuts. Independent, self-supporting Meals for Millions affiliates are active in Brazil, Burma, Ceylon, Formosa, Hawaii, India, Israel, Japan, Mexico, Pakistan, the Philippines, and Thailand, studying, interpreting, and expanding the program." Address: Former president, George Pepperdine College; Past Distirct Governor, Rotary International; Rotarian, San Diego, California.

903. Masiluñgan, Victoria A.; Ramos, Milagros A.; Palo, Macario A. 1960. Studies on some important factors involved in the mold process of making soy sauce. *Philippine J. of Science* 89(2):149-62. June. [16 ref]
• ***Summary:*** The Chinese introduced soy sauce into the Philippines as a seasoning for their various dishes, and it was readily accepted by Filipinos. It is rapidly becoming an important condiment as shown by yearly increases in its use since 1951. Consumption in 1956 was valued at 2,667,025 pesos compared with only 327,112 pesos in 1951–an 8-fold increase in only 5 years. Local production of soy sauce has also expanded, from an estimated 93,120 pesos in 1953 to 2.573,977 pesos in 1956.

Three major methods of making soy sauce are described.

The summary describes the various important factors studied in the mold process of making soy sauce. These

include the strain of *Aspergillus oryzae* mold used. The ratio of soybeans to wheat. The concentration of salt (20%) in the salt solution. The temperature in this salt solution. The molding time for the koji. The total fermentation time for the koji (4 weeks). Address: National Inst. of Science and Technology (NIST), Manila, Philippines.

904. Yap, Bwee-Hwa. 1960. Nutritional and chemical studies on tempeh, an Indonesian soybean product. MS thesis, Cornell University, Ithaca, New York. 50 p. June. No index. 28 cm. [37 ref]

• ***Summary:*** Contents: Introduction. Review of literature. Experimental: Preparation of tempeh, yield dimensions, determination of pH and temperature changes during the period of fermentation, determination of percentage of moisture, determination of total protein, preparation of a soluble fraction, determination of soluble solids, soluble nitrogen, reducing substances, and percentage transmittancy, comparison of preservation methods. Results. Discussion. Summary. Bibliography. Appendix. Address: Ithaca, New York.

905. Auckland, A.K. 1960. Soya beans in a mechanized farming system in Tanganyika. *Tropical Agriculture (Trinidad)* 37(3):201-09. July. [6 ref. Eng]

• ***Summary:*** Contents: Introduction. Crop history of the groundnut scheme in Nachingwea. Present organization of the area. Economics of crop production: Yields, prices, costs of production. Soya bean cultivation. Soya bean breeding. Summary. Acknowledgements.

"The original place of groundnuts [peanuts] as the most important crop in the area has now been take by soya beans." Starting in 1958, soya bean acreage first exceeded that of groundnuts. The agricultural and economic reasons for the importance of soyabeans are explained. It is expected that new higher-yielding soya bean varieties, suitable for mechanical combine harvesting, will contribute substantially to the economic success of the scheme.

"The Overseas Food Corporation was established by the Overseas Resources Development Act in 1948. One of the duties charged to the Corporation was to secure 'the large scale production of groundnuts, together with crops rotational therewith or ancillary thereto, in Colonial territories in East and Central Africa, and the marketing thereof' (Overseas Food Corporation *Report* 1948-49). One of the areas in which the ill-fated 'Groundnut Scheme' was developed was at Nachingwea in the Southern Province, Tanganyika.

"Clearing of the land had been begun by contractors in November 1947, and was in progress when the scheme was taken over by the Overseas Food Corporation, but it was not until the 1951 season that any large scale plantings were carried out."

Soya beans were first planted in 1951. "In 1957 it was realized that soya beans could be an important production crop and a decision was made to increase the acreage appreciably in 1958, because of its high yield, low cost of production and the higher premium price obtained for the type of beans produced... The undertakings of the Overseas Food Corporation in Tanganyika were transferred in March 1955 to the Tanganyika Agricultural Corporation."

Table 5 (p. 208) shows the characteristics of 8 soya bean varieties (name, source, 1957 yield in lb/acre, habit, days to maturity, and seed colour). The varieties are: Malaya, Benares and Glycine Ruggett (from Nigeria), Hernon 237, Light Speckled, and R.184 (from Southern Rhodesia), MIS28EB (from Indonesia), CNS (from the USA). Of these, the two highest-yielding varieties in 1957 were Malaya (1,996 lb/acre), and Hernon 237 (1,990 lb/acre).

Concerning habit of growth (p. 208): Indeterminate varieties sometimes produce very rank growth, which often lodges badly and is difficult to harvest. They have numerous branches borne at a wide angle to the main stem and as many pods on the side branches as on the main stem. Hernon 237, which is indeterminate, is used in Southern Rhodesia as a forage variety.

"Determinate varieties have fewer branches than indeterminate ones and the branches are borne at a narrow angle to the main stem. Most of the pods are clustered thickly on the main stem and there are usually more pods per flower stalk than in the indeterminate varieties. The determinate varieties have a shorter period of maturity and are smaller than the indeterminate varieties. Although the determinate varieties are most efficient plants (especially Light Speckled and R184) they are unsuitable for combining due to the pods being borne close to the ground." Address: Botanist, Ministry of Natural Resources, Tanganyika.

906. FAO/WHO/UNICEF Protein Advisory Group (PAG). 1960. Saridele plant–Indonesia. New York. R.2/Add.4. Aug. *

907. Aljat, -. 1960. Food & utilization of food resources (Indonesia). In: Proceedings of the Fourth Pan Indian Ocean Science Congress. Section G. Human Ecology. See p. 65-68. Held 14-24 Nov. 1960 at Karachi, Pakistan.

• ***Summary:*** Gives detailed instructions for making the following soybean products: tempeh (tempe, soya-cake, moulded), tofu (tahu, soya curd, coagulated with gypsum/sakow powder), miso (taotjo), and sweet Indonesian soy sauce (Ketjap, made with black soybeans). Also describes how to make onchom (ontjom) from peanuts, plus krupuk, and lempers. Table 1 compares the nutritional composition of powdered Saridele and cow's milk. Table 2 compares the amino acid composition of various mixtures containing soy.

Note: This is the earliest English-language document seen (Feb. 2004) that uses the term "soya curd" or the word "tahu" to refer to tofu. Address: Nutritional Inst. Labs., Djakarta, Indonesia.

908. Prawiranegara, Dradjat; Ravi, Ihsan el. 1960. Food & utilization of natural food resources (Indonesia). In: Proceedings of the Fourth Pan Indian Ocean Science Congress. Section G. Human Ecology. See p. 55-63. Held 14-24 Nov. 1960 at Karachi, Pakistan.

• ***Summary:*** This is a relatively early publication by an Indonesian author on soyfoods, especially tempeh. The first author's name is incorrectly listed on the document as simply Dradjat or Dradjet. "Protein rich food. Soya beans: In order to increase the protein consumption of the people more soya bean should be made available, and soya products should be popularized and manufactured on large scale." After praising the nutritional properties of soybeans, the authors continue: "In order to render soya protein utilizable, both destruction of the cell walls and heat treatment are necessary. Crushing the beans such as in the manufacture of soya milk and 'tahu' or the action of fungi which partly digest and break the cell wall such as the case with 'tempeh' are means of improving the nutritional value of soya. All these foods are heat treated both during the manufacture and on preparation for the table, and the enzyme inhibitors are destroyed. Tempeh, tahu [tofu], tautjo [Indonesian-style miso], ontjom, soya milk, etc. [are excellent foods. A meal] which gives the maximum biological value contains soya proteins and rice protein in the ratio of about 2.3. Therefore an adult who receives little or no animal food should get 15 or 20 gm soya protein with his rice. A medium size family should get 75 to 100 gm of soya protein. Unfortunately, soya preparations such as tempeh and tahu are comparatively expensive. For example 100 gm of soya protein in the form of tempeh costs about 5 rupiahs. This is why it is necessary to find a simple way of using unprocessed soya beans. The preparations of 'fried soya' is one such way. Fried soya is simply prepared as follows. Soya is soaked overnight in water with a little salt added, ground to a paste. The stuff is pleasant smelling, and tastes good. It can be used in many different ways, both in adults and in children's food. It costs little, compared to tempeh or tahu, and its nutritional value is high, specially when mixed with rice or corn. It is certain that the introduction of fried soya to the Indonesian family's daily diet will appreciably improve the nutritional status of the people. Three times as much soya protein can be consumed for the price paid for tempeh or tahu. Recent work on tempeh (which is soya bean product subjected to the action of certain fungus) have shown that the product is of a higher nutritional quality than heat-treated soya bean. Apparently the fungus growth on the soya favourably alters the biological value of its protein. More work is needed on the subject in order to find out the reason for such improvement. It was suggested that tempeh should be investigated as infant food. (P. Gyorgy's recent report to W.H.O. Protein Advisory Group).

Note: This is the earliest English-language document seen (March. 2009) uses the word "tautjo" to refer to Indonesian-style miso.

"'Saridele' is an imitation milk of vegetable origin. It is made from soya sesame combination. It is available as spray-dried powder. The composition is similar to cow milk powder. Animal trials have shown that the protein of the product is somewhat inferior to cow milk, but the biological value improves considerably when mixed with rice. Trials with infants showed that Saridele is well tolerated by older infants and it is a valuable addition to the diet after the age of 6 months. In case of emergency, when no cow milk is available, saridele may be used as food for infants over 4 months of age (will be published by Children Dep. Medical School, Univ. Indonesia)." A table lists gives the nutritional composition of soybeans, tempeh, tofu, fish flour, fresh cassava leaf, and dry cassava leaf. Address: 1. M.D., M.P.H., Director, National Nutrition Inst., Dep. of Health, Djakarta; 2. FAO Food Chemist.

909. Puyaoan, R.B.; Pengson, R.D.; Eusebio, J.A. 1960. The value of soybean oil meal in ration for growing-fattening pigs. *Philippine Agriculturist* 44(7):355-60. Dec. [12 ref]

• ***Summary:*** Soybean oilmeal can profitably replace half of the fish meal in rations for pigs. Address: Central Exp. Station, Philippines.

910. Steinkraus, K.H.; Yap, B.H.; Van Buren, J.P.; Provvidenti, M.I.; Hand, D.B. 1960. Studies on tempeh: An Indonesian fermented soybean food. *Food Research* 25(6):777-88. Dec. [6 ref]

• ***Summary:*** Also cited as New York State Agric. Exp. Station Journal Paper No. 1176.

Note: This is the earliest document seen, written by researchers in the USA, that contains the word "tempeh" in the title. Address: Cornell Univ.

911. USDA ARS Northern Utilization Research and Development Division, Peoria, Illinois. 1960. Definitions of foreign foods of current interest (Brochure). Peoria, Illinois. 4 p. 28 cm.

• ***Summary:*** The first section, titled "Japanese foods from soybeans" (p. 1-2) includes: Aburage, frozen tofu, Hamanatto, kinako, koji, kori tofu, miso, monosodium glutamate (a seasoning compound first isolated from soy sauce), nama-age, natto, satsumage, soybean milk or tonyu, soy sauce or shoyu, tofu, yaki-dofu, yuba.

The second section, titled "Indonesian fermented foods" (p. 3-4) includes: Arak, ketjap (soy sauce made with

black soybeans), ontjom, ragi, sajur asin, tapé ketan (fermented glutinous rice), tapé katella (fermented arrowroot), tempeh (or témpé or témpé kedelé), tuwak. Address: Peoria, Illinois.

912. **Product Name:** Soymilk.
**Manufacturer's Name:** Bandung College.
**Manufacturer's Address:** Bandung, West Java, Indonesia.
**Date of Introduction:** 1960.
**New Product–Documentation:** Letter from Eric C. Fehlberg, Director, International Health Food Assoc. 1990. May 24. This organization no longer makes foods.

913. Boedijn, K.B. 1960. The Uredinales of Indonesia. *Nova Hedwigia* 1:463-96. *
• ***Summary:*** Various species under Uredinales that occur in Indonesia were collected and identified. *Phakopsora pachyrhizi* was identified. Uromyces sojae (Henn.) Syd. was identified on *Glycine max.* The original material was collected between 1949 and 1954. Address: s'Gravenhage, Netherlands.

914. Rawi, Ichsan el; Oey, K.N. 1960. [Soya-rice baby food]. *Jakarta, Lembaga Makanan Rakjat, Departemen Kesehatan Repubublik Indonesia.* [Ind]*

915. Food and Agricultural Organization of the United Nations. 1960. Soybeans: Area harvested, yield, and production. *FAO Production Yearbook (Rome, Italy)* 14:116.
• ***Summary:*** The following nations are listed for the first time as soybean producers in the *FAO Production Yearbook.* * = Unofficial figure. F = FAO estimate. Bulgaria: Harvested 21,000 ha in 1948-1952, and 1,000 ha in 1957, 1958, and 1959.

Colombia: Harvested 8,000* ha in 1958, and 11,000* ha.

Viet-Nam, South: Harvested 3,000 ha in 1957, 2,000 ha in 1958, and 4,000 ha in 1959.

Name changes: Belgian Congo is changed to Congo (ex-Belgian) (production in villages). "Ethiopia and Eritrea, Fed. of Ethiopia" is changed to "Ethiopia" (Footnote states: "excludes Eritrea"). The 1967 issue of this Yearbook states that Ethiopia harvested 13,000 ha in 1948-1952, 10,000F ha in 1952-1956, and 10,000F ha in 1962, 1963, 1964, 1965, and 1966. The 1982 issue states that Ethiopia harvested 6,000 ha in 1974-76, and 7,000 ha in 1980F, 1981, and 1982F.

"China Taiwan" is listed under Asia, and "China Mainland" is listed by itself outside of (below) Asia.

916. Huang, Lin. 1960. Seni bunga Tionghoa [Chinese flower arrangement]. Djakarta, Indonesia: Keng Po. xiv + 97 p. See p. 99. Illust. 22 cm. [Ind]*
• ***Summary:*** Mentions *ketjap manis* and *ketjap asin* as ingredients in one recipe (XIX. Tambahan, p. 99).

Note: This is the earliest document seen (May 2010) that contains the term *ketjap manis.* Indonesians have been making a sweet, thick soy sauce since at least the early 1800s (see Titsingh 1824 and Prinsen Geerligs 1895). Traditionally, it was typically sweetened with a dark sugar from the areng palm and flavored with star anise and other seasonings and herbs

917. Reischauer, Edwin O.; Fairbank, John K. 1960. East Asia: The great tradition. Boston, Massachusetts: Houghton Mifflin Co. xiii + 739 p. Illust. Index. 23 cm. First published 1958. [150+* ref]
• ***Summary:*** A masterful history of the subject, focusing on political history. Contents: 1. The setting of East Asian history. 2. Early China: The birth of a civilization. 3. Classic China: The golden age of Chinese thought. 4. The first Chinese empire: The Ch'in and Han dynasties. 5. The "barbarian" challenge and the regeneration of the empire. 6. The late T'ang and Sung: The golden age of Chinese culture. 7. China and the "barbarians": The Mongol empire. 8. State and society under the Ming. 9. Traditional China at its height under the Ch'ing (incl. Manchu Conquest, Tibet). 10. Traditional Korea: A variant of the Chinese cultural pattern. 11. Early Japan: The absorption of Chinese civilization. 12. Feudal Japan: A departure from the Chinese pattern. 13. Tokugawa Japan: A centralized feudal state. 14. East Asia on the eve of modernization.

Page 12 states that "many of the principal crops and animals of East Asia, notably rice, the soy bean, the chicken, the water buffalo and the pig, seem to have come from hot and humid Southeast Asia." Note: As of 1995 the soybean is thought to have originated in northeast China, not in Southeast Asia. Address: Harvard Univ.

918. Winstedt, Richard Olof. 1960. An English-Malay dictionary. 2nd ed. Singapore. *
• ***Summary:*** States that the Indonesian word *kedelai,* meaning "soybean" comes from the Tamil language of southern India. Richard Olof was born in 1878. "Notes: Based on Mr. R.J. Wilkinson's Malay-English Dictionary."

919. Nagata, Tadao. 1961. Studies on the differentiation of soybeans in the world, with special regard to that in the Southeast Asia. III. Some photoperiodic aspects of the nature of the tropical soybeans. *Nippon Sakumotsu Gakkai Kiji (Proceedings of the Crop Science Society of Japan)* 29(2):267-72. Jan. [14 ref. Eng; jap]
• ***Summary:*** In the tropics, soybeans are a crop of minor economic importance Concerning growth habit: Indeterminate soybean plants are generally taller than determinate soybean plants. Soybean plants from temperate zones grow low in height when planted in the tropics and

the yield is usually lower. Address: Hyogo Agricultural College, Japan.

920. Sutedjo, -; Poey, S.H. 1961. [Nutrition, soya and trials of it for young children and infants]. *Majalah Kedokteran Surabaya (J. of the Indonesian Medical Association) (Surabaya)* 11:7-28. *

921. Sutedjo, -; Poey, S.H. 1961. [Nutrition: Soja and trials of it for young children and infants]. *Majalah Kedokteran Surabaya, Indonesia (Surabaja J. of Medicine)* 10:271-76. Jan. [Ind]*

922. Fact sheet: Harry Willis Miller, M.D., F.A.C.S. (News release). 1961. n.p. 1 p. April. [1 ref]
• ***Summary:*** This one-page biographical sketch of Dr. Miller was released with the book *China Doctor,* by Raymond S. Moore, published this month by Harper & Brothers in New York. "Dr. Clarence Hall, *Reader's Digest,* says: 'Towering figure... Dr. Harry W. Miller... in the inspiring tradition of such all-time "greats" as Livingston, Judson and Paton [sic, Patton, General George]... restless creator of new traditions, a modern-day pioneer whose imaginative use of medicine has touched millions with the magic of new hope and health."

Concerning his work with soymilk and nutrition, this sketch states: "Proponent of preventive medicine, public health and nutrition as greatest challenge to America from world's needy (Consultant to United Nations). Out of this grew his research and development of fiber-free, potable soybean milk which is saving countless lives of infants and adults around the world (In Hong Kong more Miller soymilk sold than soda pop). Gives all royalties and fees back to research and building of hospitals (over $2,500,000). U.N. establishing overseas soymilk plants with Miller's counsel in areas where there are few cows (Indonesia, etc.). Recipient of gold medals for research."

Note: The soymilk made in Hong Kong that sold better than soda pop was not made by Harry Miller; he never made commercial soymilk in Hong Kong. Rather, it was Vitasoy, made by K.S. Lo of Hong Kong Soya Bean Products Co. Ltd.–with little or no influence from Dr. Miller.

923. Moore, Raymond S. 1961. China Doctor: The life story of Harry Willis Miller. New York, NY: Harper & Brothers. xiv + 215 p. Illust. (8 pages of photos). Index. 21 cm. 2nd edition, 1969. Pacific Press, Mountain View, California.
• ***Summary:*** A key but sometimes inaccurate source of biographical information. Contains many excellent photos of Dr. Miller, including an especially good portrait on the inside rear cover.

Contents: Foreword by Hollington K. Tong. Preface. Map: The Far East. The opium cure. Hallway to service. The medical buff. Young surgeon at work. Slow boat to China. From mufti to mao tze and queue. The penniless VIP. Strange horizons. Pigtail honeymoon. Wife hunt. Picture section. Some close calls. A key decision. Operating on the Siamese elephant. Conquering new fields. Return to the Orient. No recipes in China. High finance. Facing the medical boards. A doctor's choice. Travel by presumption. To bow or not to bow. Kidnaping the generalissimo. "Mayor" Miller. An ounce of prevention. Shanghai again. China's greatest honor. Benghazi brink.

The rear cover of the book describes it as follows: "What happens when a man gives himself and his talents to the service of God? Here are a few of the things that Dr. Harry Willis Miller has done and is still doing! At 23 gave up a promising medical career and quarter-million dollar inheritance in America. Went to China as a medical missionary and lived among the poor and sick. Immediately began building the first of 15 hospitals throughout China. With inventive genius performed daring operations and made new discoveries in preventive medicine. Was responsible for many cures of the dread opium 'sickness,' including the cure of the famed 'Young Marshal' Chang. Became perhaps the most widely practiced surgeon in the world. Invented and developed soybean milk, which is responsible today for saving thousands of lives in undernourished areas of the world. Had many dramatic encounters with bandits, wars, famines. Was so well-known and respected that during World War II the Japanese invaders permitted Dr. Miller to give sanctuary to Chinese soldiers in the hospital compound. Returned to the U.S. for a time. Was consulting physician to 3 U.S. presidents and personal physician to national figures, senators, ambassadors, etc. Was awarded the coveted Blue Star of China by Generalissimo Chiang Kai-shek. At 81 is still healing and caring for the people of the Far East."

An ad for the book in *Soybean Digest* (Nov. 1935, p. 35) begins: "The incredible biography of the 'Schweitzer' of the Orient."

Pages 180-89 describe Dr. Miller's work with soy milk, Soyalac and Soyagen, and other soy foods. In the Shanghai Sanitarium kitchen he learned how to improve the flavor and digestibility of soy milk by running steam directly into the milk. From the Philippine Refining Co., which transformed bad-smelling copra into good-smelling coconut oil, he learned that steam distillation was the key to the transformation. From a Filipino company that refined stale and rancid butter into a product that tasted as fresh as new, he learned the secret of flash pasteurization–which effectively killed bacteria. Back in China, Dr. Miller, with his older son, Harry Willis Miller, Jr., worked to apply these new discoveries to soy milk. They worked! He expanded his experiments with infants and children, and in 1936 his results were published in the *Chinese Medical Journal.*

Photos (p. 81-89, unnumbered) show: (1) An excellent full-page portrait of Dr. Miller at age 81. (2) Harry and

Maude Miller in China, wearing the Chinese dress they adopted after their arrival in 1903. Maude's tragic death two years later–caused by sprue, a vitamin deficiency disease–gave added personal meaning to Dr. Miller's nutritional research. (3) A group portrait showing a meeting of Adventist Missionaries at Shanghai, China, in 1907. (4) Harry and Marie Iverson Miller at the time of their marriage in 1908. A trained nurse, she served with him through 42 years of missionary activity, and helped rear their 4 children. (5) Shanghai Sanitarium, opened 1 Jan. 1928, the first of 15 hospitals to be established in China under the leadership of Dr. Miller, who also founded numerous smaller clinics. (6) Members of the Shanghai Sanitarium staff in the mid-1930s, standing in front of a one-engine plane, as they see him off for a visit to outlying places. (7) Dr. Miller and Marshall Chang Hsüeh-liang at Hankow airport in 1935, two years after Dr. Miller had cured the young Marshall's opium addiction. (8) Dr. Miller carried out more than 18,000 operations. Here he performs a thyroidectomy at one of his frequent visits to hospitals in Manila, Philippines. (9) Wuhan Sanitarium and Hospital at Wuchang, one of the medical units established through the generosity of the Young Marshal. Twenty thousand refugees moved into the Sanitarium compound when Hankow capitulated to the Japanese in 1938. (10) The ruins of the Wuchang city dispensary, destroyed by Japanese bombs in 1938. (11) Dr. Miller examines a soybean plant grown on his farm at Mt. Vernon, Ohio. (12) Dr. Miller demonstrates his small-scale soymilk processing machine, which can be operated by one person. "The goal of Japan's Ministry of Health is to install one of these in each of the thirty thousand village tofu (soy cheese) factories in Japan." (13) A baby and nurse with a large can of Soyalac. (14) A soymilk booth in Hong Kong, where more soymilk is sold than any kind of soft drink. The bottles in wooden cases are stacked four high. (15) A baby at the Benghazi, Libya, hospital, that Dr. Miller nursed back to health in 1956. (16) "Generalissimo Chiang Kai-shek greets Mrs. Mary Greer Miller while Madame Chiang congratulates Dr. Miller following the ceremonies held March 26, 1956, in which Miller received the Blue Star of China, that country's highest award, similar to the Congressional Medal of Honor in the United States." Address: Vice President, College of Medical Evangelists, Loma Linda, California.

924. Hafner, Fred H. 1961. Multi-Purpose Food: Valuable aid to improved nutrition. *Soybean Digest.* June. p. 20-21.
• ***Summary:*** "Since 1946, the nonprofit Meals for Millions Foundation has distributed over 62 million 2-ounce servings of MPF to 127 countries. Such eminent men as Dr. Albert Schweitzer (Gabon), Dr. Glen Tuttle (Congo), and the late Dr. Tom Dooley (Laos) praised MPF for its value in treating severe cases of protein starvation (kwashiorkor) and in meeting dietary needs of the malnourished which were treated at their hospitals. Since 1959, General Mills (GMI) has been manufacturing MPF for MFM as well as promoting its use in the U.S.A. and abroad." A photo shows Hafner. Address: Director of Protein Operations, Specialty Products Div., General Mills, Inc.

925. Dwidjoseputro, Dakimah. 1961. Studies on *Monilia sitophila* from Indonesia. *Bulletin of the Torrey Botanical Club* 88(6):404-11. Nov. [10 ref. Eng]
• ***Summary:*** A fungus found on ontjom-presscake of peanuts and okara onchom *(ontjom tahu)* fermented products in West Java, Indonesia is reported. Biological data suggest it to be *Neurospora sitophila;* it was traditionally called *Monilia sitophila.* Address: Dep. of Biology, Vanderbilt Univ., Nashville, Tennessee.

926. Ko Swan Djien; Hesseltine, C.W. 1961. Indonesian fermented foods: Made from soybeans. *Soybean Digest.* Nov. p. 14-15. [6 ref]
• ***Summary:*** Focuses on tempe (tempeh), ketjap, and studies at the Northern Laboratory. Address: NRRL, Peoria, Illinois.

927. *Soybean Digest.* 1961. A.K. Smith of Peoria Lab on trip to Asia. Nov. p. 7.
• ***Summary:*** Dr. A.K. Smith, head of meal products investigations, oilseed crops laboratory, Northern Regional Research Laboratory (Peoria, Illinois), left Oct. 15 on a 2½ month trip to India, Japan, and Indonesia. "Dr. Smith will survey research laboratories in the countries to determine those that are qualified to do food research and development on soybeans, soybean products, and related agricultural products under the P.L. 480 program." In Japan, he will visit trade associations to encourage the use of U.S. soybeans in Japanese foods.

Research is needed in six areas: Use of soy flour to supplement bread and cereal products. Manufacture of soybean protein. Use of tempeh. Production and nutritional value of soy milk. Production of low-salt miso for feeding babies. Comparison of U.S. soybean varieties in commercial production of tofu. A portrait photo shows Smith.

928. Ter Horst, K. 1961. The selection of pulses in Suriname. III. Soybean, cowpea, blackeye pea, mungbean and miscellaneous pulses. *Euphytica* 10(3):277-82. Nov. [10 ref. Eng; dut]
• ***Summary:*** Summarizes in English four papers originally published in Dutch, dealing mainly with crops suitable for alternating with rice. In the section titled "Selection of pulses for heavy clay soils" are the following subsections: (1) The soybean (p. 278-79). From the USA 59 varieties were imported, from Indonesia 16 and from the Philippines 4. All the American varieties had to be discarded, probably because they were not adapted to the day-length of Suriname. The three varieties chosen for multiplication and

release were Laris (selection from Otan from Buitenzorg, Indonesia; used to make tempé), Vada (from Indonesia), and Bilomi I (from Philippines).

(2) *Vigna sinensis* Savi ex Hasskarl, cowpea and blackeye pea.

(3) *Phaseolus radiatus* L., mungbean. "The mungbean was included in the selection programs. This crop is indigenous and offers an extra possibility for cultivation after rice because the growing cycle is very short, 60-70 days. The local varieties *urdi* and *katjang idjoe* were compared" with other varieties. "The world market for mung beans depends largely on the failure of the crop in Oklahoma. There is only trade when the American farmer cannot meet the domestic demand for sprouted beans. Prices and volumes are very erratic. It will be very difficult to base a program for the extension of the mungbean culture on this situation." Sesame is also mentioned (p. 280).

Note 1. This is the earliest English-language document seen (Nov. 2008) with the word "mungbean" (or "mungbeans") in the title.

Note 2. This is the earliest English-language document seen (Oct. 2006) that uses the term "blackeye pea" to refer to the cow pea. Address: Agronomist, Inst. for Soil Fertility, Groningen, The Netherlands.

929. Concepcion, Isabel; Cruz, Iluminada S. 1961. Amino-acid composition of some Philippine plant foods. *Philippine J. of Science* 90(4):497-517. Dec. [44 ref]

• ***Summary:*** Tables show the essential amino acid (EAA) content of many Philippine plant foods, including whole dry soybeans and defatted soybean meal. "The EAA indices ranged from 42 in fresh cassava to 99 in soybean (defatted) and in *tapilan.*" Address: Food & Nutrition Research Center, National Inst. of Science & Technology, Manila.

930. *Agricultural Statistics Yearbook of Vietnam.*1961-1967. Serial/periodical. *

• ***Summary:*** Contains information on soybeans in Vietnam.

931. Bennett, D.C. 1961. The basic food crops of Java and Madura. *Economic Geography* 37(1):75-87. *

• ***Summary:*** The distribution and areas of cultivation of the following crops are discussed: irrigated rice, unirrigated rice, maize, cassava, soybeans, groundnuts, and sweet potatoes.

932. *Directorate of National Agriculture, Vietnam, Progress Report.*1961. Cropping systems. p. 140-43. For the years 1960-61. *

• ***Summary:*** Various catch crops (including early soybean varieties, planted after mid-season rice), were successful in paddy fields. Groundnuts were also successful.

933. Directorate of National Agriculture, Vietnam. 1961. Field crops improvement. *Annual Progress Report, Directorate of National Agriculture, Vietnam.* p. 111-39. For the years 1960-61. *

• ***Summary:*** In soybean variety trials, Palmetto (from the USA) and Sankuo (from Japan) gave the highest yields. In the spacing trial the highest yields were obtained at 40 x 20 cm (1 plant per hill). Phosphate and calcium fertilizers significantly increased soybean yields. Eight varieties were planted monthly from Aug. to Dec. 1960. The growth period was shortened and plant height and yield were decreased by delayed planting. The largest seeds were produced from plants sown in September.

934. **Product Name:** Joy of Java Tempe.
**Manufacturer's Name:** Otten's Indonesian Foods.
**Manufacturer's Address:** Albany, California.
**Date of Introduction:** 1961.
**New Product–Documentation:** Shurtleff. 1982. Soyfoods. Winter. p. 21; Soyfoods Center Computerized Mailing List. 1982. July 23. The company is now located at 322 Key Blvd., Richmond, California 94805. Phone: 415-232-9511. It is run by Irene and Mary Otten.

Shurtleff & Aoyagi. 1985. History of Tempeh. p. 39. In 1961 Mary Otten started making tempeh in her basement on Stannage Ave. in Albany. She sold it to her friends and served it at parties that she catered. In 1967 she started Java Restaurant and served many tempeh recipes. In 1974 she and her daughter, Irene, started Otten's Indonesian Foods, America's earliest known tempeh company. By 1981 they were making a full line of tempeh second generation products.

935. Sutedjo, -; Poey, S.H.; Rawi, I. el. 1961. Soya-milk trial on infants up to 6 months old. *Paediatrica Indonesiana* 1:57-87. Based on Proceedings, First All Asian Congress on Pediatrics (New Delhi). *
Address: 1-2. Pediatric Dep. Medical School, Univ. of Indonesia, Jakarta.

936. György, Paul. 1961. The nutritive value of tempeh. *National Academy of Sciences, National Research Council, Publication* No. 843. p. 281-89. [3 ref]

• ***Summary:*** "The first tempeh preparations and control soybeans used in this study were obtained from Indonesia * (Footnote: *Through the courtesy of Dr. Poorwo Soedarmo, Institute of Nutrition, University of Djakarta, Indonesia) (1954, 1955) and Southern Rhodesia ** (Footnote: **Through the courtesy of the Executive Officer, Nutrition Council, Federal Ministry of Health, Salisbury, S. Rhodesia) (1955). In the following years attempts, largely futile, were made to produce tempeh in our own laboratory. In 1959 a cooperative arrangement has made it possible to produce tempeh and control soybeans on a larger scale in the

Department of Food Science and Technology, New York State Agricultural Station, Cornell University, Geneva, N.Y. under the supervision of Drs. D.B. Hand and K.H. Steinkraus. Under this arrangement, animal studies are carried out independently in our laboratory and in the laboratory of the School of Nutrition (Dr. R.H. Barnes), Cornell University, Ithaca, N.Y."

Various rat feeding experiments are described. Hemolysis tests were carried out by Dr. Kiku Murata (Osaka, Japan) in György's laboratory. It was found that "tempeh is stabilized by virtue of an 'antioxidant' produced during the course of the fermentation process. Unfermented soy flour had a high peroxide content and was rancid.

Note: Dr. Paul György was born in Nagyvarad, Hungary, on 7 April 1893. He received his M.D. degree in Budapest in 1915 and later studied at Heidelberg, Germany, where he became a professor of pediatrics. He has made many contributions to the field of nutrition with his studies of vitamin B-6, pellagra, biotin and vitamin H. Since 1944 he has been associated with the Philadelphia General Hospital as a pediatrician and as Professor of Pediatrics at the University of Pennsylvania, a post from which he "retired" in 1960. Address: Chairman, Dep. of Pediatrics, Philadelphia General Hospital, Philadelphia 4, Pennsylvania.

937. Issoegianti, Seraphine. 1961. Qualitative determination of amino acids in *Rhizopus.* Thesis (Skripsi), Bagian Biologi Institut Teknologi Bandung, Bandung, Indonesia. 14 p. PBITB. [Eng]*
Address: Bandung, Indonesia.

938. Mendoza, Jose M. 1961. Philippine foods, their processing and manufacture. Manila: Published by the author. 421 p. See p. 152-59. Chap. XV, Sauces and Similar Products. [7 soy ref]
• ***Summary:*** Contents of Chapter 15 titled "Sauces and similar products" (p. 152-58): Soybean sauce *(toyo).* Japanese soya sauce: Preparation of the starter, preparation of the material, inoculation, fermentation. Modified Chinese soya sauce. Coco sauce or coprameal sauce (The taste compares favorably with Chinese soy sauce and Japanese soy sauce). Hints and suggestions. Philippine bean sauces. The tao-si [taosi, soy nuggets], tokua [tofu, not fermented], tahore [taori, taore; probably fermented tofu], the tajo (unpressed tofu curds, usually served with medium brown sugar), mongo [mung bean] sprouts, soybean sprouts, Vetsin (contains 1 part monosodium glutamate, 7 parts lactose, and 3 parts salt). Includes a formula for Worcestershire sauce (which contains no soy sauce).

Note 1. This is the earliest document seen (May 2003) that contains any Filipino word for unpressed tofu curds, usually served with medium brown sugar, tajo.

Note 2. The section titled "Tahore" (p. 157) states: "This product is simply taori whereby the already prepared taore is macerated to mass. Tokua [tofu] is used frequently with tahore. They are both popular food [sic, foods] among Chinese. The Chinese eat them with soft-boiled rice called 'barabasa.'" Address: Lecturer in Food Technology and Fermentation Technology, Manuel L. Quezon Univ., Manila.

939. Mendoza, Jose M. 1961. Philippine foods, their processing and manufacture. Manila, Philippines: Philippine Educational Co. 524 p. See p. 186-93. Chap. XV, Sauces and Similar Products. [7 soy ref]
• ***Summary:*** The contents of this edition is basically identical to that of the other 1961 edition published by the author. However the typesetting and the page numbers are different. Address: Lecturer in Food Technology and Fermentation Technology, Manuel L. Quezon Univ., Manila.

940. Steinkraus, Keith H.; Van Buren, J.P.; Hand, D.B. 1961. Studies on tempeh: An Indonesian fermented soybean food. *National Academy of Sciences, National Research Council, Publication* No. 843. p. 275-79. Progress in Meeting Protein Needs of Infants and Preschool Children. [4 ref]
• ***Summary:*** Same as 1960 article published in *Food Research* 25(6):777-78. Address: Cornell Univ.

941. *Soybean Digest.*1962. Sees growing interest in soybeans in Philippines. Jan. p. 5.
• ***Summary:*** "Soybean production in the Philippines to date has been insignificant, but there appears to be a growing interest in the crop at the present time.

"The Philippine Bureau of Plant Industry is carrying on soybean improvement work including development, multiplication and distribution of pure seed of high-yielding adapted varieties.

"In the Philippines, soybeans are planted twice a year, in the wet season during May and June, and in the dry season during November and December."

942. **Product Name:** Amoy Soy Sauce.
**Manufacturer's Name:** Amoy Canning Corp. (Singapore) Ltd.
**Manufacturer's Address:** 13 KM Bukit Timah Rd., Singapore.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 37. "Southeast Asia as a market for U.S. soybeans and vegetable oils." Amoy Canning Corporation, Singapore, Ltd. is one of the two largest manufacturers of soybean sauce in Singapore. No address is given.

Soya Bluebook. 1981. p. 69. Address: 13 KM Bukit Timah Rd., Singapore.

943. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Cheong Chan (Hup Kee).
**Manufacturer's Address:** 36 Jalan Penchala, Petaling Jaya, Selangar, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 39. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

944. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Chong Pang Chan.
**Manufacturer's Address:** 327 Telaga Ayer Road, Butterworth, Province Wellesley, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 38. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

945. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Chop Chow Tuck Woh.
**Manufacturer's Address:** 54 Tranquerah Road, Malacca, Malacca, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 39. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

946. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Chop Woh Chun.
**Manufacturer's Address:** 192 Patani Road, Penang, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 38. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

947. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Chop Yuen Chan Chun.
**Manufacturer's Address:** 19 Chan Sow Lin Road, Kuala Lumpur, Selangor, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 39. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

948. **Product Name:** Tofu.
**Manufacturer's Name:** Eng Hor Hin Co.
**Manufacturer's Address:** 96-A Sungei Road, Singapore 8, Singapore.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 37. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

949. *Foreign Agriculture.* 1962. Soybean markets in Southeast Asia. 26(2):17. Feb.
• ***Summary:*** Four areas in Southeastern Asia–Hong Kong, Malaya, Singapore, and possibly Sarawak–are growing commercial markets for U.S. soybeans and soybean oil. Communist China has long been the main source of soybeans for Southeast Asia. The use of U.S. soybeans in the four areas is limited largely to those foods for which splits and broken beans are suitable–namely, soybean curd, soybean sauce, and soybean cheese.

950. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Hang Chan Woh Kee.
**Manufacturer's Address:** c/o 1-3 Pudu St., Kuala Lumpur; Factory: 4¼ mile, Klang Gate Rd., Setapak, Kuala Lumpur, Selangor, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 39. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

951. **Product Name:** Tofu.
**Manufacturer's Name:** Heng Seng Tung Kee.
**Manufacturer's Address:** 13 Ophir Road, Singapore 7, Singapore.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 37. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

952. **Product Name:** Tofu.
**Manufacturer's Name:** Hok Hoo Him.
**Manufacturer's Address:** 108-A Albert St., Singapore 7, Singapore.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 37. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

953. **Product Name:** Tofu.
**Manufacturer's Name:** Hup Hin Co.
**Manufacturer's Address:** 155 Syed Alwi Road, Singapore 8, Singapore.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 37. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

954. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Kian Guan Sauce Factory.
**Manufacturer's Address:** 2¼ mile, Tampin Road, Seremban, Negri Sembilan, Malaysia.
**Date of Introduction:** 1962. February.

**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 39. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

955. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Kong Chang.
**Manufacturer's Address:** 226 Jelutong Road, Penang, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 38. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

956. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Kong Guan Tong Kee.
**Manufacturer's Address:** 232 Bagan Ajam, Butterworth, Province Wellesley, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 38. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

957. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Kum Cheong.
**Manufacturer's Address:** 202 Jelutong Road, Penang, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 38. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

958. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Kwan Loong & Co.
**Manufacturer's Address:** 214 Jelutong Road, Penang, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 38. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

959. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Kwong Ban Wah Factory.
**Manufacturer's Address:** 6 MacCallum Street, Penang, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 38. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

960. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Kwong Bee Chun Sauce Factory.
**Manufacturer's Address:** P.O. Box No. 20, Taiping, Perak, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 39. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

961. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Kwong Bee Woh Sauce Factory.
**Manufacturer's Address:** 19 Chinese Club Road, Taiping, Perak, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 39. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

962. **Product Name:** Beanectar or Beannectar (Soybean Milk).
**Manufacturer's Name:** Malayan Food Products Ltd.
**Manufacturer's Address:** 153 McNair Rd, 12, Singapore.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 22. "Southeast Asia as a market for U.S. soybeans and vegetable oils." In Singapore 2 companies are engaged in the production of pasteurized soybean milk, which is sold as a soft drink. They use about 100 tons of soybeans a month for this purpose. One product is marketed as "Beanectar" soybean milk. On p. 37 the company name is given, and the product name is spelled Beannectar. The managing director is Tan Chong Ming. "The company uses about 3 tons of Mainland Chinese soybeans daily when operating."

963. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Man Sang Sauce Manufacturer.
**Manufacturer's Address:** 39 Patani Road, Penang, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 38. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

964. **Product Name:** Tofu.
**Manufacturer's Name:** Min Shing Chop.
**Manufacturer's Address:** 68 Wiltie Road, Singapore 9, Singapore.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 37. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

965. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Nanyang Sauce Co.
**Manufacturer's Address:** Lot 6774 Tambun Road, Ipoh, Perak, Malaysia.
**Date of Introduction:** 1962. February.

**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 39. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

966. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Sin Hin Leong.
**Manufacturer's Address:** 6A Jalan Kampong Perak, Alor Star, Kedah, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 39. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

967. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Soon Cheong Co.
**Manufacturer's Address:** 4076 Bagan Ajam, Butterworth, Province Wellesley, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 38. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

968. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Soon Hing Sauce Factory.
**Manufacturer's Address:** 191 Burmah Road, Penang, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 38. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

969. Spilsbury, Calvin C. 1962. Southeast Asia as a market for U.S. soybeans and vegetable oils. *USDA Foreign Agricultural Service.* FAS-M-126. 41 p. Feb. Summarized in Soybean Digest, March 1962, p. 26.

• ***Summary:*** Gives an excellent, detailed discussion, with many statistics, of the soybean markets in Hong Kong, Singapore, Malaysia, Indonesia, British Borneo (Sarawak, Brunei, and North Borneo [Sabah]), and Burma.

"The 350,000 Chinese of British Borneo are large consumers of soybean food products and fats and oils, but this market is small. Domestic production of soybeans in North Borneo is more than sufficient to supply domestic demand for that country, and some exports are made each year. Imports of soybeans into Sarawak and Brunei, though small, have been growing each year. In 1960 Sarawak's imports were 608 long tons, compared with 526 tons in 1959 and 403 tons in 1958. Thailand, Mainland China, Vietnam, and Cambodia are the main suppliers, as U.S. soybeans have been scarce in this market."

Burma: "The domestic production of soybeans in Burma has been small, but output is large enough to provide demands of the Burmese people in the Shan State, population approximately 500,000, who use soybeans for food." The peanut is the main oilseed crushed in Burma. The majority of peanut crushing mills are located in Rangoon, Insein, Mandalay, and Myingyan.

Table 6 (p. 29) shows imports (in piculs; 1 picul = 133 lb) of soybeans to Sarawak, by country of origin, annually 1958-1960. The main source countries are Thailand, Mainland China, and Indochina. Imports increased from 6,853 piculs in 1958 to 10,343 piculs in 1960.

Appendix: Hong Kong: Importers of U.S. soybeans, manufacturers of wet and dried bean curd for export to U.S., soybean sauce manufacturers. Singapore: Importers of U.S. soybeans, importers agents providing services to soybean importers, manufacturers of soybean curd, largest soybean sauce manufacturers, soybean milk companies. Federation of Malaya: Importers of soybeans, soybean sauce factories (Penang, Province Wellesley, Kedah, Perak, Selangor, Malacca, Negri Sembilan). Sarawak: Soybean importers and dealers (all of Kuching). Burma: Fats and oils importers (Rangoon), vegetable oil mills (Rangoon).

Note 1. Sarawak became part of Malaysia in 1963. Note 2. This is the earliest document seen (May 2010) concerning soybeans in Brunei. This document contains the earliest date seen for soybeans in Brunei (Feb. 1962). Address: Fats and Oils Div.

970. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Swee On Woh Sauce Pty Ltd.
**Manufacturer's Address:** 52/4 Bridge Street, Penang, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 38. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

971. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Tai Tong.
**Manufacturer's Address:** 20 Sungei Rambai, Bukit Mertajam, Province Wellesley, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 38. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

972. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Thye Woh.
**Manufacturer's Address:** 33C Kampong Perak, Alor Star, Kedah, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 39. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

973. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Tin Chan Sauce Factory.

**Manufacturer's Address:** Chan Sow Lin Road, Kuala Lumpur, Selangor, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 39. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

974. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Tong Fong.
**Manufacturer's Address:** 2 Kajang Road, Penang, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 38. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

975. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Woh Chun.
**Manufacturer's Address:** 21-H Kampong Perak, Alor Star, Kedah, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 39. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

976. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Yee Yuen.
**Manufacturer's Address:** 840 Perak Lane, Penang, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 38. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

977. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Yeo Hiap Seng Canning & Sauce Factories.
**Manufacturer's Address:** 23, 7 M.S. Bukit Timah Rd., Singapore.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 37. "Southeast Asia as a market for U.S. soybeans and vegetable oils." Yeo Hiap Seng Canning and Sauce Factories is one of the two largest manufacturers of soybean sauce in Singapore. The address appears to be at 23, 7 M.S. Bukit Timah Rd.

Soya Bluebook. 1981. p. 69. Yeo Hiap Seng Ltd., 950 Dunearn Rd., Singapore 21.

978. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Yip Heong.
**Manufacturer's Address:** 3 Lines Road, Penang, Malaysia.
**Date of Introduction:** 1962. February.
**New Product–Documentation:** U.S. Foreign Agricultural Service. FAS-M126. Feb. p. 38. "Southeast Asia as a market for U.S. soybeans and vegetable oils."

979. Lee, Elinor. 1962. Goodwill grows in climate of culture: Food promotes friendship. *Washington Post.* March 22. p. C7, 20.
• ***Summary:*** In Washington, DC, the "Cultural Evenings in Asian Embassies" is a flavor venture, sponsored by the Buddhist Center of the U.S.A. to help promote international goodwill and understanding. The dinner menu at the Royal Thai Embassy on Saturday night will include "Kung Lon (Boiled coconut cream with shrimp and soya bean sauce)." The recipe is given. A second recipe, Mee Krob, which contains "3 tablespoons finely cut bean curd" and "soya bean sauce" to season, is also given. A third recipe, Yam Yai, includes ½ cup bean curd (cut fine). "Thailand's top recipes aren't in any cookbooks."

980. Scott, Walter M. 1962. Current status of soybean research under P.L. 480. *Soybean Digest.* May. p. 44, 46-48.
• ***Summary:*** Gives a summary of progress on grants approved prior to Sept. 1971 in Finland, France, Israel, Italy, Japan, Poland, Spain, and the United Kingdom. There are now additional proposals under consideration in France, Indonesia, Israel, Italy, Japan, and Spain. For each project, the size of the grant in that country's currency is given.

In Finland, for example, a grant has been approved for an "Investigation of continuous multistage countercurrent crystallization of linseed and soybean fatty acids as a practical method of producing pure unsaturated fatty acids," by the University of Helsinki, Viik, Malmi. Amount: $70,500. Approved Feb. 1960. Address: Asst. Director, Foreign Research and Technical Programs Div., ARS, USDA.

981. Republic of Vietnam, Department of Rural Affairs, Commissariat General for Land Development and Rural Affairs, Directorate of Rural Affairs. 1962. Field crops improvement. In: Annual Work Progress Report on Crop Improvement Program of Rice, Sugarcane, Vegetable and Field Crops (for the period from July 1961 to June 1962). Vietnam: Directorate of Rural Affairs. 300 p. July. See p. v-vi, 135-48.
• ***Summary:*** At bottom of cover page: "A cooperative project between the Directorate of Rural Affairs (DRA), and the Chinese Technical Mission to Vietnam on Crop Improvement (CIM)."

The summary section titled "Field crops improvement" states (p. v-vi): As part of a crop improvement program, 16 varieties of soybeans were tested. Promising varieties were Palmetto and Sankuo. It was found that growing soybeans with closer spacing than the conventional spacing could increase yield. In a field experiment with the soybean

variety Palmetto, sown as a second crop in July, the close spacing of 40 cm by 10 cm and 2 plants per hill gave 38% more yield than the conventional spacing. Soybeans showed a high response to phosphate and a moderate response to nitrogen fertilizer. As for planting date, Palmetto can be grown year-round, but the best seasons for sowing are April and July, whereas Sankuo is best planted in July as a summer crop.

The larger section on "Field crops improvement" (p. 114-175) contains a subsection titled "IV. Soybean" (p. 135-48) which has this contents: Field work on soybean: Comparative test of 12 soybean varieties in 1961 (summer crop, fall crop, yields of each: Sankuo yielded 2,045 kg/ha), test of planting date of soybean, fertilizer tests, spacing tests. Recommendation for the future: Exploring foreign markets (such as Taiwan), developing main production areas near sea ports and organizing cooperatives, varietal improvement, cultural improvement (planting date, spacing, fertilizer), insect control (stem maggot and pod borer are the most destructive; *Leguminivora (Cydia) glycinivorella* (Mats.) and *Caloptilia soyella* (van Dev.) *[Melanagromyza, Ophiomyia];* sprays of endrin, fenthion or Sevin gave good control of the former).

The soybean is currently one of the crops grown on a small scale in Vietnam; its production is still insufficient to meet the demand. For example, in 1959 only 1,416 metric tons (tonnes) were produced on 2,219 ha, and an additional 400 tonnes were imported for consumption. Vietnam is working to diversify crop production in order to expand exports, in order to earn more foreign currency. Expanded soybean production seems to look promising in this respect. Therefore, experiments on varietal and cultural improvement have been carried out at Hung-Loc Station since 1960. Despite the good experimental results, expansion of commercial soybean production has faced many obstacles: 1. Local consumption is limited, because the people of Vietnam do not frequently include soybean products in their daily meals. 2. Since the difference between the export price and the local price is small, dealers are not interested in exporting soybeans at a small marginal profit. Thus growers have difficulty selling their product. 3. Production is unstable because of the uneven distribution of rainfall and insect damage. 4. The reluctance of farmers to plant new crops will prevent the expansion of soybean culture into new areas. Address: Vietnam.

982. Hermann, F.J. 1962. A revision of the genus *Glycine* and its immediate allies. *USDA Technical Bulletin* No. 1268. 82 p. Dec. Illust. [26 ref]

• ***Summary:*** Contents: Introduction. Taxonomic history of the genus Glycine. Taxonomy: Key to genera related to Glycine, systematic list of Glycine and its immediate allies, Glycine (Subgenus Leptocyamus, subgenus Glycine, subgenus Soja), species excluded from Glycine, Paraglycine, Pseudoglycine, Teyleria. Index.

"A tabulation of the species described as *Glycine* from Index Kewensis, for example, results is a total of 286 and the addition of published subspecies and varieties brings the number to 323... Linnaeus proposed eight species under the name *Glycine* in 1753 in Species Plantarum (p. 753-54). The cultivated soybean, *Glycine max,* appeared in the same work as *Phaseolus max* (p. 725) and also under the name *Dolichos soja* (p. 727)... In 1825 De Candolle summed up the genus as embracing 21 species, of which only 2 species *(G. clandestina* Wendl. and *G. javanica* L.) can be admitted to the genus as here defined. It was not until 1864 that the first major addition to the genus was made. This was by Bentham, who treated the genus in Australia as comprising six species, all of them still valid although two of his names *(Glycine sericea* and *G. tomentosa)* must be dropped as being later homonyms... Bentham's *Glycine falcata* of 1864 was the last of the true *Glycine* species to be described."

This article contains many superb illustrations by Regina O. Hughes. In the subgenus Leptocyamus (wild perennial Glycine species), the author includes Glycine clandestina Wendl. (Australia, Formosa, Micronesia), G. clandestina var. sericea Benth (Australia), G. falcata Benth. (Australia), G. Latrobeana (Meissn.) Benth. (Australia), G. canescens F.J. Herm. (Australia), G. tabacina (Labill.) Benth. (Australia, southern China, South Pacific Islands), G. tomentella Hayata (Australia, south China, Philippines, Formosa).

Note: This is the earliest document seen (July 2007) concerning soybeans (but only wild perennial relatives of soybeans) in Micronesia; cultivated soybeans have not yet been reported. Yet it is not clear where in Micronesia these soybeans were growing, and if they were growing in the Federated States of Micronesia. Address: Senior botanist, Crops Research Div., Agricultural Research Service; USDA.

983. Steinkraus, K.H.; Hand, D.B.; Hackler, L.R.; Van Buren, J.P. 1962. Research on soybean products of improved nutritional value. *Farm Research (New York Agricultural Experiment Station)* 28(4):4-5. Dec.

• ***Summary:*** Discusses soymilk and tempeh. As a result of studies at Geneva, the yield of soybean solids for soymilk production has increased from 65 to 90 percent." Photos show: (1) Two men pouring soymilk from a large metal vat into a cooker, in the Cornell "pilot plant process for producing soymilk. (2) Small packets of tempeh wrapped in banana leaves on a round woven bamboo tray in Indonesia. Address: Dep. of Food Science and Technology, Geneva, New York.

984. Sutedjo, -; Poey, Seng Hin. 1962. Continuation of soya milk trials on premature infants. *Paediatrica Indonesiana* 2(4):129-39. Oct/Dec. [4 ref. Eng]

• ***Summary:*** "In the *Journal of the Indonesian Medical Association* of January 1961 the results of Indonesian made soya milk (Saridele of Jogjakarta) trials on infants and prematures have been published by the writers. Their conclusions are as follows: (a) Cow's milk remains superior to soya milk (saridele). (b) Soya milk, as a source of 'complete protein' in Indonesia–since cow's milk and other animal proteins are still difficult to get and highly expensive–can be used as a 'remedy' and preventive to protein deficiency in adults and children over six months of age. (c) Under pressing circumstances, it can probably be used also as a substitute for cow's and breast milk on infants over four months old. (d) On infants less than six months–to be more exact less than four months–soya milk is unfit for use as a substitute for cow's milk and breast milk." Address: Pediatric Dep., Medical School, Univ. of Indonesia, Jakarta.

985. Directorate of Rural Affairs, Vietnam. 1962. [Sowing date and spacing trials with soyabeans]. In: Annual Work Progress Report C.I.M. Vietnam (for the years 1961-62): Directorate of Rural Affairs. See p. 138-45. [Vie]* Address: Hung-Loc Station, South Vietnam.

986. Kedelai Bogor [The Bogor soybean]. 1962. Lembaga Penelitian Ubi-Ubian and Kacang-kachangan. 8 p. [Ind]* Address: Indonesia.

987. **Product Name:** Tempe.
**Manufacturer's Name:** Runnels Foods.
**Manufacturer's Address:** Los Angeles, California.
**Date of Introduction:** 1962.
**New Product–Documentation:** Shurtleff & Aoyagi. 1985. History of Tempeh. p. 39. America's 2nd earliest tempeh shop.

988. Cartter, Jackson L.; Hartwig, Edgar E. 1962. The management of soybeans. *Advances in Agronomy* 14:359-412. [174 ref]
• ***Summary:*** Contents: I. Introduction: World production (958,275,000 bushels in 1960), United States production trends, utilization (processing to obtain oil and meal, hay and green manure). II. Soil and climatic adaptation: Areas of production in the United States, soil requirements, climatic adaptation (effect of temperature on plant growth, effect of temperature on composition of seed, effect of light on plant growth, effect of photoperiod on flowering and maturity, effect of soil moisture on growth). III. Time of planting and varietal adaptation: Effect on plant characters (maturity, plant height, lodging, seed quality, size of seed, seed yield), effect on composition of the seed. IV. Planting methods and equipment: Seedbed preparation (conventional, minimum tillage, deep tillage), row width and planting rate (row width, planting rate), double cropping (after fall-sown grain crops, after peas), special methods of planting, types of equipment. V. Rotation practices and erosion control: Effect on soybean yields, effect on the following crop, effect on weed population, soil residues from herbicides, erosion control. VI. Weed control: Effect of planting time on plant growth and weed competition, methods of cultivation, chemical weed control (pre-emergence herbicides, post-emergence herbicides). VII. Seed quality and seed treatment: Factors affecting seed quality and germination, seed treatment. VIII. Nutrient requirements: Nitrogen requirements and nodulation (effectiveness of nodulation as a source of nitrogen, methods of inoculation, survival of bacteria in the soil, effect of seed treatment on inoculation, effect of nitrogen applications), liming and pH levels (pH and plant development, calcium and magnesium requirements), phosphorus, potassium, trace elements, fertilizer practices and recommendations. IX. Water requirements and utilization: Water needs in relation to plant growth and development, irrigation and soil management. X. Growth-regulating chemicals. XI. Harvesting: When to harvest, harvesting methods. XII. Seed storage. XIII. Discussion. The USA now produces about 57% of the world's soybeans, followed by China (PRC; about 33%), Indonesia, Japan, Korea, USSR, Brazil, and Canada, in that order. By 1920, U.S. production was 3,000,000 bushels and the leading states were North Carolina, Virginia, Alabama, Missouri, and Kentucky–North Carolina producing 55% of the total. By 1931, the center of production had shifted to the North Central States, where it is at present. Address: 1. United States Regional Soybean Lab., Urbana, Illinois; 2. Stoneville, Mississippi.

989. Cummins, J.S. ed. 1962. The travels and controversies of Friar Domingo Navarrete 1618-1686. *Works Issued by the Hakluyt Society (Cambridge, England)* No. 118. cxx + 475 p. Series 2. 2 vols. See Vol. 2, p. 195-96. Index. 28 cm. [273* ref]
• ***Summary:*** This work contains the "earliest accurate description by a European of food use of soybeans" (T. Hymowitz). The author, Domingo Fernández de Navarrete, is referred to as "Navarette" throughout this book. For details, see Navarrete's 1665 journal entry. Cummins states (p. cxix): "This edition is not a translation of the *Tratados,* for it is limited to the sixth book, namely the autobiographical section of the *Tratados.* Yet the section on tofu is almost identical (except in capitalization, italics, and punctuation) to the first English translation published in 1704 by Churchill and Churchill. The title page notes that this work was "Edited from manuscript and printed sources by J.S. Cummins."

At the very end of Chapter XIII, titled "My journey to Che Kiang and stay there till the persecution," the author describes tofu in China. Note that Chekiang is today the name of a coastal province in eastern China, bounded on the

north by Kiangsu province, on the south by Fukien [Fujian] province, and on the east by the East China Sea. Writing in the year 1665, Navarrete says (p. 195-96): "16. Before I proceed to the next Chapter, because I forgot it in the first Book, I will here briefly mention the most usual, common and cheap sort of Food all China abounds in, and which all Men in that Empire eat, from the Emperor to the meanest Chinese; the Emperor and great Men as a dainty, the common sort as necessary sustenance. It is call'd Teu Fu, that is, Paste of Kidney Beans.* I did not see how they made it. They drew the Milk out of the Kidney-Beans, and turning it, make great Cakes of it like Cheeses, as big as a large Sive [Sieve], and five or six fingers thick. All the Mass is as white as the very Snow, to look to nothing can be finer. It is eaten raw, but generally boil'd and dress'd with Herbs, Fish, and other things. Alone it is insipid, but very good dress'd as I say and excellent fry'd in Butter. They have it also dry'd and smok'd, and mix'd with Caraway-seeds, which is best of all. It is incredible what vast quantities of it are consum'd in China, and very hard to conceive there should be such abundance of Kidney-Beans. That Chinese who has Teu Fu, Herbs and Rice, needs no other Sustenance to work, and I think there is no body but has it, because they may have a Pound (which is above twenty Ounces) of it any where for a Half-penny. It is a great help in case of want, and is easy for carriage. It has one good Quality, which is, that it causes the different Airs and Seasons, which in that vast Region vary much, to make no alteration in the Body, and therefore they that travel from one Province to another make use of it. Teu Fu is one of the most remarkable things in China, there are many will leave pullets for it. If I am not deceiv'd, the Chinese of Manila [Philippines] make it, but no European eats it, which is perhaps because they have not tasted it, no more than they do Fritters fry'd in oil of *Ajonjoli* (a very small seed they have in Spain and India, which we have not**) which the Chinese make in that City, and is an extraordinary Dainty, of which Europeans do deprive themselves."

Footnotes: "*To fu, or beancurd, is made of the soya beans which were familiar to the servicemen in the East during the Second World War; few of them would 'leave Pullets for it (see Couling 46). **Ajonjoli, oil extracted from sesame *(Sesamum indicum),* used as an olive-oil substitute, a hair-dressing, and for medicinal purposes."

Near the end of Chapter 14, titled "My journey to the Imperial City, and residence there," Navarrete writes (p. 242-43, concerning the period 1666-1669): "19... My two Companions, three Servants and I continued in the Imperial City from the 28th of June till the 13th of September. During this time, bating Fish, Flesh and Wine, the Emperor allow'd all our Expence, as well as theirs; so that we had Rice, Wood, Herbs, Oil, and what they call Teu Fu [tofu] in abundance brought in to us; so that when we went away the Fathers of the Society that remain'd behind were stock'd for a great while with Rice, Wood, Oil and Vinegar." Note: The tofu, being a perishable food, would have been consumed within a day or two.

This first part of this book (p. xix–cxx) gives a detailed biography of Fernández Navarette. It begins: Few men have had more literate enemies and as many inventive biographers as Domingo Fernández de Navarrete (1618-86)..." The best of his life was spent working as a missionary in China, where he was a determined opponent of the evangelical methods of the 'Jesuit Mandarins.' On his return to Europe he wrote an account of China, the *Tratados... de la monarchia de China.* This is an enthusiastic compendium of contemporary knowledge of the Empire, which Navarrete constantly exalts as a Utopian state fit to be imitated by Europe... the author, wherever he went, had an observant eye, an open ear, and an ever ready pen... This edition of Navarette's travels is based on all of [his] writings, but principally upon the sixth book of the *Tratados"* an autobiographical account of his travels. Navarrete was born in 1618 in Castrogeriz, Spain (he was Castilian), and he died in 1686 on the island of Santo Domingo, where he was Archbishop and Primate of the Spanish Indies. In 1635 he became a Dominican friar in Peñafiel, Spain. In July 1645, at the age of 27, he volunteered for the Philippine mission. En route he spent 2 years in Mexico, from Aug. 1646. Landing in the Philippines on 23 June 1648, he did mission work among the Filipino Indians, then taught at the University, where his brilliant, curious mind was recognized. He then joined the Dominicans in China, arriving in Macao in 1658. "From the very beginning he seems to have fallen in love with China and its people," among who he now remained working until the outbreak of the persecution of 1664. He learned the Chinese language well–and loved it. He became very critical and accusing of the Jesuit missionaries in China–which later embroiled him in controversies with them. He reached Canton in March 1666, and spent the next 4 years under house arrest until Dec. 1669. Subsequently he travelled in many countries and underwent frightening adventures, finally arriving back in Spain in Dec. 1674. There, in Madrid, he wrote extensively–starting with his *Tradutos [sic, Tratados] historicos, politicos, ethicos y religiosos de la monarchia de China* (518 pages, divided into 7 Treatises) in the first half of 1675. In 1677 he was nominated Archbishop of Santo Domingo, where he arrived on 20 Sept. 1677. He died there of an illness in Feb. 1686. Address: King's College, Univ. of London.

990. György, Paul; Omans, W.B.; Hau, E. W-S. 1962. Feeding value of soy milks for premature infants. In: USDA Northern Regional Research Laboratory, ed. 1962. Proceedings of Conference on Soybean Products for Protein in Human Foods. Peoria, IL: USDA NRRL. iii + 242 p. See p. 179-87. [9 ref]

• ***Summary:*** Discusses Sobee, Mull-Soy, Soyalac, and Saridele. Address: 1. Chairman of the Dep. of Pediatrics, Philadelphia General Hospital, Philadelphia, Pennsylvania.

991. Le, Quy Don. 1962. Van dai loai ngu' [Encyclopedia of Vietnam {18th century}, 2 vols.]. Hanoi, Vietnam: Van Hoa, Vien Van Hoc [Culture Publishing House]. 931 p. 25 cm. [Vie]*
• ***Summary:*** The author of this book lived 1723-178; he was a famous Vietnamese polymath. In his discussion of grains, he mentions soybean *(dai dau).* Address: Vietnam.

992. Muljokusumo, E. Sudigdo. 1962. Tahu [Tofu]. Bandung: Penerbit Tarate. [Ind]*
Address: Indonesia.

993. Muljokusumo, E. Sudigdo. 1962. Témpé dan ontjom, benguk, dagé. Tjetakan ke-1 [Tempeh and onchom, benguk, and dagé. First printing]. Bandung, Indonesia: Penerbit Tarate. 44 p. Illust. 21 cm. Kita membuat sendiri, 2 [Series: We make these foods ourselves No. 2]. [Ind]
• ***Summary:*** Tempeh is a fermented food made from soybeans. Ontjom is a fermented food made from peanut presscake. Tempeh benguk is a fermented food made from the seeds of the velvet bean *(Mucuna pruriens).* Dagé is a fermented food made with bacteria rather than molds on a substrate of oilseed cakes, primarily pressed coconut, sesame seeds, or peanuts. Contains many excellent illustrations (line drawings). On page 10 is an interesting aerial cut-away view of a tempeh shop, with many people actively making tempeh. Address: Science specialist [Indonesia].

994. Muljokusumo, E. Sudigdo. 1962. Ketjap, kedelai, bungkil katjang, ikan [Soy sauce, soybeans, peanut flakes, fish]. Bandung, Indonesia: Penerbit Tarate. 44 p. Illust. No index. 21 cm. Kita membuat sendiri (3) [Series: We make these foods ourselves No. 3]. No. 131. [Ind]
• ***Summary:*** Describes how to make Indonesian-style soy sauce from soybeans, peanut press-cake, or fish. Contains many excellent illustrations (line drawings). Address: Science specialist [Indonesia].

995. Steinkraus, K.H.; Hand, D.B.; Van Buren, J.P.; Hackler, L.R. 1962. Pilot plant studies on tempeh. In: USDA Northern Regional Research Laboratory, ed. 1962. Proceedings of Conference on Soybean Products for Protein in Human Foods. Peoria, IL: USDA NRRL. iii + 242 p. See p. 83-92. [8 ref]
• ***Summary:*** Contents: Indonesian method of tempeh production. Changes in soybeans fermented to tempeh. Advantages of tempeh. Problems in pilot plant production of tempeh. Fermentation by the mold. Summary. Literature cited. Address: New York State Agric. Exp. Station, Cornell Univ., Geneva, NY.

996. Sukardi, -. 1962. Peranan katjang-katjangan dalam makanan sehari-hari penduduk Patjet [The role of legumes in the diet of Patjet inhabitants]. Thesis (Skripsi), Akademi Pendidikan Nutrition, Bogor, Indonesia. 25 p. [Ind]*
Address: Bogor, Indonesia.

997. van Veen, A.G. 1962. Panel discussion on problems involved in increasing world-wide use of soybean products as foods: Possible contribution of FAO. In: USDA Northern Regional Research Laboratory, ed. 1962. Proceedings of Conference on Soybean Products for Protein in Human Foods. Peoria, IL: USDA NRRL. iii + 242 p. See p. 210-13.
• ***Summary:*** About "25 years ago, a group of missionaries from Travancore, a poor region in South India, wanted to make 'tempeh' from soybeans (which you had yesterday and enjoyed). For 3 weeks we gave them short courses in how to make tempeh. When the missionaries went back to Travancore they made tempeh and it was fine, but the Indian population did not have any interest in this unknown fermentation product and the experiment failed." Note: This document contains the earliest date seen for tempeh in India–about 1937.

"After the war, as Dr. Gyorgy knows, one of my former coworkers came to South Rhodesia, and saw a lot of soybeans exported, and not eaten by the population. He went to a local food technology institute, where the staff became interested. For some time the interested scientists made 'tempeh' for the hospitals, but the population having no experience with fungus products at all (as the people in Southeast Asia have) just did not want to embark on tempeh manufacture and at the moment tempeh has disappeared from Rhodesia." Address: Chief, Food Science & Technology, Food and Agriculture Organization of the United Nations, Viale delle Terme di Caracalla, Rome, Italy.

998. Vietnam Directorate of Rural Affairs. 1962. Pests of field crops. In: Annual Work Progress Report on Crop Improvement Program of Rice, Sugarcane, Vegetable and Field Crops (for the period from July 1961 to June 1962). Vietnam: Directorate of Rural Affairs. 300 p. See p. 278-82. *
• ***Summary:*** Discusses *Caloptilia soyella, Leguminivora glycinivorella, Melanagromyza, Ophiomyia.*

999. Omans, W.B.; Leuterer, W.; Gyôrgy, P. 1963. Feeding value of soy milks for premature infants. *J. of Pediatrics* 62(1):98-106. Jan. [10 ref]
• ***Summary:*** Recently soy products have been included in the "Protein-rich food Program of World Health Organization [WHO], Food and Agriculture Organization [FAO], and United Nations Children's Fund" [UNICEF].

This program's goal is to prevent protein malnutrition, which is widespread among infants and preschool children in most tropical countries. A toasted full-fat soybean preparation, Sobee, supported better growth in rats (PER 2.3 ± 0.15) and infants than soybean water extracts like Soyalac, Saridele, and Mull-Soy. The authors found considerably more variability in weight gain than with feedings of cow's milk formula. Formulas made from toasted low-fat soy flour gave the best results (PER 2.43), followed by those made from full-fat soy flour (PER 2.40).

Note: This is the earliest report seen on the results of feeding soy protein formula to premature infants. Address: Dep. of Pediatrics, Philadelphia General Hospital, Pennsylvania.

1000. *Foreign Agriculture.* 1963. Thailand's soybean production up slightly. 1(7):16. Feb. 18.
• ***Summary:*** Thailand produced 907,560 bushels of soybeans from 57,330 planted acres in 1962, for a yield of 15.8 bushels/acre. Exports, however, declined to 68,875 bushels, compared with 76,830 in 1961. In 1960, they had reached 148,921. Malaya, Singapore, and Penang continued to be the principal destinations. There is a slow movement by the government toward achievement of increased soybean cultivation. A variety test on soybeans was conducted at two experimental stations in 1960-61 for the first time.

1001. Meals for Millions. 1963. Friendship food for a hungry world. Distribution of relief shipments, September 1946–May 15, 1963. 215 West 7th Street, Los Angeles 14, California. 4 p. Undated. [2 ref]
• ***Summary:*** Total distribution of MPF (Multi-Purpose Food) up to 15 May 1963 was 12,830,416 pounds, comprising 102.6 million meals. Countries receiving over 20,000 pounds, in descending order of amount received, were: India (1,979,748 lb), Korea (1,356,110), Japan (541,102), Hong Kong (394,259), China (358,957, stopped in 1951), Brazil (312,244), Germany (206,185), United States (183,366), Philippines (146,943), Haiti (139,823), France (126,022), Pakistan (101,041), Congo (86,101), Austria (82,159), Tanganyika (77,997) Mexico (65,722) Burma (63,554), Taiwan (58,639), Lebanon (56,910), Canada (51,836), Ceylon (38,428), Israel (38,280), Jamaica (38,171), Greece (38,133), Vietnam (37,524), Italy (36,768), Indonesia (35,873), Jordan (33,375), Hungary (33,165), New Guinea (31,535), Gabon (27,704), Liberia (27,187), Okinawa (23,640), Malaya (23,454), Morocco (22,736), Chile (22,721), Iran (21,482), Peru (21,374), Honduras (21,168), Bolivia (20,860), Nepal (20,626), Borneo (20,053).

The following countries (listed alphabetically) were early recipients of soy-based Multi-Purpose Food from Meals for Millions, and were late in introducing soybeans to the country: Bahamas (received 6 shipments totaling 2,079 lb between 1 July 1960 and 31 Dec. 1962). Basutoland [Lesotho] (received 2 shipments totaling 1,539 lb between 1 July 1960 and 31 Dec. 1962). Bolivia (received 2 shipments totaling 1,634 lb between Sept. 1946 and 30 June 1960). British Honduras (received 5 shipments totaling 11,319 lb between Sept. 1946 and 30 June 1960; renamed Belize in about 1975). Cape Verde Islands (received 1 shipment of 2,007 lb between Sept. 1946 and 30 June 1960; independent since 1975). Caroline Islands (received 2 shipments totaling 2,008 lb between Sept. 1946 and 30 June 1960; renamed Federated States of Micronesia in 1986). Central African Republic (received 1 shipment of 2,025 lb between 1 July 1960 and 31 Dec. 1962). Eritrea (received 1 shipment totaling 2,025 lb between Sept. 1946 and 30 June 1969). Fiji Islands (received 2 shipments totaling 2,052 lb between Sept. 1946 and 30 June 1969). Finland (received 1 shipment of 2,040 lb between Sept. 1946 and 30 June 1960). Gabon (received 3 shipments totaling 17,660 lb between Sept. 1946 and 30 June 1960). Guam (received 3 shipments totaling 4,995 lb between 1 July 1960 and 31 Dec. 1962). Guadalcanal ([later part of the Solomon Islands] received 1 shipment of 513 lb between Sept. 1946 and 30 June 1960). Iraq (received 3 shipments totaling 8,122 lb between Sept. 1946 and 30 June 1960). Jordan (received 9 shipments totaling 28,839 lb between Sept. 1946 and 30 June 1960). Liberia (received 10 shipments totaling 21,949 lb between Sept. 1946 and 30 June 1960). Luxemburg [Luxembourg] (received 1 shipment of 5,130 lb between Sept. 1946 and 30 June 1960). Marshall Islands (received 1 shipment of 739 lb between Sept. 1946 and 30 June 1960). Mozambique (received 3 shipments totaling 7,641 lb between Sept. 1946 and 30 June 1960). New Hebrides [later Vanuatu] (received 1 shipment of 513 lb between Sept. 1946 and 30 June 1960). Oman (received 4 shipments totaling 10,659 lb between Sept. 1946 and 30 June 1960). Panama (received 1 shipment of 96 lb between Sept. 1946 and 30 June 1960). Samoa (American) (received 6 shipments totaling 6,480 lb between Sept. 1946 and 30 June 1960). Somali (received 1 shipment of 270 lb between 1 July 1960 and 31 Dec. 1962). Swaziland (received 1 shipment of 621 lb between 1 July 1960 and 31 Dec. 1962). Tonga Islands [Kingdom of Tonga, independent since 1970] (received 5 shipments totaling 6,723 lb between 1 July 1960 and 31 Dec. 1962). Virgin Islands [USA] (received 2 shipments totaling 2,113 lb between Sept. 1946 and 30 June 1960). Western Samoa [independent since 1962] (received 1 shipment of 1,026 lb between 1 Jan. 1963 and 15 May 1963).

Other countries which received MFM shipments by 15 May 1963 are: Afghanistan, Algeria, Angola, Argentina, Basseterre [Probably refers to the island, Basse-Terre (or Guadeloupe proper) which is the western half of Guadeloupe, separated from the other half, Grand-Terre, by a narrow channel. As of 1994 Guadeloupe is a French

Overseas Department. Probably not the seaport on St. Christopher Island, capital of St. Christopher-Nevis–since that is not a country], Belgium, Cambodia, Republic of Cameroun [Cameroon], Canal Zone, Colombia, Costa Rica, Cuba, Czechoslovakia, Dominica, Dominican Republic, Ecuador, Egypt, El Salvador, England, Eritrea, Ethiopia, French West Indies, Gambia, Ghana, Goa [former Portuguese possession; annexed by India in 1962; became a state of India in 1987], Grenada, Guatemala, Haute Volta [Upper Volta, later Burkina Faso], Iraq, Kenya, Laos, Libya, Macao, Madeira Islands [autonomous region of Portugal in east Atlantic Ocean, 600 miles due west of Casablanca, off the coast of Morocco], Mauritius Islands, Montserrat [island in the West Indies], Netherlands, Nicaragua, Nigeria, Northern Rhodesia [later Zambia], Nyasaland [later Malawi], Oman, Paraguay, Persian Gulf, Poland, Puerto Rico, Ruanda Urundi, Rumania [Romania], Ryukyu Islands, American Samoa, Santa Lucia [probably Saint Lucia island in the Caribbean], Sicily, Sierra Leone, South Africa, Southern Rhodesia [later Zimbabwe], Spain, Surinam [Suriname], Switzerland, Thailand, Trieste [Italy], Tunisia, Turkey, Uganda, Uruguay, Venezuela, Yugoslavia.

Note: This is the earliest document seen (March 2010) concerning soybean products (soy flour in MPF) in British Honduras [Belize], Cape Verde, Caroline Islands, Eritrea, Iraq, Lesotho, Liberia, Luxembourg, Marshall Islands, New Hebrides [Vanuatu], Oman, Samoa (American), Tonga, or Western Samoa. Soybeans as such have not yet been reported in these countries.

This document contains the earliest date seen (Feb. 2009) for soybean products (soy flour in MPF) in Bolivia (June 1960), British Honduras (June 1960), Cape Verde (June 1960), Central African Republic (Dec. 1962), Eritrea (June 1960), Iraq (June 1960), Lesotho (Dec. 1962), Liberia (June 1960), Luxembourg (June 1960), Marshall Islands (June 1960), New Hebrides (June 1960; Vanuatu), Oman (June 1960), Samoa (American) (June 1960), Tonga (Dec. 1962), or Western Samoa (May 1963). Soybeans as such had not yet been reported by that date in these various countries. Address: Los Angeles, California.

1002. Senti, Frederic R. 1963. Current status of soybean utilization research under P.L. 480. *Soybean Digest.* May. p. 28, 30-34.

• ***Summary:*** This is the third in a series of USDA research reports under the P.L. 480 program. Discusses progress on active projects: Soybean oil in Seville, Spain; Chemical changes in sterols during refining of soy oil by Prof. H. Niewiadomski in Gdansk, Poland; Flavor stability of soy oil in by Prof. Y. Toyama at Toyo Univ. in Japan; Improving the frying quality of soybean oil by Prof. G. Varela at Univ. of Granada, Spain; Meal constituents.

Oriental foods: Production of shoyu (soy sauce) using U.S. vs. Japanese soybeans, use of dehulled soybean grits for making miso, miso-type food in Israel, use of U.S. soybeans im making tofu, or soybean curd, by the Japan Tofu Association, Tokyo.

Industrial applications: Polymerization studied in Milan, Italy. Soybean constituents. Oriental foods #2: Dried tofu in Japan, *Saccharomyces rouxii* yeast in shoyu and miso, development of fermented products from soybean milk in Japan, fermented soybean cheese in Taiwan, fermented soyfoods (tempeh, ontjom, ragi) in Indonesia.

Domestic research for increasing imports: Work with soy oil, UNICEF trainees from Brazil studying tempeh, projects saponins, protein complexes, and isolated protein quality in Israel.

A small portrait photo shows F.R. Senti. Address: Director, Northern Utilization Research and Development Div. (also known as the Northern Regional Research Lab.), Agricultural Research Service, USDA, Peoria, Illinois.

1003. *Newsweek.*1963. New foods and new hopes. 61:51. June 17.

• ***Summary:*** "It is a sad paradox that a child with a full stomach can die of malnutrition. The problem is not how much he eats, but rather what he eats. Without an adequate supply of protein, which enables a child's body and mind to grow, all the fats and carbohydrates he can eat will not help him. One of the most promising ways out of this paradox is the development of new, high-protein foods, to supplement standard native fare of starchy foods such as cassava, manioc, yams, or plantains."

According to organizations like UNICEF and WHO, the world's two most promising sources of protein are considered to be fish flour and defatted oilseed meals, including those from soybeans, peanuts, cottonseeds, and coconuts. "UNICEF has helped start a project in Indonesia promoting Saridele, a soybean extract ideal for infant feeding. With such supplements, a child can be kept healthy from the time he is weaned, and loses his original source of protein, until he is 7 or 8, and the need for protein begins to diminish."

"UNICEF is cautiously optimistic. The agency's senior food technologist, Max Milner, said last week: 'We are beginning to see some glimmers of light.'"

1004. Mamicpic, Noel G.; Caldwell, William P. 1963. Effects of mechanical damage and moisture content upon viability of soybeans in sealed storage. *Proceedings of the Association of Official Seed Analysts* 53:215-20. June. [18 ref]

Address: 1. Research Instructor, Univ. of the Philippines; 2. Asst. Agronomist, Mississippi Agricultural Research Station.

1005. Republic of Vietnam, Department of Rural Affairs, Commissariat General for Land Development and Rural

Affairs, Directorate of Rural Affairs. 1963. Annual work progress report for field crops improvement (1962-1963). In: Annual Work Progress Report on Crop Improvement Program of Rice, Sugarcane, Vegetable and Field Crops (for the period July 1962 to June 1963). Vietnam: Directorate of Rural Affairs. 266 p. July. See p. 102-10. *

• ***Summary:*** The section titled "Soybean" (p. 102-10) is divided into "Experimental work (p. 102-09) and "Recommendation for future program" (109-10).

In yield trials, Palmetto and Sankuo performed best in May planting; if earliness was the most important attribute, Dortchsoy was the best variety. The best spacing was 10 x 10 cm with 1 plant per hill.

1006. Republic of Vietnam, Department of Rural Affairs, Commissariat General for Land Development and Rural Affairs, Directorate of Rural Affairs. 1963. Demonstration and extension of field crops and pest control. In: Annual Work Progress Report on Crop Improvement Program of Rice, Sugarcane, Vegetable and Field Crops (for the period July 1962 to June 1963). Vietnam: Directorate of Rural Affairs. 266 p. July. See p. 234-49. [Eng; vie]

• ***Summary:*** At bottom of cover page: "A cooperative project between the Directorate of Rural Affairs (DRA), and the Chinese Technical Mission to Vietnam on Crop Improvement (CIM)."

Soybean is a minor crop in Vietnam. Unlike China, Vietnam uses coconut oil instead of soybean oil, and fish sauce *(Nuoc-Mam)* instead of soysauce. Vietnam does not use soybean as a food or vegetable (bean-sprouts, bean curd, bean milk, etc.) and does not use it as a feed for pigs (soybean cakes, after extraction of the oil). Taiwan, with about the same population as Vietnam, grows about 50,000 hectares of soybean, but still has to import more than 60,000–75,000 metric tons (tonnes) every year to meet its demand.

In Vietnam the total acreage of two crops of soybean (planted in mid-May, and mid-July to mid-August) is only 5,940 ha, 80% of which grows in Long-Khanh Province, concentrated in the 3 villages of Xuan-Loc, Gia-Kiem, and Phuong-Tho. The yield averages 664 kg/ha. This low yield could be increased to 2,000 kg/ha or more based on tests at the Hung-Loc Experiment Station.

In order to promote economic cooperation between Vietnam and China, the export of soybean to Taiwan will play an important role to balance the trade between the two nations.

A regional trial planting of soybean was conducted, and based on it recommendations were made concerning soybean planting, fertilization, weeding, pest control, harvest, and disease control.

1007. *Soybean Digest.*1963. Process soybeans in Philippines. Aug. p. 18.

• ***Summary:*** Soybeans are now being processed and soybean oil and meal produced commercially for the first time in the Philippines, according to USDA. A solvent extraction plant with an annual capacity of around 32,000 short tons of soybeans was established recently near Manila by a local feed manufacturer.

1008. *Territory of Papua and New Guinea, Department of Agriculture, Stock and Fisheries, Annual Report (Port Moresby).*1963. Division of Plant Industry. p. 31-94. Nov. For the year 1960-61. See p. 62-63, 71, 73-75.

• ***Summary:*** In the section titled "Agricultural Experiment Station, Epo" is a subsection titled "Soy bean" *(Glycine max)* (p. 62-63) which notes that 13 varieties were planted in an unreplicated trial in early January, at the beginning of the wet season. All varieties were seriously damaged by insects. A table shows the name, yield, and seed color of each variety. The highest yielding varieties (in lb/acre in the pods) were: Batavian Yellow (3,091), Mamloxi (3,020), Avoyelles (2,224), C.N. 5 (1,852), Mamloxi 57/5 (1,770), and Glycine 317 (1,624).

The section titled "Plant Introduction and Quarantine Station, Laloki" (near Port Moresby, Papua New Guinea) states that 14 soybean varieties were introduced in 1960-61 (p. 71). The subsection titled "Soy bean" *(Glycine max)* (p. 73) states that attempts were made to introduce varieties that might be adaptable to the Markham Valley and other lowland areas. The introductions from the Philippines were chosen mainly for non-sensitivity to photoperiod. Six bottles of soybean Rhizobium inoculum were distributed to growers throughout the Territory (p. 74). Rhizobium inoculations and inoculation studies were conducted (p. 75).

1009. Hesseltine, C.W.; Camargo, R. de; Rackis, J.J. 1963. A mould inhibitor in soybeans. *Nature (London)* 200(4912):1226-27. Dec. 21. [4 ref]

• ***Summary:*** This factor inhibits the mould growth of *Rhizopus* species, which are used in the "fermentation of soybeans to make the Indonesian food tempeh." The inhibitory factor(s) was found to be heat-stable and water-soluble. One gets the best tempeh when it is dissolved out and rinsed / washed out before the tempeh fermentation. Address: National Utilization Research and Development Div., USDA, Peoria, Illinois; NRRL, Peoria, IL.

1010. Yuwa, J.A. 1963-1964. Introduction of soyabeans into Abuja [Emirate, south central Nigeria]. *Samaru Agricultural Newsletter* 5:100-101. [Eng]

• ***Summary:*** Contents: Abuja Emirate. Introduction of soyabeans. Production of soyabeans 1950-1962. Extension activities on soyabeans: To improve the quality of exportable seed, to increase yield per acre, to increase the acreage of soyabeans grown in the Division. Other uses of soyabeans.

Abuja Emirate forms the southeastern corner of Niger Province in Nigeria. It has a total population of over 71,739 people, occupying an area of about 2,337 miles. In 1941, during World War II, Nigeria's Ministry of Agriculture introduced soyabeans as an additional cash crop in an attempt to improve local living standards. 4 tons of Malayan seeds were introduced and distributed among all the adult taxpayers for planting. Farmers generally showed little interest in growing soyabeans until 1950, when the Ministry of Agriculture renewed its campaign for soyabean planting and introduced another 4 tons of Malayan seed. Production increased from only 8 tons (26 acres) in 1950/51, to a record 561 tons in 1961/62. The crop is grown mostly in the northern part of the Division. Abuja Town produces by far the largest amount, followed by Kabo, Gwagwa, and Diko. Starting in 1963/64 all soyabeans in the Division were sold to the newly-formed Abuja Cooperative Society.

Concerning uses: "The Gwarrin Genge around Diko have discovered that soyabeans can be used for making 'Daddawa' in place of the usual locust bean. The Koros around Ija pound it into powder and use it in place of melon seed to thicken their soup."

Note 1. This is the earliest document seen (Dec. 2001) that mentions the word "Daddawa"–which is sometimes made from soyabeans.

Note 2. This is one of several periodicals published by the Institute for Agricultural Research (IAR), a semi-autonomous institute within the Ahmadu Bello University at Samaru, near Zaria, Nigeria. Before the establishment of the University in October 1962, Samaru was the headquarters of the Research and Special Services Division of the Ministry of Agriculture, Northern Nigeria. As of 1968, IAR had outstations at Shika, Kano, and Mokwa. Address: Abuja, Nigeria.

1011. Lin, Tjen Sin. 1963. Ketahanan spora *Rhizopus oligosporus* dalam berbagai suhu dan kelembaban [Resistance of *Rhizopus oligosporus* spores at various temperatures and humidities]. Bandung: Bagian Laboratorium Mikrobiologi Institut Teknologi Bandung. 31 p. [Ind]*
Address: Bandung, Indonesia.

1012. U.S. Interdepartmental Committee on Nutrition for National Defense. 1963. Union Burma–Nutrition survey, October-December 1961. *

1013. Cartter, Jackson L.; Hartwig, Edgar E. 1963. The management of soybeans. In: A.G. Norman, ed. 1963. The Soybean. New York: Academic Press. x + 239 p. See p. 161-226. [209 ref]
• ***Summary:*** Contents: 1. Introduction: World production, United States production trends, utilization (processing to obtain oil and meal, hay and green manure). 2. Soil and climatic adaptation: Areas of production in the United States, soil requirements, climatic adaptation (effect of temperature on plant growth, effect of temperature on composition of seed, effect of light on plant growth, effect of photoperiod on flowering and maturity, effect of soil moisture on growth). 3. Time of planting and varietal adaptation: Effect on plant characters (maturity, plant height, lodging, seed quality, size of seed, seed yield), effect on composition of the seed. 4. Planting methods and equipment: Seedbed preparation (conventional, minimum tillage, deep tillage), row width and planting rate (row width, planting rate), double cropping (after fall-sown grain crops, after peas), special methods of planting, types of equipment. 5. Rotation practices and erosion control: Effect on soybean yields, effect on the following crop, effect on weed population, soil residues from herbicides, erosion control. 6. Weed control: Effect of planting time on plant growth and weed competition, methods of cultivation, chemical weed control (pre-emergence herbicides, post-emergence herbicides). 7. Seed quality and seed treatment: Factors affecting seed quality and germination, seed treatment. 8. Nutrient requirements: Nitrogen requirements and nodulation (effectiveness of nodulation as a source of nitrogen, methods of inoculation, survival of bacteria in the soil, effect of seed treatment on inoculation, effect of nitrogen applications), liming and pH levels (pH and plant development, calcium and magnesium requirements), phosphorus, potassium, trace elements, fertilizer practices and recommendations. 9. Water requirements and utilization: Water needs in relation to plant growth and development, irrigation and soil management. 10. Growth-regulating chemicals. 11. Diseases: Foliar, root and stem, seed. 12. Insects and spider mites: Leaf feeders, above-ground stem feeders, pod feeders, root feeders. 13. Nematodes: Root knot, cyst, others. 14. Harvesting: When to harvest (moisture content of seed, chemical defoliation, losses from respiration after maturity), harvesting methods (historical, combine harvesting). 15. Seed storage. 16. Discussion. The USA now produces about 57% of the world's soybeans, followed by China (PRC; about 33%), Indonesia, Japan, Korea, USSR, Brazil, and Canada, in that order. By 1920, U.S. production was 3,000,000 bushels and the leading states were North Carolina, Virginia, Alabama, Missouri, and Kentucky–North Carolina producing 55% of the total. By 1931, the center of production had shifted to the North Central States, where it is at present.

The subsection titled "Seed treatment" (p. 193) states: "Seed treatment with a fungicide is not recommended as a general practice when seed with high germination is planted. Stands may be increased by seed treatment when seed having a germination of 85 per cent is planted. Although seed treatment seldom results in increased seed yields,... the improved stands resulting from seed treatment aid in giving soybeans a competitive advantage with weeds.

Studies by Howard W. Johnson *et al.* (1954) show that seed may be treated at any time between harvest and planting with equal effectiveness. The most satisfactory time for treating seed would be as it is cleaned. The materials Arasan, Captan, and Spergon have proved to be most satisfactory for treatment of soybean seed. Before any lot of seed is treated, it may be a good practice to check the germination with and without the fungicide to determine the beneficial effect of seed treatment on each seed lot."

The section titled "Harvesting methods: Historical" (p. 219) states: "The earliest harvester designed specifically for soybeans was a two-wheeled, horse-drawn machine which straddled the bean row (Piper & Morse, 1923, p. 94). This special harvester was common in Virginia and North Carolina, but was never commonly used in the North Central States. Harvesting losses ranged from 20 per cent under favorable conditions to as high as 60 per cent under unfavorable (Sjogren, 1939). In small-grain growing areas, the binder and thresher were adapted for soybean harvest. Harvest losses for using the binder or mower for cutting and then threshing ranged from 16 to 35 per cent of the total yield, with an average loss of 24 per cent (Sjogren, 1939).

"The combine harvester was first used for soybeans in the mid-twenties. The combine harvester has been a major factor in the expansion of soybean production. This machine required less labor than earlier methods and was more efficient." Address: 1. Agronomist-in-charge, U.S. Regional Soybean Lab., Crops Research Div., ARS USDA, Urbana, Illinois; 2. Research Agronomist, U.S. Regional Soybean Lab., ARS USDA, Stoneville, Mississippi.

1014. Cruz, N.B. 1963. Determination of the protein content of soy sauce from different local materials. Thesis, Araneta University, Philippines. *

• ***Summary:*** The author studied the protein content of soy sauce in different mixtures prepared by mold-enzyme hydrolysis. Address: Araneta Univ., Philippines.

1015. Geertz, Clifford. 1963. Agricultural involution: The process of ecological change in Indonesia. Berkeley and Los Angeles, California: Published for the Association of Asian Studies by the University of California Press. xx + 176 p. Illust. index. 23 cm. Series: Association of Asian Studies, Monographs and Papers 11. [196 ref]

• ***Summary:*** In 1956, 90% of Indonesia's soya beans were produced in Java. However commercial crop cultivation shows a sharply contrasting pattern. "With the exception of soya beans (and, of course, unirrigated rice) all the dry-field annuals which are today important in Java–maize, cassava, sweet potatoes, peanuts–were introduced subsequent to European contact, and their penetration into the by then long-established sawah ecosystem was very gradual." Address: Chicago, Illinois.

1016. Hesseltine, C.W.; Smith, Mabel; Bradle, Barbara; Ko Swan Djien. 1963. Investigations of tempeh, an Indonesian food. *Developments in Industrial Microbiology* 4:275-87. [8 ref]

• ***Summary:*** "Tempeh is made in Indonesia with mixed cultures that appear to be largely *Rhizopus oligosporus,* of which NRRL 2710 is a typical representative. We prepared tempeh by pure culture fermentation with 39 strains of *Rhizopus* representing 6 species. A satisfactory laboratory-scale fermentation is described based on a 20 to 24-hour fermentation of dehulled beans with *R. oligosporus.* Full-fat grits may be used in place of dehulled whole beans... The tempeh-producing strains were characterized with regard to carbon and nitrogen source required for growth. All strains grew on soybean oil, xylose, glucose, galactose, trehalose, and cellobiose. None grew on i-erythritol, lactose, raffinose, or inulin. The best nitrogen sources appeared to be asparagine and ammonium sulfate." Address: NRRL, Peoria, Illinois.

1017. André, Émile; Hou, Kia-Wo. 1964. La lipoxydase. Sa découverte dans le résidu de la préparation du lait de soja [Lipoxidase. Its discovery in the residue by-product of soybean milk production]. *Oleagineux* 19(3):187-93. March. English-language summary, p. XXVII. [Fre; eng]

• ***Summary:*** "The cheese called *Teou-fou* in China is somewhat consumed in Paris and the region surrounding it, where the number of Chinese restaurants is greater than one could believe." Of the total restaurants in this area, about 35 are Chinese restaurants, 10 at Vietnamese, and only 5 are Japanese. They are visited both by people of those countries and by western consumers who are curious to taste exotic foods. "There were, and still are, two or three shops in and around Paris, where tofu (fromage de soja) is prepared daily and delivered to the restaurateurs who have ordered it. Mr. Kia-Wo Hou had friendly relations with one of the two established at Colombes and was able to easily procure the materials he needed."

Note: In about 1910 Li Yu-ying, a Chinese soyfoods pioneer, established a soyfoods manufacturing company named Usine de la Caséo-Sojaïne, at Valées, near Colombes, outside of Paris. It is not clear how the current companies at Colombes are related to the earlier company. Address: 1. Conseil scientifique a l'R.H.O.; 2. Docteur es-Sciences de l'Universite de Paris.

1018. Ohta, Teruo; Ebine, H.; Nakano, M. 1964. Tenpe (tempeh) ni kansuru kenkyû. I. Indonesia-san tenpe funmatsu no hinshitsu to seijô ni tsuite [Study on tempeh. I. On the property of tempeh powder made in Indonesia]. *Shokuryo Kenkyujo Kenkyu Hokoku (Report of the Food Research Institute)* No. 18. p. 67-69. March. [4 ref. Jap; eng]

• ***Summary:*** Soybeans were fermented with *Rhizopus oryzae* for 60 hours at 30ºC, then vacuum dried and ground to a powder. The solubility of protein and the rate of amino-nitrogen to total-nitrogen were 20% and 2% respectively, indicating that protein hydrolysis slightly exceeded that of koji-beans, but was far less than that of natto.

Peroxide value of fat and oil in tempeh stored for 3 months at room temperature was only 1.3 M.E./kg, whereas that of cooked and dried soybean powder and that of natto powder stored under the same conditions were 71 M.E./kg and 38 M.E./kg respectively. This fact shows that tempeh has antioxidative property comparable to that of miso. Address: Food Research Inst., Shiohama I-4-12, Koto-ku, Tokyo, Japan.

1019. Hewitt, Jean. 1964. Food news: The flavors of Indonesia. *New York Times.* April 29. p. 44.
• ***Summary:*** Food will be a major part of the forthcoming Indonesian Pavilion at the World's Fair to be held in New York (1964/1965). Defines several terms: Sambals are hot sauces; atjars are relishes. A recipe for Sates [skewered ingredients] calls for "¼ cup ketjap bentang [sic, benteng] (sweet Java soy sauce)."

1020. Roelofsen, P.A.; Talens, Anneke. 1964. Changes in some B vitamins during molding of soybeans by *Rhizopus oryzae* in the production of tempeh kedelee. *J. of Food Science* 29(2):224-26. March/April. [11 ref]
• ***Summary:*** During tempeh fermentation, riboflavin and niacin increased considerably, whereas thiamin decreased. Of the thiamin present in the cooked soybean cotyledons, about one-third was used up by the tempeh mold–*Rhizopus oryzae.*

During tempeh fermentation, the hyphae of the mold penetrate between the cells in the outermost layer of the cotyledons, and "secrete enzymes that penetrate further. As a result of the enzymatic action on the cell walls, the cells in tempeh separate easily when the cotyledons are either masticated, squeezed, or shaken with water. The digestibility of the cotyledons is greatly increased over that of merely cooked ones."

Note: This is the earliest English-language document seen (Sept. 2006) with the word "kedelee" (Indonesian for "soybean") in the title. Address: Lab. of General and Technical Biology, Technological Univ., Delft, Netherlands.

1021. Diser, G.M.; Hayward, J.W. 1964. Expanding overseas markets for U.S. soy protein products: The most serious need in the human diet is adequate levels of good quality protein. *Soybean Digest.* May. p. 16.
• ***Summary:*** "During the period Feb. 1 to March 21, 1962, the Soybean Council of America, Inc., in cooperation with the Foreign Agricultural Service of the U.S. Department of Agriculture, conducted a survey in 11 developing countries to determine the potential utilization of soy products as an aid in alleviating protein deficiencies in the diets of the people in these areas of the world. "

The survey covered the following countries: Burma, Egypt, Greece, Hong Kong, India, Iran, West Pakistan [later renamed Pakistan], Philippine Islands, Portugal, Spain and Turkey.

"The results of this survey showed that protein malnutrition, suffered by a major portion of the people in these countries as a result of inadequate food supplies, particularly a serious lack of protein foods, could be relieved by utilization of inexpensive oilseed protein products.

"Bread, a principal food in these countries, if properly fortified with soyflour or grits, offers the greatest opportunity for increasing protein in the diet. Soy-supplemented chapattis, pakoris, samosas, buns and various other local breads were readily acceptable because of improved palatability, appearance and storage quality. "

Describes the development of soy products in Colombia (with panela, "a sugar-based food product widely used in the diet of infants and children in Colombia"), Peru, and Hong Kong. "UNICEF is very active in promoting the utilization of soy in the protein-deficient areas of the world." Address: Soybean Council of America, Inc., Minneapolis, Minnesota.

1022. Ko Swan Djien. 1964. Tempeh, a fermented food made from soybeans. Paper presented at the International Symposium on Oilseed Protein Foods, May 11-16, Tokyo, Japan. 17 p. [30 ref]
• ***Summary:*** This is the author's most important and original report on tempeh, and the best presentation to date on tempeh in Indonesia. It discusses tempeh's history, traditional production methods, inoculum, packaging, chemistry and microbiology, contamination, shelf life, recipes, and price, plus a review of other research (including the best English-language bibliography of Dutch research to date) and a description of a tempeh pilot plant being developed in Bandung (complete with a mechanical roller-miller dehuller, water flotation hull removal, heated incubator and trays, and improved inocula).

Concerning okara tempeh, page 5 states: "For the purpose of lowering the price, often the dehulled soybeans are mixed with the residue of soybeans material from the process of manufacturing of tofu. This material is in fact the coarse components of crushed soybeans. Usually it is used as feed for pigs and is relatively low in price. Mixed in tempe, it will lower the price of tempe." Note: This is the earliest English-language document seen (Jan. 2005) that refers to the use of okara in tempeh.

In this document, Ko signals what he hopes will be the beginning of a new image for tempeh in Indonesia: "But there is no doubt that the time will come when Indonesians

will be proud of their tempe, in the same way as the Japanese are proud of their sake, the French people of their wine, Italians of their macaroni, Indians of their curry, Russians of their caviar, the Dutch of their cheese, etc."

"Totally this food is produced in large quantities. Though dependable statistics are not yet available, it is not excessive to say that every day 10 percent of Indonesia's population of more than 100 million people consume at least 10 grams of tempeh per person. Although this huge amount illustrates the importance of tempe in the Indonesian diet, it is recognized as such by only a few experts." Note: This is 2.2 million lb/day or 1,000 metric tons per day. Address: Lab. for Microbiology, Bandung Inst. of Technology, Indonesia.

1023. Lo, K.S. 1964. Pioneering soy milk in Southeast Asia. *Soybean Digest.* May. p. 18, 20.

• ***Summary:*** "In 1962 we sold 2,500,000 cases of Vitasoy... Vitasoy has become the largest single seller in the local soft drink market. And this is no small achievement, when we are competing with such internationally known brands as Coca Cola, Pepsi Cola and Seven Up. We have certainly come a long way since we first got started in 1940 with a small setup to make 'milk' out of the soybean. How I came about it was quite an accident. I happened to be in Shanghai in 1937 and attended a talk given by the late Julian Arnold who was then commercial attache to the American Embassy in Nanking. He called soybean the 'Cow of China' and practically attributed to it the preservation of the Chinese race... I was very impressed by his talk and came away with soybean stuck in my mind. I soon returned to Hong Kong and decided to do some experiments in making a formulated soybean milk which could serve as a milk substitute. A few friends took an interest in my work, and a private limited company with a paidup capital of HK$15,000 was formed to put the product on the market. The small factory with its crude equipment was formally opened in March 1940 by the then director of medical services, Dr. Selwyn-Clarke. In my opening speech, I said that the aim and object of this new venture was to bring better nutrition to the masses of people at the price they could afford to pay. This has ever since remained the policy of our company. To this day the retail price of our Vitasoy is less than one-third the price of cow's milk.

"The first couple of years were extremely difficult. We soon found that, even among us Chinese to whom the soybean was by no means new, there was a strong prejudice against soy milk. They not only did not believe its nutritional values, but thought it could cause diarrhea, indigestion and stomach ache. At that stage the taste of our product, too, left much to be desired. Many consumers found it hard to take, because of the strong beany flavor and the slightly bitter taste. Another problem we had to face was the keeping quality of the soy milk. We followed the dairy industry by packing it in standard half-pint milk bottles and sealed them with paper cap and hood. They spoiled even quicker than milk unless they were kept under refrigeration all the time."

"Hurt by public prejudice and lack of marketing know-how, the business soon became a failure. When the Pacific War broke out in December 1942, the company had not only lost all its money, but also owed a large sum to me personally because I had to put up the money in order to keep it going. After the Japanese took over Hong Kong, they also took over our small factory and everything inside it. I left the Colony for Free China and remained there until the war was over.

"I returned to Hong Kong after the war was over, and my first task was to get Vitasoy back on the market. I was happy to find most of the equipment was left intact in the factory and by November 1945 Vitasoy [which was named Sunspot Soya Milk at the time] was on sale again. This time I decided to push my product to the small people in the street and to market it as a beverage rather than a milk substitute."

In 1953 the original milk bottle with a paper cap and hood was changed to a soft drink bottle with a metal crown cap. After sterilization by heat, it could be kept for months without refrigeration. "This technical breakthrough gave the biggest impetus to the increase in sales volume."

"Soft drink sales in Hong Kong are very seasonal, with 80% of the volume during the 6 summer months and the remaining 20% spread out from November to April. So we set to work on a heater which will keep Vitasoy hot during the cold weather. Its function will be just the opposite of an electric beverage cooler. After some initial failures we finally came out with a heater which has a capacity of heating up to 4 cases of Vitasoy at a time and always maintains a temperature of 145ºF. So at any time during the winter a customer can walk up to a store and ask for a bottle of hot Vitasoy which will take away the chill, and yet not hot enough to burn his lips... With the help of the heaters, we are able to maintain 50% of our peak summer sales through the winter months. Hot Vitasoy stands out uniquely among the soft drinks, because there is no other soft drink which one can drink hot!"

In 1963 the company built a new plant in Kowloon with twice the production capacity of the old original plant in Hong Kong. Today, Vitasoy is consumed by 250,000 people daily.

"The influence of our work does not stop within the bounds of this little island. We helped UNICEF train technicians to operate a soybean milk powder plant in Indonesia. In Singapore, Malaya and Thailand, private enterprise started soybean milk plants after having seen our success in Hong Kong."

Photos show: (1) K.S. Lo. (2) Part of the crowd standing in line at the Vitasoy plant in Kowloon. Address:

Hong Kong Soya Bean Products Co., Ltd.

1024. Lerner, Michael D. 1964. Sliver of a shop has big trade in its stock of 700 exotic foods. *Washington Post, Times Herald.* Aug. 15. p. A3.
• ***Summary:*** Irving Karabell owns the 4½ foot wide specialty foods store at 1749-A Pennsylvania Ave. One of his "fastest moving items is a soja sauce favored by Indonesians that is called ketjap benteng."

Karabell says of Indonesians that if they don't have this sauce, "'they have to go back to their country.'"

1025. Hardjo, Suhadi. 1964. Pengolahan dan pengawetan kedelai untuk bahan makanan manusia [Soybean processing and preservation for human consumption]. Paper presented at Seminar Kedelai (Soybean Seminar, Rapat Kerdja Kedelai). 14 p. Held 28-30 Sept. 1964 at Bogor, Indonesia. [Ind]*
• ***Summary:*** Describes several methods of processing and preserving soybeans in Indonesia, including the production of tempeh, tofu (tahu), soy sauce (kecap), tauco (soybean paste), koji, and soybean flour.

Note: This is the earliest document seen (March. 2009) uses the word "tauco" (spelled in that way) to refer to Indonesian-style miso.

1026. Ko Swan Djien; Sastramihardja, I. 1964. Some experiments on fermentation of soybean. Presented at Seminar Kedelai (Soybean Seminar, Rapat Kerdja Kedelai). Held 28-30 Sept. 1964 at Bogor, Indonesia. [Eng]*

1027. Mustakas, G.C.; Griffin, E.L., Jr.; Allen, L.E.; Smith, O.B. 1964. Production and nutritional evaluation of extrusion-cooked full-fat soybean flour. *J. of the American Oil Chemists' Society* 41(9):607-14. Sept. [14 ref]
• ***Summary:*** The abstract begins: "A processing method for preparing full-fat soybean flours for human consumption by a new extrusion cooking method was developed." The paper continues: "The extrusion equipment described in this paper was used in 1961 to convert soybeans directly to full-fat meals for feed mixing. Swine feeding tests carried out on these meals at Purdue University [Indiana] were reported [Jimenez et al. 1961, in *Feedstuffs* 33(44):42] to give comparable weight gains and feed conversion efficiencies of regular defatted soybean meal with added fat.

"On the basis of the Purdue experiment, it was conceived that it might be possible to apply the cooker-extruder process to dehulled soybeans to produce an edible-grade full-fat soybean product which could be ground to a highly nutritious flour for human foods."

"A collaborative project was therefore sponsored by UNICEF, and undertaken by the Northern Utilization Res. & Dev. Div., ARS, USDA [NRRL], and the Wenger Mixer Manufacturing [Sabetha, Kansas] to develop and evaluate and evaluate a simplified extrusion cooking process for the production of full-fat soybean flour for edible uses." Contains an analysis of 12 soybean flours processed under different conditions. "The United Nations Children's Fund (UNICEF) has been improving local diets in the developing countries, especially of children and of pregnant and nursing mothers. Since [cow's] milk is a logical food for this group, UNICEF has assisted in building and equipping over 200 milk-processing plants in the developing countries to provide safe milk or milk powder."

"Asians have traditionally used soybean foods, generally in a moist form. Some of these are: soy milk (a water extract of the ground whole bean); tofu (a precipitated curd similar to cottage cheese); and tempeh (a fermented product of the decorticated bean). Because of their relatively short shelf life they are usually made locally each day as a cottage of small village industry."

The product flavor was evaluated. "The prevention of off-flavors and odors which result from fat deterioration is of major importance." Only one lot was stabilized with an antioxidant. Accelerated stability tests were conducted on two lots at 100ºF and 113ºF for 1-39 weeks. The higher-temperature lot began to show evidence of rancidity by its elevated peroxide value of 6.4 at the end of 15 weeks, and this rancidity was strong at the end of 26 weeks when the peroxide value reached 54. The fresh products had a desired nutty flavor, and the strong beany-bitter flavor had been removed.

"Proposed Clinical Testing. A 1,000-lb lot of the milled soy flour has been forwarded to the P.N. Sarihusada Co., Jogjakarta, Indonesia, where it will be formulated and packaged for acceptability testing in the areas now supplied by the plant with the dried water-extracted soya milk formulation. Clinical and acceptability testing is being done by the College of Medicine of the National Taiwan University, Taipei, Taiwan. It is part of a large-scale clinical test with infants up to 12 months of age to compare the extruded soy flour formulated as a milk, with various other soybean products." Two illustrations show the extrusion equipment, which was operated by LaVon Wenger.

Note 1. This is the earliest document seen (Dec. 1997) that discusses extrusion cooking in connection with soybeans for food uses. This appears to be the first production of full-fat soy flour (FFSF) by an extrusion cooker.

Note 2. This is the earliest document seen (Sept. 2000) that describes the equipment used to make soy flour. Address: 1-2. NRRL, Peoria, Illinois; 3. Food Conservation Div., UNICEF, United Nations, New York; 4. Wenger Mixer Manufacturing, Kansas City, Missouri.

1028. Prawiranegara, Dradjat D. 1964. Pentingnja kedelai dalam menu Indonesia [The importance of soybeans in the Indonesian menu]. In: Seminar Kedelai, Bogor. (Rapat

Kedelai Kerdja, Bogor). See p. 5. Held 28-30 Sept. 1964. [Ind]*

1029. Soedarmo, P. 1964. Kedudukan katjang kedelai sebagai makanan di Indonesia [Soybeans as a food for Indonesians]. In: Seminar Kedelai, Bogor. (Soybean Seminar, Rapat Kedelai Kerdja, Bogor). See p. 5. Held 28-30 Sept. 1964. [Ind]*

1030. *Foreign Agriculture.* 1964. Thailand's soybean production down. 2(40):14. Oct. 5.
• ***Summary:*** Unofficial estimates placed Thailand's 1964 soybean crop at only about 990,000 bushels, harvested from 63,000 acres, for a yield of 15.7 bu/acre. The decline in plantings is attributed to unfavorable prices received by farmers. Soybeans are widely consumed as a pulse in Thailand. No soybeans are consumed in oil production; small quantities of oil are imported annually for use as salad oil.

1031. *Foreign Agriculture.* 1964. USDA promotes soy beverage, defatted grits in test project. 2(48):10. Nov. 30.
• ***Summary:*** A pilot project to test the consumer acceptance of U.S. defatted soy grits and soy beverage products will get underway within the next 3 months with the distribution of 7,500 tons to consumers in six foreign countries. Main participants will be Brazil, Hong Kong, India, Korea, the Philippines, and Taiwan.

1032. Hand, D.B.; Steinkraus, K.H.; VanBuren, J.P.; Hackler, L.R.; Rawi, I. el; Pallesen, H.R. 1964. Pilot-plant studies on soymilk. *Food Technology* 18(12):139-42. Dec. [7 ref]
• ***Summary:*** Contents: Summary. Introduction. Experimental methods [cold-water grind]: Spray-dried water-extracted soymilk, soymilk from [unsoaked] dehulled soybeans, soymilk from soaked dehulled soybeans, spray-dried acid curd, soymilk residue [okara]. Results and discussion: Interrelation of soybean fractions, indices of quality in relation to processing conditions, nutritional assessment, studies on flavor.

This investigation was made to develop improvements in the process for making dried soymilk from whole soybeans for use in developing countries, and especially in the process used at the soymilk plant in Indonesia equipped by UNICEF. The authors made a dry soymilk of excellent quality directly from whole soybeans without including the typical water-extraction step. The yield is higher and labor costs are reduced. A homogenizer is added to the processing line, but an evaporator and filter press are eliminated.

Figures show: (1) Flow sheet for water-extracted soymilk. (2) Flow sheet for soymilk from dehulled whole soybeans. (3) "Distribution of solids and protein as percentages in fractions from soaked soybeans." When whole soybeans are soaked, 98.5% of the solids and 99.5% of the protein remain in the soaked beans; the rest goes into the soak water. When the soaked soybeans are ground and filtered, 65% of the solids from the original dry soybeans and 83% of the protein remains in the soymilk; 33.5% of the solids and 16.5% of the protein goes into the residue [okara]. When the soymilk is made into tofu by cooking, precipitation with 4% acetic acid, and pressing the curd, 49% of the solids from the original soybeans and 74% of the protein remain in the tofu; 16% of the solids and 9% of the protein go into the whey.

(4) "Distribution of solids and protein as percentages in fractions from dehulled soybeans." When whole dry soybeans were steamed lightly, then dehulled, 10% of the solids and 4% of the protein were lost in the hulls. When the dehulled whole soybeans were soaked in 3 times their weight of water, 10% of the solids in the original dry soybeans and 4.5% of the protein was lost in the soak water. This 80% of the solids and 89.5% of the protein remained in the soaked dehulled soybeans.

Tables show: (1) Composition of soymilk samples (% of total). (2) Taste panel comparison of soymilk samples: The water-extracted soymilk received the highest (i.e., best) score for flavor (6.7) and consistency (8.1), followed by the soymilk made from dehulled whole soybeans (6.1 and 6.8), then the soymilk made from dehulled soaked whole soybeans (5.2 and 5.8). The acid-precipitated curd received a very low flavor score (1.8) and low consistency score (1.8) because of its grittiness.

(3) Pilot plant equipment list: Names and sources of 17 pieces of equipment,

Note: This is the earliest document seen (Oct. 2003) with the word "soymilk" in the title from Cornell University's Department of Food Science and Technology, Geneva, New York. This was the first group to consistently spell "soymilk" as one word–the modern spelling. Address: New York State Agric. Exp. Station, Cornell Univ., Dep. of Food Science and Technology, Geneva, New York.

1033. Ezedinma, F.O.C. 1964. The soybean in Nigeria. *Proceedings of the Agricultural Society of Nigeria* 3:13-16. Papers Presented at the Annual General Meeting. [10 ref]
• ***Summary:*** "The soybean was probably introduced into Nigeria in 1908. It was first reported in 1910 (in the Annual Report of the Nigeria Department of Agriculture) that soybeans planted at Moor Plantation, Ibadan, on 1.35 acres failed. Introductions of new varieties were made in the years following but there was no indication that a successful crop was obtained from these. The soybean was probably taken from Ibadan to Samaru in 1928. In 1937, ten varieties were obtained from the United States of America and one each from Malaya and British Guiana. Of these, only one U.S. variety, Otootan, the Malayan and Creole from British Guiana [Guyana] survived; the rest either failed to

germinate in the first planting or failed in the second year planting. Two varieties obtained from Ottawa [Ontario, Canada] in 1938 did not germinate at Ibadan. A variety which had been brought into Itu in Eastern Nigeria was taken to Moor Plantation in 1940 and further introductions were made in the same year from the Philippines (six varieties) and Trinidad [Lesser Antilles] (one variety). Eight varieties were introduced from Southern Rhodesia in 1942, and in 1949 a total of 11 varieties were obtained from India, Ceylon, and the Philippines. By 1954, there were 38 varieties in the collection at Samaru and this had increased to 60 including some pure line selections by 1960. More varieties of soybeans have been introduced by the various Regional Ministries of Agriculture in recent years, notably by the International Development Services working in Western Nigeria. The problem of poor germination of soybean introductions is still experienced...

"Although the early attempts to grow soybeans in the forest belt of Southern Nigeria failed owing essentially to the poor quality of imported seeds, subsequent trials in the guinea savanna belt proved successful. In 1928, soybeans were successfully grown at the Samaru Experimental Station. This success apparently encouraged the formulation of a programme which eventually resulted in the issue of seeds to subsistent farmers in the adjoining districts in order to establish soybean as a cash crop... A world shortage of oil-seeds immediately after World War II accelerated the drive for increased soybean production in Nigeria. A variety 'Malayan,' which showed promise of yielding above 1100 kg/ha was multiplied and issued to farmers about 1946.

"Following an initial export of 10 tons (25,110 kg) from Nigeria in 1947, soybean became a cash crop and was grown in parts of the three provinces of Benue, Katsina and Zaria." The main production area was the Tiv Division of Benue Province where output grew from 10.5 tons in 1946 to 700 tons in 1948.

Today "Benue Province [in east central Nigeria] is the most important soybean producing area in the country. From this 'nucleus' soybean has spread into the adjoining districts of Plateau, Niger, Kabba, as well as Ogoja and Abakaliki provinces in Eastern Nigeria." The amount of soybeans purchased for export increased steadily from 10 tons in 1947 to a peak of 15,860 tons in 1963. Yields of soybean in Nigeria range from 340 to 1120 kg/ha.

Note: This document contains the earliest date seen for soybeans in Nigeria (probably 1908), or the cultivation of soybeans in Nigeria (1910). The source of these soybeans is unknown. Address: Federal Dep. of Agricultural Research, Moor Plantation, Ibadan.

1034. Faktor-faktor penghambat perluasan dan produksi kedelai [Inhibiting factors for soybean extension and production]. 1964. Jakarta: Lembaga Penelitian Hortikultura (Horticultural Research Institute). 7 p. [Ind]*

1035. **Product Name:** Tofu.
**Manufacturer's Name:** Fuji Tofu Co.
**Manufacturer's Address:** 248 Jackson St., San Jose, CA 95112. Phone: 408-297-1666.
**Date of Introduction:** 1964.
**How Stored:** Refrigerated.
**New Product–Documentation:** San Jose City Directory. 1969. First listing for Fuji Tofu Co. (Reiso Kake), bakery, 248 Jackson St.

Hokubei Mainichi Nenkan (Year Book). 1970. Page 314. Directory entry under "Food Companies." In Japanese: Fuji Tofu Seizôsho [Fuji Tofu Mfg. Co.]. In English: Fuji Tofu Co., 248 E. Jackson St., San Jose, California. Phone: 297-1666.

Shurtleff & Aoyagi. 1975. *The Book of Tofu.* p. 314. A traditional shop. Soyfoods Center Computerized Mailing List. 1981. Jan. 22. Owner: Reiso and Steve Kake. Article in West. 1983. Nov. Make way for tofu. About Fuji Tofu Co. Reiso Kake started Fuji Tofu Co. 20 years ago.

Shurtleff & Aoyagi. 1978, Dec. *The Book of Tofu* (Ballantine pocketbook edition). "Appendix B: Tofu Shops and Soy Dairies in the West." p. 393. Owner: Reiso and Steve Kake.

Talk with Kenny Nozaki. 1988. Aug. 25. Reiso Kake started this shop in 1964 just down the street from and in competition with San Jose Tofu Co. The company was sold in 1987.

Talk with Tom Schmitz of San Jose. 1994. March 29. Linda Lam, who is Chinese-Vietnamese, purchased this company (now named Fuji Fresh Tofu Co.) 7 years ago. She is a native Vietnamese, the daughter of ethnic Chinese parents who moved to Vietnam. Both she and her parents are lifelong vegetarians. She learned how to make tofu in Vietnam at a Buddhist temple during the early 1960s. She would spend her school vacations there. Then she came to this country and went into the foodservice business. When she saw that the shop was for sale, and now contained new automated and semi-computerized equipment, she bought it from the Japanese owner, Mr. Kake, who was retiring. She still makes tofu using nigari as a coagulant.

1036. Pembibitan dan penyaluran bibit kedelai unggul dalam rangka mempertinggi produksi kedelai [Seedlings and the distribution of prime seed to increase soybean production]. 1964. Semarang: Dinas Pertanian Rakyat Dati I Jawa Tengah. [Ind]*

1037. Poey, S.H. 1964. Trial of soy bean milk on children older than five months. In: Proceedings of the A-A Congress on Pediatrics. I. See p. 595. *

1038. Tat, P.V. 1964. Nuoc mam [Nuoc mam fish sauce]. *Vietnemese Bulletin of Science and Technology* No. 45.

[Vie]*

1039. Tat, P.V. 1964. [Soyabean sauce]. *Vietnemese Bulletin of Science and Technology* No. 45. [Vie]*

1040. U.S. Interdepartmental Committee on Nutrition for National Defense. 1964. Federation of Malaya–Nutrition survey, September-October 1962. *

1041. **Product Name:** Poluk Milk.
**Manufacturer's Name:** [Medium-sized Soft Drink Manufacturer].
**Manufacturer's Address:** Bangkok, Thailand.
**Date of Introduction:** 1964.
**Wt/Vol., Packaging, Price:** Bottle.
**New Product–Documentation:** E. Orr. 1972. Tropical Products Inst. G73. The use of protein-rich foods for the relief of malnutrition in developing countries: an analysis of experience. p. 15-16. "Poluk Milk has been produced in Thailand by a medium-sized soft drink manufacturer since 1964. It differs from the soya beverages mentioned above in that the soya milk is combined with powdered milk and butter. It could therefore be described as a milk extender but appears in fact to be marketed as a soft drink. Sales are in the region of 400,000 bottles per year, about half the capacity of the plant, and appear to be static. The main reason given for the failure of sales to expand is competition–as mentioned above the soft drink market in Thailand is highly competitive."

1042. Belden, Gail Chester; Congleton, W.L.; DeVoto, W.R.; et al. 1964. The protein paradox: Malnutrition, protein-rich foods, and the role of business. Management Reports, 38 Cummington St., Boston, MA 02215. ix + 145 p. No index. Also published by Nimrod Press, Boston, in 1965. 28 cm. [101 ref]

• ***Summary:*** Contents: Foreword by Nevin S. Scrimshaw, Massachusetts Inst. of Technology (MIT). Preface (by the 10 authors, May 1964). I. The problem and the challenge: Population and food supply, protein and nutrition, protein quality, getting the protein into the diet, the need for action. II. Pioneering commercial efforts–Approaches to product development and marketing: 1. ProNutro in South Africa: Incumbe–the initial product, development and testing of ProNutro, commercial test marketing, first national campaign, second national campaign, results of the national campaigns. 2. Incaparina in Latin America: Development of Incaparina, field trials, commercial policies on INCAP, advertising policies. 3. Incaparina in El Salvador and Nicaragua. 4. Incaparina in Guatemala. 5. Incaparina in Mexico. 6. Incaparina: Early development, test marketing, results of the first three months. 7. A protein-rich concentrate for Africa: Product development, commercial introduction. 8. Other approaches: Nestle corn-soy weaning food in Brazil, India [no soy], Senegal [no soy], Saridele [which means "essence of the bean"; a soymilk] in Indonesia, started in mid-1957. 9. Lessons from the case histories: Product development, price, packaging, distribution, promotion, grass roots facilities versus incremental expansion, results, government and medical support.

III. A look at quality problems and processing soybeans: Solvent extraction, water-extracted soy protein, full-fat soy flour. Cottonseed: Expeller process, pre-press solvent extraction. Peanuts. Fish: VioBin process (p. 78), Chile process, Bureau of Commercial Fisheries. Other protein sources: Protein isolates, protein from petroleum, other oilseeds, other plants. Conclusion. Note: The VioBin Corporation produces commercially a fish protein concentrate or fish flour at plants in New Bedford, Massachusetts; Monticello, Illinois; and Greenport, New York. "Ezra Levin, president of VioBin, states that his process can solve the malnutrition problem and that a one-time $300 million investment could finance enough permanent, self-sustaining facilities to overcome the world's animal protein deficit indefinitely." He has written a paper titled "The VioBin process for solvent extraction and dehydration of wet-fat products" (Monticello, Illinois, Sept. 1963) (p. 78).

IV. Are potential protein resources available?: Animal vs. vegetable protein. Oilseed resources. Marine resources. Protein resources and individual countries. V. The role of governments: United States government: Cooley loans, guarantees, information, research, Food for Peace, competition. Local governments.

VI. Commercial feasibility–attitudes and opinions: How well is industry informed? What approaches are being considered?: Commercial ventures, individual projects, incremental basis, licensing arrangements, cooperative efforts, government involvement. What are the bottlenecks?: Finding the commercial market, distribution, changing food habits, product development, motivation and personnel, technical problems, risk and economic return. What are the opportunities?: Profitability, future markets, public relations value, local government relations, social responsibility. Lack of consensus.

VII. Conclusions, reflections, and advice: Product development, production, promotion, distribution, getting started, words of caution. VIII. Bibliography. IX. Appendix.

Concerning Food for Peace (p. 102-04). "The Food for Peace program was an outgrowth of Public Law 480, passed in 1954. The original purpose of the law was to provide the United States with a means of disposing of surplus commodities by selling them for local currencies of needy countries. Total exports under this law accounted for 28% of total U.S. agricultural exports for the first nine years the law has been in operation." These exports were composed of the following: wheat and wheat flour (56%), fats and oils

(16%), cotton (13%), feed grains (5%), rice (4%), dairy products (2%), and other commodities (4%). "In 1963 these exports amounted to 34% (in dollars) of the total United States economic assistance effort abroad.

"In administering Public Law 480 the various agencies involved are governed by the provisions of the four sections: Title I–sales for foreign currencies (63% of total shipments); Title II–emergency relief and economic development (11%); Title III–donations through voluntary agencies (25%); Title IV–credit sales for dollars (1%).

"The Department of Agriculture administered the program from 1954 until 1960, when President Kennedy created the office of the Director of Food for Peace program. This person reports directly to the President and coordinates the efforts of the many governmental agencies that are involved in the administration of Public Law 480." A diagram (p. 103) shows the Food for Peace operational [organization] chart. Immediately below the Director of Food for Peace are USDA, AID (Agency for International Development), State Department, Treasury Department, BOB [Bureau of the Budget, later Office of Management and Budget], Defense USIA & OEP Commerce [OEP is Office of Economic Programs within the Business and Defense Services Administration].

"Much of the free food is distributed through voluntary agencies ('Volagencies' on the chart). Such organizations as CARE, the Church World Service, Catholic Relief Services, the Jewish Joint Distribution Committee, and others have many projects that are largely dependent on PL–480 for food and seed. Shipping charges on these products are often paid by AID. Within the recipient country, the local government usually pays the distribution charges..."

"Perhaps the broadest Food for Peace activity is the school lunch feeding program under which 40 million children (as of August, 1963) receive daily lunches in many countries. Another important use of this food is as wages for community development projects; present Food for Work projects in 22 countries employ an estimated 700,000 workers. In this manner, the food has been used to encourage the building of schools in Bolivia, the planting of trees in Tunisia, and the construction of a road in Iran."

Note: This is the earliest document seen (Nov. 1999) that mentions Nestle's work with soy. Address: Boston, Massachusetts.

1043. Kedelai [Soybeans]. 1964. Lembaga Makanan Rakyat. [Ind]*

1044. Oei Jang Tjoe. 1964. Penentuan kadar riboflavin dari hasil berbagai fermentasi kedelai dengan tjara mikrobiologi [Microbiological determination of the riboflavin level in various fermented soybean products]. Thesis (Skripsi), Bagian Biologi Institut Teknologi Bandung, Bandung, Indonesia. 40 p. PBITB. [Ind]*

Address: Bandung, Indonesia.

1045. Abbott, J.C. 1965. Protein rich foods from oilseeds: Economic aspects. *P.A.G. News Bulletin* No. 5. p. 19-38. April. [15 ref]

• ***Summary:*** Table 1 lists annual consumption (in metric tons) of oilseed protein foods in some main consuming areas. Column 1: Miso, tofu, tempeh and other fermented or cooked soybean products: Mainland China 3,736,000. Japan 2,536,000. Indonesia 200,000. South Korea 160,000. Taiwan 153,000. Hong Kong 15,000. Malaya 15,000. Singapore 15,000.

Column 2: Soy milks: Singapore and Malaya 1,300 metric tons, Hong Kong 1,000.

Note: This is the earliest document seen (Sept. 2002) that contains industry or market statistics for soymilk by geographical region. Address: Chief, Marketing Branch, FAO Headquarters, Rome, Italy.

1046. Henderson, F.C. 1965. Division of Plant Industry. *Territory of Papua and New Guinea, Department of Agriculture, Stock and Fisheries, Annual Report (Port Moresby).* p. 48-163. April. For the years 1961-63. See p. 48, 108-09, 156, 163.

• ***Summary:*** In the section titled "Highlands Agricultural Experiment Station, Aiyura" is a subsection on a "Soya bean variety trial" (p. 108-09) which states: "Interest in this crop has stemmed primarily from its nutritional value, and chemical analyses have been associated with agronomic studies. A variety trial was planted in November 1961, to compare yields of 15 varieties and to study the effect of inoculation of the seed with *Rhizobium."*

"In 1963, plots of most of these varieties were planted at Aiyura, Minj, Wabag and Laiagam, in order to compare their performance at different localities and altitudes." A table (p. 109) shows the results of the trial harvested in 1962. For each of the 15 varieties is given the name, place of origin, seed description, time to mature in months, and yield. Yields from inoculated plants was only about 2½% greater than from uninoculated plants The highest yielding varieties (in lb/acre) were: Tanganyika (2,643; from Tanganyika, large dull black seed). Coral Sea Mission (2,407; from Goroka in highlands of central Papua New Guinea, large dull black seed). Avoyelles (2,366; from Nigeria, black, yellow and brown seeds mixed). Hernon 49 (2,330; from Tanganyika, large yellow seed). Baptist Mission (2,175; from Baiyer River in highlands of central Papua New Guinea, large yellow seed). Blyvoor (2,014; from South Africa, large yellow seed). Batavian Yellow (1,990; from Tanganyika, shiny black seed). SHE 30 (1,900; from Congo, large yellow seeds). Glycine 317 (1,742; from Tanganyika, small yellow seed). Geduld (1,639; from South Africa, large yellow seed). CN 5 (1,582; from Tanganyika, small yellow seed). Ringgit (1,462; from Indonesia, small

yellow seed). Two Mamloxi varieties from Nigeria gave very low yields.

In the section titled "Agricultural chemistry," a subsection on "Plant nutrition studies" (p. 155-56) contains a table showing that 2 samples soybean leaves were analyzed in 1961-62. A paragraph titled "Soya bean" (p. 163) states that 37 samples "were received from variety trials at the Highlands centers of Aiyura, Minj, Wabag and Laiagam." Those which have been analyzed show wide variations in oil and crude protein content between varieties and within the same variety grown at different locations. Samples including "soya bean, soya oil and soya bean cake from a small oil crushing installation established by a Mission in the Markham Valley" were also analyzed. Address: Director.

1047. Hesseltine, C.W. 1965. A millennium of fungi, food, and fermentation. *Mycologia* 57(2):149-97. March/April. [38 ref]

• ***Summary:*** A landmark, widely cited work on indigenous fermented foods. Interestingly, it makes no mention of amazake, or kanjang (Korean soy sauce). Contents: Tempeh. Ragi. Sufu (describes process, mentions pehtzes and the mold *Actinomucor elegans* NRRL 3104). Thamnidium (meat tenderizer and flavor enhancer from the mold *Thamnidium elegans).* Miso. Shoyu (incl. tamari. "In China, shoyu is more of the tamari type, that is, more soybeans are used and less wheat,..."). Tea fungus. Ang-Kak (p. 179-81). Advantages of fermenting foods. The future of food fermentations.

The glossary gives brief descriptions of aga-koji, akakoji, amylo process, anchu, angkak, angkhak, ang-quac, anka, ankak, arack, arak, arrack, atsumandie, awamori, bagoong, bakhar, beni-koji, benikoji, braga, brem, busa, chao, ch'au yau (Chinese name for shoyu), chee-fan (a type of Chinese cheese or sufu), chiang (Chinese equivalent of miso), chicha, Chinese cheese (sufu), Chinese red rice (ang-kak), chiu-chu (Chinese yeast), chiu-niang (Chinese term for koji), chou *[ch'ü]* (Chinese equivalent of koji), dahi, dawadawa (made from African locust bean–*Parkia filicoidea;* soy is not mentioned), dhokla, dosai, fermentation of citron, fermented fish, fermentation of maize, fermented minchin (wheat gluten), fermented soybeans ("a Chinese food prepared from small black soybeans." See A.K. Smith 1961 [soy nuggets]), fish paste, fish sauce, fish soy, fu-yu, fu-yue, fuyu (see sufu [fermented tofu] for all 3), ginger beer plant, grib, hamanatto, hon-fan [fermented tofu], hongo, hung-chu, idli, injera, jamin-bang, java yeast, jotkal, kaffir beer, kanji, katsuobushi, katyk, kefir, ketjap, kimchi, kishk, kisselo mleko, koji, kombucha (tea fungus fermentation), kome-miso, kuban, kumiss, kumys, kushik, kushuk, kvass, kwass, kyoku-shi, lao-chao, leben, lebeny, levain of khasia, levain of sikkin, lontjom, magou, mahewu, maize fermentation of the maoris, mazun, medusen tee, meen, meitauza, meju (fermented soybeans of Korea), mén, mien (Chinese yeast), mirin, mish, miso, moromi, mugi miso, murcha, nappi, nata, natto, ngapi, nuoc-mam, nukamiso, ontjom, patis, paw tsay, peh-khak, pehtze, peujeum, peyem, poi, prahoc, pulque, raggi, ragi, ranu, red pepper sauce, red rice, red sufu, sajur asin, saraimandie, sekihan, shiro koji, shottsuru, shoyou, sho-yu, shoyu, soja japonais (shoyu), sonti (a rice beer wine of India), South African fermented corn, soy, soybean cheese [fermented tofu], soy sauce, sufu, su fu [both fermented tofu], sweet flour paste, taette, tahuli, tahuri [both "Philippine fermented soybean curd"], takuwan, tamari, tane koji, tao-cho [taotjo], taokoan [pressed or firm tofu, not fermented], tao dji (see taotjo {sic}), tao-si ([soy nuggets]; see Handbook of Philippine Agriculture. 1939. p. 132-43), tao-tjung, tao-yu, taotjo, tapej, tape ketan, tape ketella, tarhana, tea beer, tea cider, tea fungus, teekwass, teeschwamm, tempe, tempeh, tempeh bongkrek, tempeh kedelee, thamnidium, thumba, tibi, tien mien chang [chiang], tojo, tokua, torani, tosufu, toyo, trassi, tsue fan, tuwak, uri, u-t-iat, wunder pilz, yen-tsai.

Note 1. This is the earliest document seen (Feb. 2007) that mentions *Actinomucor elegans* in connection with sufu [fermented tofu]. In 1966 Hesseltine describes it as the best mold for use in making this fermented food.

Note 2. This is the earliest document seen (July 2000) that mentions "mugi miso"–a type of miso made with barley koji. By the mid- to late-1960s, macrobiotic companies in the USA were importing barley miso from Japan and labeling it "Mugi Miso."

Note: This is the earliest English-language document seen (Feb. 2007) that uses the terms "fuyu" or "fu-yue" to refer to fermented tofu.

Photos show: (0) Clifford W. Hesseltine (portrait). (1-3) *Rhizopus oligosporus* mold, used to make tempeh (3 views). (4) Skewered cubes of sufu in an incubator, with one skewer of uninoculated tofu cubes and three rows of tofu inoculated with *Actinomucor elegans* showing luxuriant growth of mold. (5) Cubes of Chinese cheese [fermented tofu] removed from brine. (6) Dilution plate of tane koji showing different types of *Aspergillus oryzae.* Address: NRRL, Peoria, Illinois.

1048. Hesseltine, C.W. 1965. A millennium of fungi, food, and fermentation: Ang-kak (Document part). *Mycologia* 57(2):149-97. March/April. See p. 179-81, 184-85. [4 ref]

• ***Summary:*** "Ang-kak, or red-rice, is a product made by fermenting rice with certain strains of *Monascus purpureus* Went. Our culture, NRRL 2897, used to carry on this fermentation was isolated from a sample of ang-kak bought in the Manila market in the Philippines.

"Ang-kak is used for coloring various foods including fish and Chinese cheese, and for manufacturing red wine in the Orient. It is used in China, Taiwan, and the Philippines,

and presumably in many other countries of the Orient. It is stated also to impart flavor. The most recent authoritative account of this product and its fermentation is by Palo, Vidal-Adeva and Maceda (1961) at the Philippine National Institute of Science and Technology. According to them, it is known under the following names: red rice, Chinese red rice, ang-kak, ankak, anka, ang-quac, beni-koji, and aga-koji. Church (1920) points out that strains of this mold may be isolated from many sources but only certain ones are suitable for the fermentation. They must produce a dark red growth on the rice, but also must form the pigment throughout the rice kernels, and must do this at low enough moisture levels to allow the individual grains to remain separate from one another."

A long paragraph then describes how to prepare ang-kak on a laboratory scale. "After drying, ang-kak can be ground into a flour and used to color various foods mentioned above." It contains two pigments: monoascorubrin (red) and monascoflavin (yellow).

The glossary mentions synonyms for ang-kak: aga-koji [aka-koji], akakoji (Red rice in Formosa), angkak (Chinese red rice), angkhak, ang-quac, anka, ankak, beni-koji, benikoji, Chinese red rice (ang-kak), red rice (used to make red sufu [= red fermented tofu]). Address: NRRL, Peoria, Illinois.

1049. Stone, M.W. 1965. Biology and control of the lima-bean pod borer in southern California. *USDA Technical Bulletin* No. 1321. 46 p. April. [23* ref]

• ***Summary:*** States that the lima-bean pod borer *(Etiella zinckenella* (Treitschke)) was found as a pest on soybeans in Indonesia (Van Hall 1924) and in the northern Caucasus (Schlaeger & Mamonav 1929). Address: Entomology Research Div., Agricultural Research Service, USDA.

1050. Meeuse, B.J.D. 1965. Straddling two worlds: A biographical sketch of Georg Everhard Rumphius *Plinus Indicus. Biologist* 47(3-4):43-54. May. [23 ref]

• ***Summary:*** For 50 years, Rumphius lived on the island of Amboina in the Dutch East Indies. A simple man, he was blind during the entire second half of his life. He may be considered the last of the herbalists. From 1653 until his death in 1702 he produced his *Amboinsch Kruidboek or Herbarium Amboinense.*

A brief chronology: 1663–He writes the High Council of the Dutch East India Co. announcing his intention to report on all the plants and animals he has observed on Amboina in a series of well illustrated books. The reply is favorable.

1669–He has lost his eyesight from strenuous work under the tropical sun, probably from glaucoma simplex. Yet Joan Maetsuyker encourages him to work on.

1674 Feb.–Ambon is completely destroyed by an earthquake. Among the 2,000 dead are his beloved wife.

1681–He is appointed to membership in a learned society in Vienna, the Academia Naturae Curiosorum, under the name of *Plinus Indicus.* This buoys his spirits, but his trials are far from over.

1687 Jan. 11–A great fire burns down the town of Ambon. Only the manuscript of his Kruidboek is saved. "His collections, his library and many priceless manuscripts, including his own original drawings for this book are lost forever. His assistants make new illustrations but the blind naturalist cannot see them or correct them.

1690–He sends to Batavia (today's Jakarta) the first six books of his Kruidboek, complete as to text and illustrations.

1692–Joannes Kamphuys, after studying and admiring the book, sends it from Batavia to Europe on the ship *Waterlandt.* But just before it reaches Holland, in the English channel, the ship is attacked by the French and sent to the bottom with everything in it and on it. Only 12 sailors escape this fate. So is this the inglorious end of the book? No! With rare foresight, Kamphuys himself had had seen to it that a copy was made in Jakarta before it was shipped to Holland.

1697–All 12 volumes are safe in Holland. Note: The books are not published until the 1740s. Address: Dep. of Botany, Univ. of Washington, Seattle.

1051. Miller, Harry W. 1965. Meeting the world's nutritional needs with soy milk. *Soybean Digest.* May. p. 19-21.

• ***Summary:*** In East Asia, milk is in short supply and expensive. A replacement made from soybeans has proved acceptable both tastewise and nutritionally. Moreover, animals are not an efficient means of producing protein. In East Asia, soybeans for food use have traditionally been soaked and then milled. Thus a "wet milling operation" is used instead of dry milling, as to make flour. "For adult use, they have built up a number of soy protein dishes, called 'meat without bones'. However they have not taken into consideration the nutritional needs of infants and growing children, and malnutrition is seen everywhere in these developing countries."

"In Japan, 30 pounds per capita of soybean are consumed as food but to provide soy milk for infants and children another 15 pounds per capita need to be added." For soy milk processing two systems are in use: the small community soy milk plant (the fresh milk may be dispensed from the conventional milk can without bottling, thus lowering the cost) and the large commercial bottling plant. "In Hong Kong, soy milk is made, bottled, and distributed everywhere in the colony for 3½ cents for a 7-ounce bottle. It has the largest sale of any bottled beverage in the colony... In Hong Kong are two factories of the most modern type, with upwards of 40 large delivery beverage trucks, under the genius and leadership of K.S. Lo, general manager.

These plants daily manufacture some 25,000 cases each containing 24 bottles of soy milk [i.e. 600,000 bottles/day]. These are delivered to hospitals and schools, and this milk is on sale at all beverage places..." In Singapore, in Bangkok, Thailand, and in Manila, Philippines, soy milk is also made and well accepted. In Formosa, where 2-3 years ago there was only one soy milk plant in Taipei, today more than a dozen rural pilot plants have sprung up all over the country.

Photos show: (1) A bottling machine at a soy milk plant in Hong Kong. (2) Boy scouts in Hong Kong drinking bottled soy milk. Address: M.D., Director Emeritus, International Nutrition Research Foundation, Arlington, California.

1052. *Soybean Digest.*1965. Expect "entirely new foods" from Asian fermentations. May. p. 26-27.
• ***Summary:*** One of these new foods may be a tempeh-like product made from wheat, Dr. C.W. Hesseltine, retiring president of the Mycological Society of America, told that group at its annual meeting. USDA's Northern Utilization Research Laboratory is making a broad effort to find new outlets for American farm products. "Scientists at Peoria [Illinois] began studying the use of U.S. soybeans in foods such as Indonesian tempeh and Japanese miso more than 5 years ago. They have supported contract research on fermented foods in foreign laboratories for the past 2 years... The retiring president discussed research and processing of six fermented foods. Among them were tempeh and miso." A photo shows Dr. Hesseltine.

1053. Ocampo, Santiago C. 1965. Three-year test of promising soybean varieties and their response to time of planting. *Philippine J. of Plant Industry* 30(1-2):49-62 + 2 plates. 1st and 2nd quarter. [4 ref]
• ***Summary:*** Eleven soybean varieties were tested. The five highest yielders (in descending order) were: Improved Pelican, Black Manchurian, Yellow Gatan, Mis 33 Dixie, and Acadian, with yields ranging from 33.33 to 30.74 cavans per hectare. "Higher yields were obtained in the wet season but quality of beans produced was very much inferior to those produced during the dry season." The best time to plant soybeans under Ilagan conditions is at the start of the rainy season in June and early July, and Dec. to early Jan. for the dry season. Address: Agronomist I, Ilagan Exp. Station, Bureau of Plant Industry, Isabella, Philippines.

1054. Rawi, Ihsan el; Nio, Oey Kam. 1965. Soya-rice baby food. *Paediatrica Indonesiana* 5(1-2):606-08. Jan/June. Supplement. [7 ref. Eng]
• ***Summary:*** Saridele is a commercial weaning food made in a factory in Joeja (Central Java). It is powdered soya milk fortified with vitamins and minerals. Animal trials (young albino rats) show that saridele has a high P.E.R. value, especially after adding rice flour. A table compares the PER of whole milk, skim milk, Saridele, fried tempeh, and fried whole soybeans.

The latter, which are the least expensive, are prepared as follows: Soak whole soybeans overnight in water (or for 1 hour in hot water). Remove the hulls by rubbing and pour off the hulls. Drain and rise the soybeans, then drain until dry. Deep fry the soaked whole soybeans in hot cooking oil until golden brown in color. Then grind or pound the fried beans.

"The combination of tempeh and red rice is a daily food for adults and older children." There is no reason why it cannot be made into a porridge and served to younger children after weaning. Address: Nutrition Inst., Ministry of Health, Jakarta, Indonesia.

1055. Thrapp, Dan L. 1965. Thousands owe lives to doctor's soybean "milk." Noted surgeon nutritionist, now 86, devised formula as missionary in 1925 [Dr. Harry Miller]. *Los Angeles Times.* July 31. p. 19. Saturday.
• ***Summary:*** "Starving babies, often cast out to die because the parents have no way to feed them, inspired Dr. Miller to undertake his research [on milk from soybeans 40 years ago]... Today in Hong Kong about 25,000 cases of 24 bottles in a case are delivered daily... In America, the use of soybean formula for infants is growing rapidly–at a rate of 15-20% a year. Dr Miller has seen plants to create his product rise in China, Japan, Formosa, the Philippines, Singapore, Thailand, and, of course, Hong Kong. 'The nutritional qualities of the soybean are a gift to the world,' he said, 'and I have not copyright.' He said that U.S. studies showed that 14% of the people here are allergic to some degree to cow's milk and 7% of new-born infants get severely ill from cow's milk formula. There is no allergy rate from soybean milk, he said... Since 1960 he has been in Hong Kong raising money for two hospitals." One served refuges from Red China. As a surgeon, he has performed more than 3,000 goiter operations during his lifetime. Address: Times religion editor.

1056. De, Sasanka S. 1965. The present state of protein-rich food development in Asia and the Far East. *J. of Nutrition and Dietetics (India)* 2(3):166-76. July. [23 ref]
• ***Summary:*** Gives an excellent account of soymilk production in Asia during the mid-1960s and a brief history of the FAO/WHO/UNICEF/Protein-rich food program. "The First International Conference sponsored by FAO, WHO and Josiah Macy Jr. Foundation (New York) held in Jamaica in 1953, discussed the biological, technical and pathological aspects of protein malnutrition. The next Conference on 'Human protein requirements and their fulfillments in practice' held in Princeton in 1955 under the same sponsorship, gave detailed consideration to the testing

of new protein rich foods before their use in child feeding was recommended.

"The Protein Advisory Group (PAG) was established by the Director-General of WHO in 1955 to 'act on behalf of WHO in rendering advice to FAO and UNICEF on the safety and suitability for human consumption of proposed new protein-rich foods.' The PAG... became a tripartite FAO/WHO/UNICEF Protein Advisory Group in 1961."

Soybean milk: "In 1939, K.S. Lo established a firm known as 'Hong Kong Soyabean Products' to produce sterilized bottled soya milk. The two plants of the firm in Hong Kong produce 12,000 cases (24 x 7-oz. bottles per case) a day."

Also discusses miso, natto, tempeh, full-fat soya flour, soya presscake and meal, groundnut protein isolate. Address: Regional Office for Asia and Far East, FAO, Bangkok, Thailand.

1057. Steinkraus, K.H.; Lee, C.Y.; Buck, P.A. 1965. Soybean fermentation by the ontjom mold *Neurospora. Food Technology* 19(8):119-20. Aug. [5 ref]

• ***Summary:*** The ontjom mold was compared with the tempeh mold. The former had a lower maximum growth temperature and grew more slowly but produced the same general changes in a soybean substrate as the latter.

Surprisingly, a tempeh-like product made with soybeans but inoculated with the onchom mold *Neurospora* was never traditionally made in Indonesia. The soybeans were used only to make tempeh, and the onchom was always made from peanut presscake or okara. The authors developed and describe an acceptable soy onchom, which resembled tempeh except that the flavor was more nutlike. Address: 1. Dep. of Food Science and Technology, Cornell Univ.

1058. *Harian Karya (Indonesia)*.1965. Tempe naik tahta [Tempeh steps to a higher throne]. Sept. 21. [Ind]

• ***Summary:*** This article reports with amazement that Ko Swan Djien, head of the Department of Microbiology at the Bandung Institute of Technology, studied tempeh at the university.

1059. Brandemuhl, William. 1965. Soybean utilization in Japan. San Francisco, California. xxii + 478 p. Unpublished manuscript. 28 cm. [189 ref]

• ***Summary:*** A superb, in-depth, pioneering study, based on extensive original field research in Japan. It is carefully documented with hundreds of original interviews and published sources properly cited in two different lists of sources (numerical and alphabetical) Contains 30 tables and 190 excellent photos–including 7 of the author.

Table of contents: Preface. Notes. List of tables. List of figures. Map. Part I: Background. 1. The soybean: Birth and spread (legend, botanical inception, Nagata's theory of origin, spread to Japan and beyond, the American story).

Part II: Japan's production and supply of soybeans. 1. Japan the country and supply of domestic soybeans (Japan the country, domestic soybean production, planting and harvesting, marketing domestic soybean). 2. Importation of Red Chinese soybeans (background, mechanics, advantages, and prospects). 3. Importation of U.S. soybeans (history, method and mechanics of importation, the American shippers, concluding comments on importation). 4. Distribution (use in brief, super-wholesaler, wholesaler, retailer wholesaler, Japan's grain exchange).

Part III: Soybean utilization in Japan. 1. Utilization of soybeans for oil and meal (oil crushing history, soybean source, delivery of soybeans, the crushing industry, liberalization of soybean oil and meal, oil utilization in Japan, meal utilization in Japan). 2. Tofu (history, use of soybeans, manufacture, the tofu factory, marketing tofu products, recently developed tofu products, tofu as food, concluding comments). 3. Miso (importation, home production of miso, quantity of miso produced, soybean used for producing miso, kinds of miso, fermentation time, comparison of miso firms, manufacturing, packing and marketing, price, instant miso, use of miso, miso consumption outlook). 4. Shoyu (introduction, production and manufacturers, manufacture, raw materials, preparation of raw materials for natural shoyu, preparation of materials for chemical method shoyu, preparation of materials for mixed method shoyu, fermentation, filtering and pressing, sterilization, bottling, price, use of shoyu, miscellaneous shoyu products, concluding comments). 5. Natto (description, history, Daitokuji natto, the natto industry, consumption, natto soybeans, processing, making cost and price, marketing, use of natto, problems, new ideas and natto products). 6. Frozen tofu (history, development, frozen tofu soybeans, processing, freezing, defrosting, drying, treatment with ammonia and packing, marketing, preservation, use). 7. Kinako. 8. Yuba (history and development, the plight of the yuba industry, soybeans for yuba, manufacture, classification of yuba, use). 9. Tsukudani and nimame (description, soybean tsukudani, nimame). 10. Hamanatto (history, manufacture, use). 11. Edamame. 12. Moyashi (manufacture, use). 11. Miscellaneous products (fermented soybean curd, MSG, confectionary products, other products). Conclusion. Sources (numerically arranged). Sources (alphabetically arranged).

Tables: 1. U.S. soybean production, 1924-1963. 2. United States, Red China, and world production of soybeans (bushels), 1950-1963. 3. U.S. soybean importation, exportation and amount processed for oil and meal, 1924-1963. 4. U.S. exportation of soybeans (1,000 bushels) total, by continent, and to six largest importing countries, 1958-1962. 5. Japan's soybean acreage, production, and

merchandising rate. 6. Japan's importation of soybeans, total, and Red China's portion, 1945-1963. 7. Japan's total importation of soybeans and U.S. portion, 1945-1963. 8. Soybean usage in Japan, 1963. 9. Japan's processing of oilseeds, 1963. 10. Crushing capacity of selected Japanese oilseed crushers. 11. Eight largest crushers of soybeans and amount of soybeans crushed per month in 1963. 12. Total quantity of soybeans crushed in Japan, 1950-1963. 13. Japan's daily per capita intake of edible fats and oils. 14. Japan's consumption of edible fats and oils, 1945-1961. 15. Use of soybean meal. 16. Chemical composition of tofu and aburaage. 17. Quantity of soybeans and soybean meal used for tofu-aburaage productions (all Japan), 1950-1963. 18. Miso production and quantity of soybeans and soybean meal used, 1950-1963. 19. Composition of miso. 20. Daily per capita consumption of miso in Japan, 1950-1963. 21. All Japan production of shoyu and use of soybeans and soybean meal, 1950-1963. 22. Composition of shoyu. 23. Yearly per capita consumption of shoyu, 1950-1963. 24. Composition of natto. 25. Production of frozen tofu and use of soybeans. 26. Composition of frozen tofu. 27. Yearly per capita consumption of frozen tofu. 28. Composition of kinako. 29. Composition of yuba. 30. Monosodium glutamate production and use of soybeans and soybean meal. Continued.

This typed manuscript was sent to Soyfoods Center in July 2004 by Tomoko Brandemuhl, the wife of the author. About the author (based on several interviews with Tomoko, July 2004): William Victor Brandemuhl was born on 30 Nov. 1940 at Iron Mountain, Michigan. He grew up in Florence, Wisconsin, then attended the University of Wisconsin at Madison. He roomed for 3-4 years with various Japanese cancer researchers at the university. He also became close to Tomoko Arai (born 12 Dec. 1937 in Tokyo), a Japanese woman, who was doing graduate studies in social work there as a Rotary International Fellowship student. William initially intended to graduate in June 1962, but stayed an extra year in order to pursue independent studies in Japanese language and soybeans. He became interested in the soybean and its history in an anthropology class taught by Dr. R.J. Miller; William finished his excellent research paper on soybeans in Jan. 1963. He also took one year of Japanese language instruction (night classes). William graduated in Jan. 1963 with a BSc degree in economics.

William obtained a grant (no strings attached) from Honeymead Products Co. of Mankato, Minnesota, to study soybean utilization in Japan. Only one American had studied this subject in Japan after World War II–Alan K. Smith of the USDA, who visited Japan and wrote short but detailed reports in 1948-49 and 1958. In Jan. 1963 Brandemuhl arrived in Japan and became research fellow at the Department of Agricultural Economics, Kyoto University, Kyoto, Japan. Between Feb. 1963 and May 1964 (15 months) he conducted field research on soybean utilization in Japan. In June 1963 (after William had been in Japan for 4 months), Tomoko completed her graduate studies, graduated from the University of Wisconsin, and (since her scholarship was finished), returned to Japan–to be with William and to help him with his research in Japanese, which he spoke only moderately well. She traveled with him throughout Japan and translated for him during the many interviews he conducted. At each destination, she spoke about America to the local Rotary club–which paid her transportation, room, and board. William's monthly check from Honeymead paid for his room and board–but not for his travel and research, so he had to work part time doing English translation for a Japanese company. On trips, he took many photos using his expensive Nikon camera. Tomoko's family lived near Kobe, where she and William were married on 8 Aug. 1964–three months after he finished his field research. Several days after the marriage, they returned to the USA to visit his parents in Florence, Wisconsin, and enjoy a wedding party there.

William now knew he wanted to pursue a career in international business. He was soon offered a job at Crocker Citizen National Bank (International Division) in San Francisco, California. They drove to San Francisco and got an apartment at 1701 21st Avenue; he began work that fall, and was soon learning the basics of international business. Every evening after work at the bank he returned home to work on transforming his field notes into a manuscript. As he wrote the rough draft, Tomoko (a skilled pianist but not a skilled typist) typed it on a manual typewriter. The next day he would correct any mistakes and she would retype each page into final form. In 1965 he had the best carbon copy bound and sent it to Honeymead; he kept the original. It was never published and he received no academic credit for it.

On 26 May 1966 their first son and only child, Konrad Victor Brandemuhl, was born in San Francisco. They bought a house in Pacifica. In 1967 he was offered a job with Caterpillar Tractor Co. (International Div.) in Peoria, Illinois. In 1968 he moved with his boss to work at Allis-Chalmers Manufacturing Co., West Allis, Wisconsin. In 1969 he was transferred to Tokyo, Japan, as Far East Representative of the company. In 1970 he was transferred to Singapore as Far East Manager of the company.

William and Tomoko later lived for about 10 years near Tokyo, Japan (mostly in Mitaka), and for a while in Singapore. Over the years he showed his typescript on "Soybean Utilization in Japan" to many people, but nobody was interested. In 1986 he started his own trading company, specializing in textiles, natural rubber, latex thread, and various machine mechanisms. Tragically, William died on 2 April 1998 in Bangkok, Thailand, of pneumonia, during a business trip. He loved the excitement of international business and interaction with people of different cultural backgrounds. Address: San Francisco, California.

1060. David-Perez, Enriqueta. comp. and ed. 1965. Recipes of the Philippines. Philippines: Published by the author. Printed by Capitol Publishing House, Inc. (Quezon City). 86 + [14] p. Illust. No index. 22 cm.

• ***Summary:*** This is an expanded edition of the author's 1953 book of the same title. Almost all the recipes in this book have Filipino names, with no English translation of those names. A surprisingly large number contain soyfoods (See Glossary at end). Misu is "a paste made of fermented rice and soy beans" [miso]. Tajure is "fermented soy beans, caked" (fermented tofu). Tausi is "fermented soy beans" [soy nuggets or fermented black soybeans with salt]. Tokua is "soy bean curd" (tofu). Toyo is Filipino-style soy sauce.

Soy-related recipes include: Chicken pastel (with toyo, p. 26). Arroz caldo with chicken (with 3 tbsp. patis or toyo, p. 45). Bañgus en tocho–2 (with 2 tbsp. each tajure and tausi, and 1 cake tokua, cut into pieces 3/4 inch long and 1/8 inch wide, p. 54). Bañgus in soy sauce (with 2 tbsp. soy sauce, p. 54). Bulanglang–1 (with 1 cup tokua, cubed and fried, p. 57). Burong isda (with 1 tbsp. angkak–fermented red rice, p. 59). Escabecheng apahap (with 4 pieces tokua, p. 71). Escabeche–Macao style (with 3 tbsp. toyo sauce, p. 71).

Kari-karing pata (with ground toasted peanuts or peanut butter, p. 79). Lumpia labong (with 5 bean cakes–tokua, p. 83). Lumpia sauce (with ½ cup toyo sauce, p. 84). Lumpia with peanuts (with 2 squares tokua–diced, 2 tbsp. toyo–soy sauce, and 1 cup ground peanuts, p. 85). Lumpia with ubod–2 (with 2 cakes tokua, and toyo to taste, p. 87). Misu-tomato sauce (with 2 tbsp. misu–soy bean paste, p. 92). Pancit "luglug" (with ½ cup soy bean cake–tokua–cut into small cubes, p. 97). Umba (with 2 tbsp. toyo and 1 heaping tbsp. tausi, p. 118). Pastillas de mani (with 1 can ground peanuts, p. 133).

On the page facing p. 186 is a full page ad for Suki Soy Sauce, made by the Philippine Shoyu Co., Liloan, Cebu, Philippines. It is "Pure and fully aged."

Seven unnumbered pages later is a full-page ad for "Aji-no-Moto super seasoning... The purest vetsin ever."

A glossary at the end contains brief definitions of uncommon ingredients. Definitions of the soy-related ingredients above are taken from this glossary. Angkak is "red-colored grains of rice used as coloring for fermented fish."

Note: On the title page is printed "10th printing–1965" but no original publication date is given. Address: Philippines.

1061. Food and Agricultural Organization of the United Nations. 1965. Soybeans: Area harvested, yield, and production. *FAO Production Yearbook (Rome, Italy)* 19:125.

• ***Summary:*** The following nations are listed for the first time as soybean producers in the *FAO Production Yearbook.* * = Unofficial figure. Viet-Nam, North: Harvested 26,000* ha in 1962/63, producing 9.000* metric tons. Production in 1963 was 8,000* metric tons.

1062. Ko Swan Djien. 1965. Tempe [Tempeh]. In: M. Makagiansar and R.M. Soemantri, eds. 1965. Research di Indonesia: 1945-1965. Vol. 2. Bidang Teknologi dan Industri. Djakarta: Departemen Urusan Research Nasional Republik Indonesia. xi + 298 p. See p. 312. 24 cm. [50 ref. Ind]*

Address: Indonesia.

1063. Ko Swan Djien. 1965. Tindjauan terhadap penelitian fermented foods Indonesia [Observations and investigations on Indonesian fermented foods]. In: R.M. Soemantri, ed. 1965. Research di Indonesia: 1945-1965. Vol. 2. Jakarta: P.N. Balai Pustaka. See p. 209-23. [Ind]

Address: Indonesia.

1064. Poey, S.H. 1965. Trial of soy milk on children older than 5 months. *Paediatrica Indonesiana* 5:599-605. Supplement. [4 ref. Eng]

• ***Summary:*** Indonesia is not self-sufficient in cow's milk, so large quantities are imported for infant feeding and other needs. For growing infants, breast milk or cow's milk is indispensable. But all the space where dairy cattle might be pastured is already used for growing rice.

So the Indonesian government is taking other steps to supply the population needs of its people. "It is already know that the soybean is a good source of protein. Since soybean can easily be grown in Indonesia, and is very popular among the population," there great hopes that it can fill these protein needs. "But can soybean replace the cow's milk entirely? Can it also replace breastmilk as the food for infants as cow's milk can do?

"The government has founded a soybean [sic, powdered soymilk] factory in Jogjakarta. The product, called saridele, has been tested on animals...;" the results show that it has a high P.E.R. value, especially after adding rice flour.

The purpose of this study is to try the soybean flour prepared by the government factory as a 100% substitute for cow's milk or breastmilk on infants of 5 months or older. Trials were conducted on 35 babies, which were divided into 3 groups. A number of the infants refused the soy bean milk. A graph shows that the infants fed soy bean milk has the slowest weight increase of the three groups; they weighed on average about 1 kg less at the age of 12 months than the infants in the other two groups. Address: Dep. of Child Health, School of Medicine, Univ. of Indonesia, Jakarta.

1065. Baens-Arcega, Luz. 1966. Feasibility of mold-process production of sauce from copra and soybean mixture with

authentic Philippine strain of *Aspergillus oryzae* (Ahlburg Cohn). *Araneta J. of Agriculture* 12(2):80-105. June. [21 ref]

• ***Summary:*** People in various countries have developed a preference for the sauce produced in their native countries. "The Filipinos relish 'patis'; the Thailanders, 'nam-pla'; and the Vietnamese and Cambodians, 'nuoc-mam.' These sauces are prepared by the natural fermentation and hydrolysis of fish which is salted with a suitable proportion of salt, usually 25 to 30 per cent, to prevent the growth of undesirable bacterial contaminants... In Europe the favorite sauce is 'maggi,' a food seasoning prepared from meat.

"Perhaps the most popular sauce is 'toyo,' or shoyu,' a condiment made from the highly nutritive soybean... In the United States this typical oriental soy sauce is used as an important condiment and a basic constituent of quality Worcestershire sauce, a compound spicy food seasoning."

"Figures obtained from the Bureau of Census and Statistics and the Department of Agriculture and Natural Resources" show that local Filipino production of soy sauce, which may roughly represent home consumption of soy sauce, from 12 selected establishments alone amounted to 3,031,957 pesos in 1959. "It may be reasonably estimated that should all manufacturers of soy sauce submit reports on their production, the amount could easily be doubled." Since soybean, a major "raw material for the production of soy sauce, is not yet commercially produced in the Philippines," importation of these protein-rich beans amounts to thousands of pesos annually.

The experimental work described in this article was conducted from Nov. 1962 to Sept. 1963 in the laboratory of the Biological Research Center, National Institute of Science and Technology, covering a period of ten months. Different proportions of molded copra meal (a coconut by-product containing 25% protein) were used to supplement the regular soy sauce koji. The sauces were harvested after 2 months of brine fermentation.

"A supplementation of 50 parts copra meal to 50 parts soybean was selected as the ideal combination of proteinous substrate which yielded, after 2 months of fermentative brining, a clear, yellow-red, appetizing sauce containing 5.51 per cent of protein..."

Table 7 gives the names of 8 commercial soy sauces sold in the Philippines (2 imported, 6 made locally) together with their content of protein and of sodium chloride.

Contains 7 tables, 3 graphs (incubation time vs. proteolytic activity, etc) and two photos. Address: Araneta Univ.

1066. Bharath, Sam. 1966. A note on the cultivation of soyabeans and groundnuts with special reference to Trinidad and Tobago. *J. of the Agricultural Society of Trinidad and Tobago* 66(2):171-82. June.

• ***Summary:*** Contents: Introduction to soyabean. Varieties. Climatic requirements. Soils. Culture. History of production in Trinidad. Possibilities of increasing production in Trinidad and Tobago. Summary. Groundnuts.

The soyabean is not a tropical species. "Except for Indonesia, there is no important producing country in the tropics. Attempts have been made to develop the crop in tropical Africa but these have been only moderately successful. Nigeria produced 27,000 tons and Tanganyika 2,000 tons in 1962. In the latter country soyabeans have been found to be a more economic crop than groundnuts, chiefly because of the ease of mechanisation and consequent lower labour requirement."

"History of production in Trinidad: In order to increase local food production during the War [World War II], several varieties were imported and released to farmers and school gardens. Some of the varieties formed pods but the crop did not become popular since the flavour of both green beans and dried seeds are not as attractive as other legumes already grown, such as red salad beans or black-eyed peas [cowpeas]. These locally grown legumes also give higher yields."

"In 1948 R. Moosai-Maharaj introduced a Venezuelan variety to the farmers of the Oropouche Lagoon and some crops were grown in the dry season but again the crop never caught on. The author compared a black-seeded variety with the Venezuelan cream variety at the St. Augustine Station in 1957 and 1958 and yields of 1,000 lbs. per acre of dried beans were obtained from the black-seeded variety but only 500 lbs. per acre from the cream variety. The seeds have since been lost at the St. Augustine Station but Darsan at the U.W.I. has maintained these varieties in a museum plot. Incidentally the black-seeded varieties are used for the preparation by fermentation of soy sauce *(Se-ow)* and yields of these varieties are generally lower than cream or yellow seeded varieties."

Conclusion: Soyabeans can be grown in Trinidad and Tobago, but it is unlikely that Trinidadians will ever find the soyabean an attractive addition to their diet. Varieties better adapted to Trinidad and better information on cultivation are needed before farmers can be asked to grow the crop commercially. Address: M.Sc.

1067. Boinville, Charles de. 1966. Increasing dependence on U.S. beans. *Soybean Digest.* July. p. 16-18.

• ***Summary:*** Discusses a recent FAO study on oilseed crushing in developing countries such as Philippines, Nigeria, Sierra Leone, Gambia, etc. A photo shows Charles de Boinville. Address: Chairman, British Oil & Cake Mills, and President, International Assoc. of Seed Crushers.

1068. *Agricultural Research.* 1966. From traditional Indonesian tempeh: Simple, uniform process produces new high-protein foods. 15(1):8-9. Aug.

• ***Summary:*** Describes the research on new types of tempeh conducted by microbiologist C.W. Hesseltine, biochemist H.L. Wang, and microbiological technician M.L. Smith at the USDA's Northern Regional Research Lab at Peoria, Illinois. They are making tempeh from wheat, oats, rice, barley, rye, wheat-soybean mixtures, and rice-soybean mixtures. Photos show H.L. Wang making soybeans into tempeh.

1069. Chong, Y.H.; Beng, C.G.; Ponnampalam, J.T.; Lim, R.K.H. 1966. Moulded soy beans as a potential source of aflatoxin contamination. *Far East Medical Journal* 2(9):298-300. Sept. [14 ref]

• ***Summary:*** The authors isolated *Aspergillus flavus* from moulded soybeans obtained from local soy sauce factories. However these strains of *A. flavus* did not produce aflatoxins in laboratory cultures. Neither were the authors able to detect the presence of aflatoxins in the moulded material or their products by the method of thin-layer chromatography. However the authors were able to demonstrate aflatoxin production with *A. parasiticus* NRRL 2999.

Note: This is the earliest document seen (March 2002) that uses the word "aflatoxins" in connection with soybeans. Address: Inst. for Medical Research, Kuala Lumpur, Malaysia.

1070. Baens-Arcega, L. 1966. Accelerated soy sauce production. *Philippine Patent* 2,553. *

1071. Burkill, I.H. 1966. Dictionary of the economic products of the Malay Peninsula, 2nd ed. 2 vols. Kuala Lumpur, Malaysia: Ministry of Agriculture and Co-operatives. xiv + 2444 p. See vol. 1 (A-H), p. 1098-1103. Index. 24 cm. [11 ref]

• ***Summary:*** Information on the soy bean *(Glycine max)* is found under Glycine. Contents: Origin. Man has selected the more tropical races and is still selecting. Search for a race suitable for Malaya. Java, long ago, found one suitable for the drier parts of the island. Secondary uses as fodder, a cover crop, and green manure. High food-value of the seed. The seed, ripe or nearly ripe, as food. Its special use in diabetes. Artificial milk. Vegetable casein [for industrial uses]. substitute for coffee. Seedlings [sprouts] eaten. Sauces, &c., from the bean. Témpé made in Malaysia with the aid of a fungus. Teou-fu [tofu] prepared by the Chinese. Tao-cho prepared [in Java] with the aid of fungus. Sho-yu or soy kechap. Miso, a Japanese preparation. The making of soy kechap in Java. Organisms in fermentation. Oil [soy-bean oil, or kachang oil]. Criminal use (hairs on the pods cause irritation within the digestive tract). Fibre (in the stem). Joss sticks (Ash of the stem is said to be used in joss-sticks in Indo-China). The soybean is frequently cultivated in Burma and Siam.

A photo (frontispiece) facing the title page shows Isaac Henry Burkill (1870-1965). This second edition is only slightly different from the original 1935 edition of which 2,000 copies were sold. This edition was published on behalf of the governments of Malaysia and Singapore by the Ministry of Agriculture and Cooperatives, Kuala Lumpur, Malaysia. Address: Director of Gardens, Straits Settlements (Singapore; 1912-1925).

1072. Food and Agricultural Organization of the United Nations. 1966. Soybeans: Area harvested, yield, and production. *FAO Production Yearbook (Rome, Italy)* 20:207-09.

• ***Summary:*** The following nations are listed for the first time as soybean producers in the *FAO Production Yearbook.* F = FAO estimate. North Korea: Harvested 348,000F ha in 1948-1952, 375,000F ha in 1952-1956, 385,000F ha in 1961 through 1965. South Rhodesia: Harvested 1,000 ha in 1961-1963, 1,000F ha in 1965. The yield was 640 kg/ha in 1961, 660 kg/ha in 1962, 470 kg/ha in 1963, 410 kg/ha in 1964, and 510F kg/ha in 1965. Ruanda-Urundi: Harvested 2,000 ha in 1948-1952, and 6,000 ha in 1952-56. No figures are given for soybean area for 1961-65, however yield figures (500-530 kg/ha) are given for each of those 5 years.

The Philippines reappeared in 1966. The country harvested 1,000 ha in 1952-56, 2,000 ha each year from 1961 to 1965. The yield increased from 670 kg/ha in 1948-52, to a peak of 940 kg/ha in 1961, decreasing to 880F kg/ha in 1965.

Ethiopia harvested 13,000 ha in 1948-52, 10,000 ha in 1952-56, and 10,000F ha each year from 1961 to 1965, during which years the yield was 600F kg/ha.

Under Asia, there is a listing for "China Taiwan." After Asia, there is separate listing for "China Mainland."

Name change: Tanganyika (1963) is changed to Tanzania, United Rep. of Tanganyika (1964), then Tanzania / Tanganyika (1965).

1073. Schenk, E.G.; Naundorf, G. 1966. Lexikon der tropischen, subtropischen und mediterranen Nahrungs- und Genussmittel [Dictionary of tropical, subtropical, and Mediterranean foods and food adjuncts (stimulants / enjoyables)]. Herford, Germany: Nicolaische Verlagsbuchhandlung Herford. xiv + 199 p. Index. 21 cm. Series: Manualia Nicolai 1. [200* ref. Ger]

• ***Summary:*** Pages 70-71 give a list of Japanese foods (after Mayerhofer and Pirquet 1926) in no apparent order, with the Japanese name followed by a translation of that name into German. Included in the long list are: Akamiso, miso, shiromiso, tofukasu [okara], daizu, fu [dried wheat gluten], kingyo-fu, kiri-fu, kiri-mochi [frozen and dried rice cake], ame [malt extract], mirin, aburage [tofu fried in vegetable oil], natto–Bohnenkäese, Tofu–Sojatopfen, Tonyu–Sojamilch, azuki [small red beans], kwansen-fu, kinako–

Sojabohnenmehl, geröstet, amasake–unvergorener Sake, umeboshi, koritofu [frozen and dried tofu], midzuame [soft ame = rice syrup], shoyu–Sojasauce, yuba–eine Bohnenspeise. Plus many types of sea vegetables.

On pages 140-42 the following terms are defined in German: Soja [soya], Sojabohne [soybeans], Sojabohnenkäese [soy cheese or tofu], Sojabohnenmehl [soybean meal], Sojabohnenöl [soybean oil], Sojakäese [fermented soy cheese], Sojamilch [soymilk], Soja-Nahrungsmittel [soyfoods]: Koji, Miso, Tofu, Nato [sic, natto], kondensierte Soja-Milch [condensed soymilk], Japanische Verarbeitungen [Japanese processed foods: Japanische Soja-Sauce Shoju (Shoyu), Miso, Tofu], Soja-Nahrungsmittel, javanische [Javanese soyfoods: Tao-Hoe, Tempeh, Ketjap, Tao-Tjiong [a term, and perhaps a product, between *doujiang* and *tao-tjo,* Indonesian-style miso], Sojatunken], Soja-Verarbeitungen: Sojamilch, Bohnenkäese, Teoufou (China), Tofu (Japan), Dan Phu (Vietnam), Natto (Japan), Tao-tehe (China).–Bohnenbrei Miso (Japan), Tao-tjiung (doujiang, China).–Sojasauce: Shogu [sic, Shoyu] (Japan), Tsiang-Yeou, Tao-yu (China), Ketjap (Java), Tuong (Vietnam).–Gärmittel: Kiut see (Japan). Then a table shows the nutritional composition of 8 of these foods.

Note 1. This book contains more than its fair share of errors and could be better organized.

Note 2. This is the earliest German-language document seen that uses *Sojabohnenkäese,* the German word meaning "soybean cheese," to refer to tofu. Address: 1. Prof. Dr. med. habil., Dr. phil. nat, Laurensberg ueber Aachen, Germany.

1074. Stanton, W.R. ed. 1966. Grain legumes in Africa. Rome, Italy: Food and Agriculture Organization of the United Nations. viii + 183 p. See p. 10-12, 99-105. Illust. Subject index. Author index. [7 soy ref]

• ***Summary:*** Contents of the section on Glycine max: Introduction. Origin. Breeding and selection. Physiology and development. Pests. Diseases. Place in the cultural system. Soil requirements. Soil preparation. Fertilizer. Rhizobia. Planting. Cultivation. Harvesting. Storage. Future prospects.

Contains chapters by Joyce Doughty and R. Orraca-Tetteh, and W. Steele. "Further, there may have been many attempts, dating from the early part of this century, at introduction and preparation as human food, including soybean bread (an early reference to the Gold Coast: *Tropical Life,* 1929)." Footnote 14: (1) OFC Trials, Tanganyika 1948-49; East Africa 1955; Angola 1936; van den Abeele & Vanderput 1956; INEAC reports 1960. INEAC is the Institut National pour l'Etude Agronomique du Congo, active from the 1930s and 1960s.

"Origin: The soybean is a very ancient cultigen of China and Japan and its early development is wrapped in obscurity... Cultivars can be divided into those with erect and those with reclining stems, but both types can have short or long internodes... According to Sapin (1959) cultivars grown for seed can be classified according to the length of their growth period..."

"Breeding and selection: Soybeans are adaptable to a wide range of climatic conditions, to which cultivars respond by considerable changes in growth habit... In the Democratic Republic of the Congo (formerly Belgian Congo) selection started as early as 1936, mainly with varieties from the United States, Indonesia, and Manchuria, and many cultivars have been developed... Recommended cultivars for Zambia, Copperbelt Province, are H 273, H 237, and Geduld" (p. 101).

Note 1. This book is poorly edited. It gives many author/year citations in text but no corresponding bibliographic entry for most!

Note 2. This is the earliest English-language document seen (Aug. 1999) that uses the word "cultivar" (or "cultivars") in connection with soybeans.

1075. Lebumfacil-Davide, Clara S. 1967. Corn and sorghum as possible substitutes for wheat in soy sauce production. *Philippine Agriculturist* 50(9):843-60. Feb. [10 ref]

• ***Summary:*** Soy sauce was made from three different cereal-soy combinations: Wheat-soybean, corn-soybean, and sorghum soybean. Chemical analysis showed that the traditional wheat-soybean substrate had the highest pH, highest total titratable acidity, and highest percentage of total nitrogen, proteins, amino nitrogen in total nitrogen, non-chloride solids, amino nitrogen and reducing sugars.

In the soy sauce made from the sorghum-soybean substrate, the amino acids tryptophane, lysine, and histidine were relatively higher.

In the soy sauce made from the corn-soybean substrate, the aspartic and glutamic amino acids were relatively higher. In all the soy sauces, cystine was present in traces only.

"Results obtained showed that neither corn nor sorghum can suitably substitute for wheat in the combinations mentioned. Organoleptic tests for aroma and flavor of the soy sauce showed that wheat-soybean" was the best of the three substrates.

Introduction: For many years Japanese and Chinese food companies have had monopoly on the manufacture of soy sauce for the Philippine market. "However a number food companies in the Philippines are making headway towards soy sauce manufacturing." However on of the basic problems facing these local companies is the high cost of production, and especially the high cost of importing raw materials, such as soybean and wheat. Unless Filipino farmers can produce and provide these raw materials, a local soy sauce industry will never flourish.

Contains 7 tables. Address: Univ. of the Philippines.

1076. Hewitt, Jean. 1967. With twelve nationalities in residence, the refrigerator is a melting pot. *New York Times*. March 18. p. 32.

• ***Summary:*** In this big old brownstone, an international residence owned by the YWCA of Brooklyn, each young lady keeps her own food in separate refrigerators or boxes. "Such separation helps to keep the fermented black beans [called tausi, taosi, or tao-si] used recently by Grace Esquerra of the Philippines from being mixed up with the beans served with a chicken dish" prepared by two ladies from Haiti.

1077. American Soybean Association. 1967. Soybean Digest Blue Book Issue. Hudson, Iowa: American Soybean Assoc. 170 p. Index. Advertisers' index. 22 cm.

• ***Summary:*** The title page of this year's *Blue Book* states: "Blue Book issue. Vol. 27. March, 1967. No. 6." A table (p. 26) gives world soybean production by continent and country, from 1955-59 to 1966 (preliminary) as follows: North America: Canada, United States, Mexico. South America: Argentina, Brazil, Colombia, Paraguay. Europe: Italy, Romania, Yugoslavia, Other Europe (excluding U.S.S.R.). USSR (Europe and Asia). Africa: Nigeria, Rhodesia, Tanzania. Asia: Turkey (Europe and Asia), China–Mainland, Cambodia, China–Taiwan, Indonesia, Japan, Korea–South, Thailand. Total #1. Total #2.

Soybean production in Mexico increased from about 39,000 bu in 1955-59, to 1,315 in 1964, to 2,205 in 1965 to 4,410 (preliminary) in 1966.

A table (p. 29) gives U.S. exports of soybeans, oil and meal from 1962 to 1965 (preliminary) to the following regions and countries (for marketing years beginning Sept. 1; in bushels): North America: Canada, Mexico, other, total. South America: total. Western Europe: Belgium & Luxembourg, Czechoslovakia, Denmark, Finland, France, Germany–West, Italy, Netherlands, Norway, Spain, Sweden, Switzerland, United Kingdom, other, total. Eastern Europe: Czechoslovakia, Hungary, USSR (Europe and Asia), Poland, other, total. Africa, total. Asia and Oceania: Hong Kong, Israel, Japan, Korea–South, Philippines, Taiwan, other, total. Grand total.

Exports of U.S. soybeans to Mexico increased from 33,000 bu in 1962 to 177,00 in 1964. Note: This is the 2nd earliest document seen (Feb. 2009) that gives statistics for trade (imports or exports) of soybeans, soy oil, or soybean meal to Mexico or Central America. Address: Hudson, Iowa.

1078. Huang, Po-Chao; Tung, T.C.; Lue, H-C.; Lee, C-Y.; Wei, H-Y. 1967. Feeding of infants with full-fat soya bean-rice foods. *J. of Tropical Pediatrics* 13:27-36. March. [24 ref]

• ***Summary:*** This group's most important study. Address: Dep. of Biochemistry & Pediatrics, College of Medicine, National Taiwan Univ., Taipei.

1079. Bentley, Orville G. 1967. Soybean production in the world–Limitations and potentials. *USDA Agricultural Research Service*. ARS-71-35. p. 2-19. May. Proceedings of International Conference on Soybean Protein Foods. Held 17-19 Oct. 1966 at Peoria, Illinois. [18 ref]

• ***Summary:*** This is the first paper in Session I, titled "Potentials for soybean production and use as related to world protein needs," Nevin S. Scrimshaw presiding. Contents: Introduction: "It is generally agreed by students of world food problems that the shortage of protein is the most critical need now and in the foreseeable future." Historical overview: Piper and Morse, Mildred Lager. An overview of worldwide soybean production: USA, Europe. Production in Eastern Asia: China, Indonesia, Japan, Taiwan, Thailand, India, Soviet Union, Latin America (Brazil, Paraguay), Mexico, Colombia, Argentina, Australia (no statistics given), Europe (European Russia, Bulgaria, Yugoslavia, Rumania, and Czechoslovakia).

Prospects for further production: USA, southeastern Europe, Russia, Thailand, Japan, Brazil, Colombia, Argentina, Mexico. Summary.

"In southern European Russia, commercial soybean plantings were reported in the 1870s. In the Far East, soybean cultivation may be even older as a part of the culture of the local Chinese. Before the revolution, acreage was small, however."

"Latin America is a relative newcomer in soybean production. Brazil is the only country where large acreage has been planted for more than a decade. In recent years soybeans have been planted in Argentina, Colombia, Mexico, Paraguay, and Surinam. Brazil is the major exporter with smaller amounts coming from Paraguay and Surinam. Venezuela is a major importer and Mexico imports some.

"Estimates for 1965 show that Brazil produced 16,610,000 bushels (453,000 metric tons), Mexico produced 2,482,000 bushels (67,690 metric tons), Colombia produced 1,835,000 bushels (50,000 metric tons), Paraguay 660,000 bushels (18,000 metric tons), and Argentina 360,000 bushels (9,800 metric tons). Total production of Central and South America would be only slightly more than 1 percent of world output. In Brazil about 90% of the production is concentrated in the state of Rio Grande do Sul, the southern-most part of the country. The balance is grown in nearby Santa Catarina and Parana. The climate is similar to some of our southern states... A major processing plant has been built near Porto Alegre."

"In Mexico, production began very recently. Almost all acreage is in the State of Sonora, bordering Arizona and Southern California. Here plantings started in 1959... In the Yaqui Valley, soybeans are always grown under irrigation where they fill in successfully as a second crop following

wheat and cotton." In Colombia, acreage is concentrated in the Cauca Valley on the western slope of the Andes. In Argentina, acreage up to a few years ago amounted to about 1,000 hectares, most of which is grown in the state of Misiones, the far northeast area bordering upon Rio Grande do Sul in Brazil. In recent years there has been expansion in the pampas.

In the USA, "some expansion to the West is possible under irrigated conditions. Research trials in Oregon, Washington, and California show yields as high as 80 bushels an acre. But where water is limited, the highest value crops will be favored." Address: Dean, College of Agriculture, Univ. of Illinois.

1080. Evans, Robert J.; Bandemer, Selma L. 1967. Nutritive value of legume seed proteins. *J. of Agricultural and Food Chemistry* 15(3):439-43. May/June. [27 ref]

• ***Summary:*** Discusses the following soybean varieties and products: Chippewa soybeans, Harosoy soybeans, Thailand soybeans, soybean curd (tofu). Tables show: (2) "Relative nutritive values of seed proteins" (unheated and heated, based on weight gain in rats). (3) "Relative nutritive values of seed proteins supplemented with amino acids." (4) "Relative nutritive values of seed proteins and mixture with other seeds." Address: Dep. of Biochemistry, Michigan State Univ., East Lansing, MI 48823.

1081. Orr, Elizabeth; Adair, David. 1967. The production of protein foods and concentrates from oilseeds. *Tropical Products Institute Report* No. G31. 104 p. June. Also titled T.P.I. Report (London). [44 ref]

• ***Summary:*** Contents: Foreword. Acknowledgements. Introduction. 1. The use of oilseeds as a source of protein. 2. Oilseed resources. 3. The manufacture of protein flours by standard oil milling processes. 4. Some cost aspects of the manufacture of protein flour by standard oil milling processes. 5. Examples of the use of edible flours made by standard oil milling processes. 6. Full fat soya flours. 7. Oriental methods of processing soya. 8. Other processes for making protein products. 9. The distribution of protein products. 10. Current experience of making protein flours and foods from oilseeds. 11. The initiation of protein food programmes with particular reference to the role of the administrator. Appendices. 1. Protein nutrition. 2. Oilseed statistics. 3. Toxic hazards. 4. P.A.G. Guides [PAG]. 5. Aflatoxin. 6. Questionnaire. 7. Some examples of the cost of packaging oilseed-based protein foods. 8. Prices of edible oilseed products and protein flours and foods made from oilseeds. Bibliography. Chapters 6 and 7 are especially relevant to soyfoods.

"Full fat soya flour (FFSF) is manufactured in the USA by Archer Daniels Midland Co. and Central Soya, and in the UK by 3 firms: British Arkady Co. Ltd., Soya Foods Ltd., and British Soya Products Ltd. There are no official statistics for production in either country. A trade source of information has estimated UK usage of soya flour at 30,000 tons per annum, but this figure includes defatted soya flour made from meal imported from the USA. Full fat soya flours can be divided into 2 main categories: (a) flours used primarily for bleaching purposes in bread, and (b) general purpose flours. When the flour is to be used mainly for bleaching it is made from uncooked beans, since the natural enzymes in the bean must remain active until the bleaching process has been completed. It is estimated that about half the full fat soya flour made in the UK is used in bread manufacture."

A table lists all known commercial full-fat soy flours, their composition and prices. Describes the Promo Process and Wenger Process for making FFSF, with cost data. Gives case histories for Pronutro in South Africa and Nutresco in [Southern] Rhodesia.

Chapter 7. Kinako. Fermentation products: Soya sauce (shoyu), miso, natto, tempeh. Developing the use of fermented products. Aqueous extracts: Soya milk and tofu, kori-tofu. Soya milk as a substitute for cow's milk. The package soy milk shop (including Tetra Pak and Prepac packaging; the Prepac system, developed by the S.E.A.B. Co., Villejuif, France, has a capacity of 1,500 packs/hour). Case histories for soya milk: Rural cooperatives in Taiwan, Saridele in Indonesia, and Vitasoy in Hong Kong. Soya milk made from soya flour: The 4 known manufacturers are Promo Ltd. of the U.K. ("The product made by Promo is marketed under the brand name of 'Velactin by the Wander company."), and Loma Linda Foods (Soyalac and Granogen), Mead Johnson (Sobee or Soybee), and Borden's Soy Processing Co., all of the USA. Promo and Loma Linda use the traditional Oriental method rather than using soy flour.

Note: This is the earliest document seen (Sept. 2002) concerning Tetra Pak and soy. Address: TPI, 56/62 Gray's Inn Road, London WC1.

1082. Soriano, Mercedes; Gonzalez, O.N.; Avelino, E. 1967. Studies on the preparation of "soy" sauce from coconut paring meal. *Philippine J. of Science* 96(2):129-37. June. [12 ref]

• ***Summary:*** In the Philippines, soy sauce (called *toyo),* is a popular seasoning in the Filipino diet because it improves the flavor of other foods. "Soybean is the primary raw material in the commercial production of *toyo.* Since the Philippines is not a producer of soybean and because of its high market price, this study was conducted..."

Summary: Sauces were prepared by both mold-enzyme and acid hydrolysis. Results of organoleptic tests showed that the sauce most preferred by the panel was prepared by enzyme hydrolysis using 2 parts coconut paring meal (the paring is the brownish coating of the coconut meat located directly adjacent to the shell) and 1 part soybean. Of the

acid hydrolysates, those prepared from mixtures containing two parts of coconut paring meal and one part of soybean, and from equal parts paring meal and soybean, were most preferred in flavor and aroma by the panel. Address: National Inst. of Science and Technology, Manila, Philippines.

1083. Murphy, Jean. 1967. She's gung ho for Oriental cookery: Marine's wife. *Los Angeles Times.* Aug. 31. p. E1.
• ***Summary:*** Meda Cruizat is now settled in Santa Monica, California. Her basic interest is in foods, and of the cuisines she knows well, her favorites are French and Chinese. She said she could live forever on either one and be quite happy, but she really wouldn't want to.

While living in Bangkok, Thailand, where her husband was on duty with the Marine Corps, she learned to enjoy many Thai foods, which (because of their curry basis) are more closely related to those of India than of China.

Here she offers a Thai menu, of which her favorite dish is Mee Krob ["crispy noodles"; also spelled "Meekrob"] made with fine Chinese rice noodles. One ingredient is "1/3 cup thinly sliced tofu (bean curd)."

1084. Edgar, Barry. 1967. Bachelor cooks spicy Indonesian specialty. *Christian Science Monitor.* Sept. 26. p. 21.
• ***Summary:*** Mr. Edgar is an American bachelor who used to live in Holland. Indonesian food is very common in Holland since Colonial Dutchmen brought their Indonesian tastes home with them after Indonesia acquired independence. He learned how to make Nasi goreng ("Fried rice") and gives the recipe here, together with its special sauce; the ingredients include "2 tablespoons thick soy sauce–also called ketjap benteng." A good Dutch brand is Conimex. Thin soy sauce makes a poor substitute.

1085. FAO Nutrition Div. 1967. Soybean: Production, cultivation, economics of supply, processing and marketing. *PAG Bulletin* No. 7. p. 25-44. Oct. Based on a background paper (R.1/Add.21) prepared for the Aug. 1966 PAG Meeting. [3 ref]
• ***Summary:*** The section titled "Production" states: "There is limited production in Cambodia, Taiwan (China), and Thailand in the Far East and in Italy, Yugoslavia, Rumania, Hungary and Bulgaria in Europe.

"In Africa, soybean has only been grown on a comparatively limited area. It was introduced into the Union of South Africa in 1903 where there is still a small production. The Congos, Rwanda, Tanzania (Tanganyika) and Nigeria, have also grown a small amount."

The section titled "Soybean work in various countries" discusses work in the USA, India, the Congo (Brazzaville), Western and Eastern Nigeria, and Mexico.

"The total acreage under soybean cultivation in India is small; according to *ad hoc* estimates only about 18,000 hectares of soybeans are planted in India, mainly in the hills of Uttar Pradesh, with an annual production of about 5,900 tons or 320 kg/ha, a very low yield. Elsewhere in the country, soybean is cultivated, at best, in a few small pockets. In West Bengal, for instance, where the crop is unknown, its cultivation and consumption are negligible, except, perhaps, among the hill tribes of the Darjeeling district. Preliminary experiments have indicated that the plains of West Bengal are also suitable for soybean cultivation as a *kharif* crop (sown in late spring and harvested in late summer), but the yields are much lower than those in the hills."

"Selection and breeding in Africa are increasing in importance. In the Congo (Brazzaville) selection started as early as 1936 mainly with varieties from the U.S.A., Indonesia and Manchuria.

"In Rhodesia there are now varieties available for grain that yield reasonably well... On present knowledge the varieties Masterpiece, Hernon 147, Hood, Lee, and Jackson are recommended for trial by farmers. In Tanzania, soybean production has been restricted to the Nachingwea area in the south where in 1960 the total area planted to soybean was approximately 2,000 ha., at first using the Dixie variety. With the use recently of the higher yielding variety Hernon 237, introduced from Rhodesia, the soybean area has steadily increased. Most of the Tanzania crop is sold to Far Eastern [East Asian] countries."

"In Brazil, Colombia, Peru, Ecuador, Paraguay, Uruguay, and Venezuela experimental success with some of the varieties has made it possible to draw valuable recommendations on the adaptability to different local conditions as well as the effect of planting date and seeding rate on yield."

Note: This is the earliest document seen that clearly refers to soybeans in the French Congo (Congo Republic), or the cultivation of soybeans in the French Congo. This document contains the earliest clear date seen for soybeans in the French Congo (Congo Republic), or the cultivation of soybeans in the French Congo (1936). The source of these soybeans was mainly the USA, Indonesia, and Manchuria. Address: Rome, Italy.

1086. Firma Post & Teekman. 1967. Making tofu from U.S. soybeans in Holland (Letter to the editor). *Soybean Digest.* Oct. p. 17.
• ***Summary:*** "For several years we have been making fresh tofu from U.S. soybeans... The reason we eat tofu here is that there are a lot of people from the so-called Dutch Indies [Indonesia] living in the Netherlands. There are also many Chinese people in our country, and mostly they trade in restaurants or specialty shops. We hope we have given you a small idea of the little tofu country, Holland." Address: Venserweg 1, Demen, Holland.

1087. Fischer, R.W. 1967. A review of the advantages and disadvantages of the production and utilization of soybean for human feeding in areas where it is not yet produced or traditionally consumed. United Nations FAO/WHO/ UNICEF PAG (Protein Advisory Group), Document I/22. 15 p. Presented at Oct. 1967 meeting, New York.

• ***Summary:*** Contents: I. The advantages of producing and utilizing soybeans for human nutrition. 1. Superior amino acid balance. 2. Yield of protein per hectare. 3. Adaptability to a large part of the world's arable land surface. 4. Low labor requirement.

II. Pros and cons in the economics of soybean production. III. Problems and disadvantages of producing and utilizing soybeans in human feeding. 1. Soybeans require processing. 2. The need for an organized market: Transportation and distribution, capital and credit, purchasing power. 3. Acceptability of the end products. IV. Meeting the problems of soy production and utilization.

"In the August, 1966 meeting of the PAG held in Geneva, the subject of production, cultivation, economics of supply, processing and marketing of soybeans was admirably covered by a report of the Nutrition Division, FAO Headquarters, Rome (PAG Document R.1/Add 21). The present paper will amplify or extend the FAO Document, and should be considered only in conjunction with that paper...

"Despite the general belief that photoperiodicity of soybeans limits their production to the temperate zones (30º to 50º from the equator), they are actually adaptable to a very large part of the world's arable land surface, including the equatorial zones themselves. Soybeans of rather poor quality have been produced and used in Indonesia for centuries within a few degrees of the equator. More recently, quite successful soybean production in the equatorial zones has been achieved in Colombia, Venezuela (experimentally), Nigeria, Rhodesia, Tanzania, and (in districts further from the equator) in Mexico and parts of India." Address: President, Soypro International, Inc., Cedar Falls, Iowa.

1088. Kapsiotis, G.D. 1967. A list of protein food mixtures. *PAG Bulletin* No. 7. p. 71-73. Oct.

• ***Summary:*** For each product, the following information is given: Product name, country, composition, protein content (percentage), and price (in US$/kg) and packaging. Of the 18 products listed, the following 8 contain soya. Incaparina in Colombia and Mexico. Fortifex in Brazil. Pronutro in South Africa. Saridele in Indonesia. Prolo in the UK. CSM and CEPLAPRO in the USA.

Several interesting products do not contain soya: Peruvita in Peru contains quinua. Bal-Ahar in India (made by CFTRI) contains mixed wheat flour, vegetables and defatted oilseed flour, vitamins, calcium. Address: Food Science and Technology Branch, Nutrition Div., FAO, Rome, Italy.

1089. Chong, Y.H.; Ponnampalam, J.T. 1967. The effect on duckling of a diet containing moulded-soybeans. *Medical J. of Malaya* 22(2):104-09. Dec. [16 ref]

• ***Summary:*** Recent discoveries have shown that several common species of mold (such as *Aspergillus flavus, Aspergillus parasiticus,* and *Penicillium puberulum)* which cause spoilage in food, "produce a group of toxic metabolites known collectively as aflatoxins. Aflatoxins are the most potent liver poisons yet discovered." Aflatoxins are also extremely carcinogenic, and can cause liver cancer.

Ducklings are particularly sensitive to aflatoxins. In this experiment day-old ducklings were fed a "diet containing moulded soybeans which had previously been shown by physico-chemical means to be free of aflatoxins. No significant difference was observed in the general appearance, growth rate, mortality and liver histology between ducklings fed the experimental diet and those fed the control diet. This not only confirmed our previous finding of the absence of aflatoxins but also appeared to rule out the possibility of other hepatotoxic principles of fungal origin in moulded-soybeans."

"Our present results taken in conjunction with those of our previous study (Chong *et al.* 1966) seem to rule out firmly the possibility of aflatoxin contamination in moulded-soybeans and their product–soy sauce." Address: Inst. for Medical Research, Kuala Lumpur, Malaysia.

1090. Pigeaud, Theodore G.Th. 1967-1970. Literature of Java. Catalog raisonné of Javanese manuscripts in the library of the University of Leiden and other public collections in the Netherlands. 4 vols. The Hague: Martinus Nijhoff. See vol. II, p. 32. 25 cm. [5000+* ref. Eng]

• ***Summary:*** Vol. II is titled "Descriptive lists of Javanese manuscripts." These lists "are to take the place of the Old Dutch Catalogues of the Library of the University of Leiden,..."

In the section titled "Delft Collection" (p. 25-50) is a description of the *Serat Centhini* manuscript (which mentions tempeh) in volume II, p. 32. "LOr 1814 (I-V)–B-30.802. 21 x 35 cm... Centini, encyclopedical romantic poem in macapat verse, dated 1775 A.J., i.e. 1846 A.D., by Ranga Sutrasna, who lived in the reign of Paku Buwana V (1920-1823). Five leather bound volumes with quadratic kraton script, written in Surakarta, originally belonging to the Delft Collection. Cat. Vreede p. 323-27 has a Dutch epitome and references to literature, The Centini has been edited in Batavia (KBG, romanized) in 1912/15. See Pigeaud, 'De Tjabolan en de Tjentini' (Verh. KBG vol. 72, 1933), which has an extensive Dutch summary and lists of initial lines of cantos."

Pigeaud was born in 1899. Address: PhD, Leiden.

1091. Bailey, Ethel Zoe. 1967-1981. Glycine soja–Foreign sources. Part II. Ithaca, New York: L.H. Bailey Hortorium. 3 cards. Unpublished.

• ***Summary:*** Continued: (51) Oslo 67–Hortus Botanicus Universitatis Osloensis, Oslo, Norway, 1967 [LR 1983]. (52) Frank. 66–Botanischer Garten der Johann Wolfgang Goethe Universitaet, Siesmayerstrasse 72, 6 Frankfurt am Main, Germany, 1966 [LR 1980]. (53) Heid. 66–Botanischer Garten der Universitaet, D-6900 Heidelberg, Germany, 1966 [LR 1981]. (54) Angola 68–Instituto de Investigacao Agronomica de Angola, Caixa Postal 406, Nova Lisboa, Angola, 1968 [LR 1975]. (55) Nancy 64–Jardin Botanique de la Ville Nancy, 100 Rue du Jardin Botanique, 54600 Villers-les-Nancy, Nancy, France, 1964 [LR 1981].

(56) Liege 63–Jardin & Institut de Botanique de l'Universite de Liege, 3 Rue Fusch, Liege, Belgium, 1963 [LR 1975]. (57) Oxf. 68–Botanic Garden, University of Oxford, Rose Lane, Oxford, England, UK, 1968 [LR 1981]. (58) Read. 71–Agricultural Botanic Garden, University of Reading, Reading, Berkshire, England, UK, 1971 [LR 1974]. (59) Kosice 70–See (40) Kosice 63 (Slovakia). (60) K.S.F. 72–Kerteszeti es Szolszeti Foiskola (Inst. Bot. Acad. Horti- et Viticulture), Noventami Tanszeke, Menese-ut 44, Budapest xi, Hungary, 1972 [LR 1982].

(61) Ruhr 71–Ruhr–Universitaet Bochum, Botanische Garten, Postfach 2148, D-4630 Bochum, Germany, 1971 [LR 1980]. (62) Ant. 72–Hortus Botanicus Antveroiensis Plantentuin, Gerard le Grellelaan 5, Antwerp, Belgium, 1972 [LR 1973]. (63) Pecs 73–See (43) Pecs 63 (Hungary). (64) Toh. 74–Hortus Botanicus Tokoku Universitatis Sendaiensis, Sendai, Japan, 1974 [LR 1982]. (65) Bol. 73–Instituto Botanico dell'Universita di Bologna, Via Ernerio 42, Bologna 40126, Italy, 1973 [LR 1981].

(66) (31) Barc. 77–Institut Botanic de Barcelona, Av. Muntanyans, Parc de Montjuic, Barcelona 4, Spain, 1977 [LR 1981]. (67) Lugd. 78–Hortus Botanicus Academicus Lugduno-Batavus, Nonnensteeg 3, Leiden, Netherlands, 1978 [LR 1981]. (68) Purw. 79–Purwodadi Botanic Garden, Lawang, East Java, Indonesia, 1979 [LR 1979]. (69) Oxf. 79–See (57) Oxf. 68 (Oxford, England). (70) Hohen. 79–See (27) Hohen. 58 (Hohenheim, Germany).

(71) Delft 80–Technische Hogeschool Delft, Julianalaan, Delft, Netherlands, 1980 [LR 1980]. (72) Gand. 81–Plententuin der Rijksuniversiteit (formerly named Hortus Botanicus Gandavensis), K.L. Ledeganckstraat 35, B-9000 Gent, Belgium, 1981 [LR 1981].

On a separate card is one entry for *Soja Glycine* (which should probably be *Glycine soja):* St. A. 71–University Botanic Gardens, St. Andrews, Scotland, UK, 1971 [LR 1982]. Address: L.H. Bailey Hortorium, 462 Mann Library, Cornell Univ., Ithaca, New York 14853-4301. Phone: 607-255-7981. Fax: 607-255-7979.

1092. Knott, James Edward; Deanon, J.R., Jr. 1967. Vegetable production in Southeast Asia. Manila, Philippines: University of Philippines Press. *

• ***Summary:*** James E. Knott was born in 1897.

1093. Kwon, Shin Han; Quyen, N.H. 1967. Annual report. Directorate of Agric. Research, Vietnam. *

• ***Summary:*** Contains information on soybeans in Vietnam.

1094. Laporan sementara penelitian kedelai 1965-1966 di Jawa Timur [Provisional research report on soybean 1965-1966 in East Java]. 1967. Jakarta: Direktorat Pertanian Rakyat. 48 p. [Ind]*

• ***Summary:*** This report was published as a joint venture with the Agricultural Faculty of Brawijaya University.

1095. *Sarawak Ministry of Agriculture and Forestry, Annual Report of the Research Branch, Department of Agriculture (Kuching).* 1967. Other annual crops. 112 p. For the year 1965. See p. 52-53. *

1096. Tin Tin U, Daw; Thien, U Aung. 1967. Processing of soya milk. *Union of Burma J. of Science and Technology* 2:355-62. [7 ref. Eng]

• ***Summary:*** In 1963-64 in Burma about 17 million pounds of soybeans were produced. This article is about attempts to get rid of the slight unpleasant residual flavor in soya milk.

It was further discovered that the pH of soy-milk needs to be raised when used in coffee in order to prevent coagulation. This is not a problem, however, when soy-milk is used in tea or milo. Address: Food Technology Research Dep., Union of Burma Applied Research Inst.

1097. **Product Name:** Philsoy (Soymilk).
**Manufacturer's Name:** University of the Philippines at Los Baños.
**Manufacturer's Address:** Los Banos, Philippines.
**Date of Introduction:** 1967.
**Wt/Vol., Packaging, Price:** Glass bottle with crown cap.
**New Product–Documentation:** Bourne 1970, 1971; Puertollano et al. 1970; Bourne et al. 1976; Banzon & Escueta 1979. A bottled soymilk. Due to a retail price which was lower than that of a competing skim milk, chocolate-flavored beverage, production reached 3,500 bottles/day. Production breakdowns halted the project. Talk with Rachel Cabato. 1989. May 28. Production of Philsoy stopped about 1-2 years ago.

1098. **Product Name:** Yeo's Soyabean Drink.
**Manufacturer's Name:** Yeo Hiap Seng Ltd.
**Manufacturer's Address:** 950 Dunearn Rd., Singapore.
**Date of Introduction:** 1967.
**Wt/Vol., Packaging, Price:** Tetra Pak Aseptic carton.

**How Stored:** Shelf stable; refrigerate after opening.
**New Product–Documentation:** Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 101. In 1967 it became the world's first soymilk to be sold in aseptic (Tetra Pak) cartons. Note: An aseptic product is one which is sterilized before packaging. By 1983 Yeo Hiap Seng was making 18.8 million liters/year of soymilk, the sixth largest in the world. Boi. 1986. Sunday Times (Singapore). Sept. 7. "Soya Bean Milk Packs More Water than Flavor." Yeo's sells for 35 cents per 250 ml. Comments: Sweet, very watery, not tasty.

Soya Bluebook Plus. 1997. p. 163. The company name and address have not changed. The postal code is Singapore 2158, Singapore. Phone: +65 466-2266. Fax: +65 466-4641. Contact: Desmond H.K. Ng or S.C. Toh.

1099. Direktorat Gizi. 1967. Daftar komposisi bahan Makanan [Indonesian food composition tables]. Jakarta: Bhratara. Direktorat Gizi Departemen Kesehatan R.I. 59 p. [Ind]
• ***Summary:*** Chapter 2 contains data on the nutritional composition of beans and seeds including okara *(ampas tahu),* soybeans–fresh *(basah)* and dry *(kering),* and bongkrek *(tempe bungkil kelapa).*

Note: This is the earliest Indonesian-language document seen (Oct. 2001) that mentions okara, which it calls *ampas tahu.* Address: Indonesia.

1100. Indonesia. Departemen Portanian [Indonesian Department of Agriculture]. 1967. Mustika rasa; memuat resep 2 masakan Indonesia dari Sabang sampai Merauke. [Gems of taste: Indonesian cookery]. Djakarta, Indonesia: Indonesia. Departemen Portanian [IDA]. xi + 1,123 p. Illust. (part color). 22 cm. [Ind]*
Address: Indonesia.

1101. Lien Soen In. 1967. Pembuatan Vitempo sebagai makanan anak dan penilaian daya tahannya [Preparation of Vitempo as a children's food and shelf-life tests]. Thesis (Skripsi), Akademi Kimia Analis, Bogor, Indonesia. 24 p. [Ind]*
• ***Summary:*** Vitempo is a children's food made of 78% soy tempeh (made from defatted soybean meal), 20% sugar powder, 2% rice flour, and 4 ml/100 gm of coconut oil. Address: Bogor, Indonesia.

1102. Mateles, Richard I.; Wogan, Gerald N. eds. 1967. Biochemistry of some foodborne microbial toxins. Cambridge, Massachusetts: MIT Press. ix + 171 p. Papers presented at the Symposium on Microbial Toxins held at the meeting of the American Chemical Society, New York, on 12 Sept. 1966. [100+* ref]
• ***Summary:*** Contents: Part I: Bacterial and algal toxins. Part II: Fungal toxins. One chapter in each part is about soy. They are cited separately. Address: MIT, Cambridge, Massachusetts.

1103. Associated Press (AP). 1968. Poison food kills 60. *Chicago Tribune.* Feb. 20. p. 13.
• ***Summary:*** "Jakarta, Indonesia, Feb. 19–About 60 persons have died of food poisoning in Bandung, West Java, the official news agency, Antara, reported today. Antara said they died after eating poisonous soybean cakes."

Note 1. These people almost certainly died from eating coconut-presscake tempeh *(tempe bongkrek),* which contains no soybeans, but is made and eaten in much the same way as regular soybean tempeh.

Note 2. This article, titled "Illness kills 60," also appeared in the *Hartford Courant* (Feb. 20, p. 31C).

1104. Cerny, K.; Hajkova, S.; Pechar, J.; Van Vinh, V.; Rubin, A.; Zvolankova, K. 1968. A comparison of the efficacy of a soy flour-based milk substitute in feeding malnourished Vietnamese and eutrophic Czech infants. *J. of Tropical Pediatrics* 14(1):15-25. March. [30 ref]
• ***Summary:*** "The use of soybean in infant feeding first reported by Rurah (1909) has been given great attention ever since as a substitute for cow's milk in different forms of allergy, but increasingly in the treatment and prevention of protein-calorie malnutrition in infants and preschool children in developing countries.

The two main types of vegetable mixtures recommended for infant feeding are: (a) packaged commercial products of typically high nutritional value but costly due to expensive industrial processing, fortification, and (above all) packaging; (b) formulae based on low-cost natural ingredients available even in regions with an inadequate distribution network and cash economy.

This report details trials with a vegetable milk of type (b) based on full-fat soy flour fed to 40 Vietnamese infants and toddlers with different types of malnutrition and to 25 eutrophic (well-nourished) Czech infants. The results are complex. Address: 1. Inst. of Human Nutrition, Prague, Czechoslovakia.

1105. Diokno-Palo, Natividad; Palo, Macario A. 1968. Two Philippine species of *Phycomycetes* in tempeh production from soybean. *Philippine J. of Science* 97(1):1-16. March. [13 ref]
• ***Summary:*** "Half or more of Indonesia's soybean harvest of 17 million bushels in 1959 was utilized for making this food product [tempeh] and many thousands of people particularly in big cities make a living on it. Tempeh is not known in food markets in the Philippines. There is no published report which mentions or describes its manufacture in any region of this country."

In a preliminary test conducted under room temperature conditions (27-32ºC) *Rhizopus stolonifer* (NRRL 1477), a

foreign mold strain, was observed to produce a better tempeh cake than any other foreign *Rhizopus* strains. Illustrations and photos show: A fascicle of sporangiophores of *Rhizopus stolonifer* bearing full-developed sporangia, from the base of which grow downward rootlike filaments (rhizoids) that attach it to the substrate. Within the sporangia are spores. *Cunninghamella elegans* A-12679 with unbranched conidiophores arising slightly from hyphal branches. Conidia and pointed sterigmata. Address: National Inst. of Science and Technology (NIST), Manila, Philippines.

1106. Inglett, George E.; Blessin, C.W.; Bookwalter, G.N. 1968. Flavor aspects of cereal-oilseed-based food products. *Food Product Development* 2(2):66. April/May. Presented at the 154th National American Chemical Society Meeting, Chicago, Illinois, Sept. 10-15, 1967. [10 ref]
• ***Summary:*** Discusses CSM [corn, soy, milk], its applications, and flavor constituents. CSM contains processed corn meal, toasted soy flour, and nonfat dried milk. Proper heat treatment destroys the lipid active enzymes: lipases, lipoxidase, and peroxidases.

Table I lists locations of CSM acceptability trials: Bolivia, Colombia, Dominican Republic, El Salvador, Guatemala, Honduras, Venezuela, Peru, Greece, Spain, Portugal, Jordan, Turkey, Yemen, Malagasy, Senegal, Sierra Leone, Tanzania, Macao, Singapore, Taiwan.

Note: This is the earliest document seen (Dec. 2007) concerning soybean products (cereal-soy blends) in Yemen. This document contains the earliest date seen for soybean products (cereal-soy blends) in Yemen (1968); soybeans as such had not yet been reported by that date. Address: USDA, Peoria, Illinois.

1107. *Soybean Digest.*1968. New weapons for the war on hunger: Latest high-protein soy beverage. May. p. 23.
• ***Summary:*** "American industry, stimulated by a U.S. Agency for International Development (AID) subsidy program, has intensified its attack on world malnutrition, the 'war on hunger.' The new weapon in the offensive is high-protein food supplements."

"A new protein-base beverage, Saci, is being manufactured and test marketed in Brazil by the Coca Cola Co. Saci's main ingredients are soybean milk, flavoring, sugar and other essential ingredients for nutritional adequacy. It is vitamin enriched, sterilized and noncarbonated. Monsanto Co. has acquired an interest in the biggest selling soft drink in Hong Kong, a high-protein, soybean-based beverage called Vitasoy... Future plans call for Vitasoy to be bottled and marketed in Latin America as well as Southeast Asia. Last December the Yoo-Hoo Chocolate Beverage Corp. announced development of a new high-protein beverage. It will come in 4 types."

"Under phase I of the AID program, grants up to $30,000 were offered to U.S. companies to survey the availability of local ingredients, food tastes, customs and the economics of manufacture and distribution. Under phase II, companies would develop their own high-protein food additives, retaining a proprietary interest in the results. AID then offered grants of another $30,000 (phase III) for test-marketing the new products, to be paid back if the results were successful."

"The latest development in the soy beverage field is a product that looks and tastes like cow's milk, but costs half as much. Soypro International of Cedar Falls, Iowa, has developed the patent for the new beverage whose basic ingredient is soybeans."

"Cost is said to be around $0.20 per gallon unbottled. Production equipment for a 1,000-gallon-per-hour capacity plant is estimated at $200,000 installed."

1108. Murphy, Jean. 1968. Indonesian fare: Time is worth it. *Los Angeles Times.* Sept. 5. p. J8.
• ***Summary:*** Cooking Indonesian recipes typically takes more time than Western or even Chinese recipes. A recipe for Vegetable & shrimp soup calls for "1/8 bean cake (tofu), finely sliced." A recipe for "Pork sate (Saté babi manis)" calls for "1 tablespoon sweet soy sauce (ketjap benteng)."

1109. Lal, M.S. 1968. Soybean research. *Jawaharlal Nehru Krishi Vishwa Vidyalaya, Technical Bulletin* No. 10. v + 87 p. Sept. (Jabalpur, India). *
• ***Summary:*** The soybean was probably introduced to India through China through the Himalayan mountains several centuries ago. Some believe that it was also brought via Burma by traders from Indonesia. Small, black-seeded varieties were successfully grown in the central provinces of India in 1882, and the soybean has been cultivated in the northern hills for centuries. Address: Directorate of Research Services, JNKVV, Jabalpur.

1110. Stanton, W.R.; Brook, E.J.; Wallbridge, A. 1968. Fermentation methods for protein enrichment of cassava. Presented at the Third International Fermentation Symposium. Held in Sept. at New Brunswick. *
Address: 1. PhD, Head, Microbiology Section, Tropical Products Inst., London, England. Later: Prof. of Botany, Univ. of Malaya, Kuala Lumpur, Malaysia.

1111. Steinkraus, Keith H.; David, L.T.; Ramos, L.J.; Banzon, J. 1968. Development of flavored soymilks and soy/coconut milks for the Philippine market. *Philippine Agriculturist* 52(5):268-76. Oct. [12 ref]
• ***Summary:*** The most widely accepted formulation contained 10% by volume of coconut milk prepared by grinding grated coconut with water 1:1 (w/v) and filtering.

A detailed description for making this product on a commercial scale is given.

"Soymilks distributed as soft drinks have become commercial successes in Hongkong (Lo, 1964), Bangkok, Thailand (Green Spot Ltd., personal communication, 1968), and Singapore (Yeo Hiap Seng Canning & Sauce Factory Ltd., personal communication, 1969). The flavors used in these soymilks include sugar, skim milk powder, full-fat spray-dried cow's milk, malt flavor, etc. The exact flavorings are industrial secrets." According to Malaspina (personal communication, 1969) "Coca-Cola Export Inc. has been market-testing a soymilk-based soft drink in Brazil. Flavorings used have included chocolate and caramel."

"In July 1967, U.S. AID / Washington [DC], through its office of War-on-Hunger, financed a project (Cornell Contract csd-1815) on the development of soy-based foods for infants and children. The project involved development of soymilks or soy/coconut milks and other soy-based foods with flavors acceptable to children in the Philippines." This paper reports the results of flavor studies conducted to develop those foods. Address: Agric. Exp. Station, Univ. of the Philippines.

1112. Lie Goan-Hong; Oey, Kam-Nio; Prawiranegara, Dradjat D. 1968. Corn-soy-milk (CSM) or blended food product–Formula no. 2. *Paediatrica Indonesiana* 8:251-54. [3 ref. Eng]

• ***Summary:*** CSM is officially defined by UNICEF as a supplement for weanling, preschool and school children, and is substantially a complete formula but with a low fat content. It is made from processed, precooked and gelatinized cornmeal (68% by weight), defatted toasted soy flour (25%), nonfat dry milk powder, spray dried (5%), and mineral and vitamin premix (2%). It is a complete and well-balanced supplementary food for children of all age groups starting for 1 year of age. Address: Nutrition Inst., Ministry of Health, Jakarta, Indonesia.

1113. Kwon, Shin Han; Quyen, N.H. 1968. Annual report. Directorate of Agric. Research, Vietnam. *

• ***Summary:*** Contains information on soybeans in Vietnam.

1114. Kwon, Shin Han; Quyen, N.H. 1968. Plant breeding lecture note. Directorate of Agric. Research, Vietnam. *

• ***Summary:*** Contains information on soybeans in Vietnam.

1115. Kwon, Shin Han; Quyen, N.H. 1968. Soybean in Vietnam. Directorate of Agric. Research, Vietnam. *

1116. Mempertinggi hasil kedelai [Increasing soybean yield]. 1968. Jakarta: Jawatan Pertanian (Jakarta Board of Agriculture). 4 p. [Ind]*

1117. Somaatmadja, Sadikin. 1968. Legumes. Bogor: LP3 (Central Research Institute for Food Crops). *

1118. *Territory of Papua and New Guinea, Department of Agriculture, Stock and Fisheries, Annual Report (Port Moresby).*1968. Division of Plant Industry. p. 31-130. For the year 1965-66. See p. 31, 67, 105, 111.

• ***Summary:*** Agriculture is the country's main industry; agricultural exports contributed 86% of total export income in 1965-66. Coconut products were most important, followed by cocoa and coffee. This department is divided into four divisions: Animal Industry, Plant Industry; Extension and Marketing; and Fisheries; together with an Administrative Section (p. 1). A map (facing page) shows the Territory of Papua New Guinea and the surrounding islands that are part of it.

In 1965 a soybean variety trial was conducted at Keravat (p. 67). Six varieties from Aiyura were planted from 6-11 August and compared. A table shows the results in descending order of yield (in lb/acre): C.N.S. (1,389). Glycine 317 (1,058). NG 4662 (1,050). Avoyelles (1,034). Batavian Yellow (954). Coral Sea (699). The table includes the moisture, fat, protein, and ash content of each variety.

At Aiyura, all varieties were planted to maintain seed.

The section on "Plant introduction and quarantine" contains a table (p. 105) showing that, among the oil crops, 2 soybean varieties were introduced during 1965-66.

Trials were conducted to test the efficiency in nitrogen fixation of *Rhizobium* strains on various tropical legumes, including *Glycine max* (soybeans) and *Glycine javanica* (p. 111).

1119. Orillo, C.A.; Sison, E.C.; Luis, M.; Pederson, C.S. 1969. Fermentation of Philippine vegetable blends. *Applied Microbiology* 17(1):10-13. Jan. [4 ref]

• ***Summary:*** Blends of vegetables including two with cooked soybeans (apparently green vegetable soybeans, not soy sprouts) and one with mungo [mung] bean sprouts were fermented and microbiological and chemical changes studied. Lactic acid bacteria, *Leuconostoc mesenteroides, Pediococcus cerevisiae,* and *Lactobacillus plantarum* were used. The high activity gave fermentations similar to those of sauerkraut. Address: College of Agriculture, Univ. of the Philippines College, Laguna, Philippines.

1120. **Product Name:** [Tow-foo-fah (Oboro), and Soymilk].

**Manufacturer's Name:** Super-Soy Specialty.

**Manufacturer's Address:** No. 19, Jalan Dato Teoh Siew Khor, Kluang, Johor, West Malaysia. Phone: 07-717558.

**Date of Introduction:** 1969. January.

**New Product–Documentation:** Form filled out by Richard F.C. Chan. The business was started on 1-9-1969. He uses

100 lb/day of soybeans. His business card describes him as a "Soycrafter. Soyfoods–Natural and Health Giving."

1121. Hymowitz, Theodore. 1969. The soybeans of the Kumaon Hills of India. *Economic Botany* 23(1):50-54. March. [10 ref]

• ***Summary:*** In 1967, in an attempt to transfer information about soybean production and use to India, the University of Illinois, Uttar Pradesh Agricultural University, Jawaharlal Nehru Agricultural University and USAID signed an agreement "to develop the soybean as a new protein food source in India."

From September, 1965, to the end of the 1967 calendar year, over 200,000 metric tons of soybean oil was imported into India by the State Trading Corporation. Most of the oil was processed into vanaspati (hydrogenated vegetable shortening). In the same period, over 28,000 metric tons of soybean oil was imported into India by international agencies such as CARE. Soybean meal is currently being used by Indian industry as a high protein supplement in baby foods and in the preparation of enriched flour.

"Today, soybeans are being grown in minor acreages in several locations in India. These areas are (a) the Kumaon Hills, (b) Seone, Chinndwara, Nagpur region of Madhya Pradesh, (c) Poona district of Maharastra (d) Kaira District of Gujerat (e) isolated areas of the Punjab and (f) in the Naga Hills and Manipur.

"Most of the varieties grown in the plains are black seeded, have a procumbent growth habit and a long duration of growth. These soybeans are almost exclusively used for forage...

"Historically soybeans never succeeded in India as a commercial crop because there were no markets for the beans. The farmers who grew the crop were compelled to feed the beans to their cattle."

In the Kumaon Hills Division of Uttar Pradesh in northwest India, the vernacular name of the soybean is "bhat" and it has been grown quite extensively by the hill farmers for over 100 years.

Two maps show the Kumaon Hills: (1) A political map of India and Ceylon. The Hills are located in the northwest corner of Uttar Pradesh on a part of the southern outer spurs of the Himalaya Mountains. The region is bounded by Nepal on the southwest, Tibet on the north and east, and plains of Uttar Pradesh on the south. (2) The Kumaon Hills; the collection trip, starting and ending at Patnagar, is shown by a dotted line.

For five days, from Oct. 16 to Oct. 20, 1967, Prof. Hymowitz and Mr. I.D. Joshi (a Kumaoni) crisscrossed the Kumaon Hills collecting soybeans. Table 1 shows the 30 varieties of the annual cultivated soybean *(Glycine max)* they collected. For each is given the Plant Introduction (P.I.) Number assigned, village where collected, name of the farmer, and altitude (ranging from 3,600 to 7,500 feet).

"Kumaonis were found to use the soybeans in these ways: 1. Grinding the seed and mixing with wheat flour. 2. Boiling the immature pods which contain green seed and eating the green seed. 3. Using the dried seed in the same manner as a lentil. 4. Roasting the individual seed and eating as such. 5. Using the seed in a spiced rice dish (pulao). 6. Feeding the green leaves to milch cows. 7. Feeding the straw to milch cows. 8. Boiling the seed and feeding to milch cows. 8. Boiling the seed and feeding to milch cows. 9. Grinding the seed, mixing with other grains and feeding to milch cows.

"All these uses were based upon the nutritional value of the crop. Kwashiorkor disease (protein deficiency), which is so prevalent in India, was rarely seen among the Kumaon Hill children.

"Excellent clues to the antiquity of a cultivar in India can be found in its use in religious ceremonies, in its use in the various indigenous systems of medicine or in its having many vernacular names. Except for the *kulti* of Central India, *bhat* of the Kumaon Hills and *gari-kalai* of Bengal, *Glycine max* Merrill is commonly called soybean or soyabean throughout India. Soybeans are not used in any of the indigenous systems of medicine nor in any religious ceremonies of any of the major religions in India. Therefore, it must be assumed that the soybean is a recent introduction into India. It was probably introduced into India from Burma via the Naga Hills and Manipur.

"Over 90% of the soybeans were black seeded, with a procumbent habit of growth. The pods shattered severely upon maturity, and the plants had extremely poor yields. Although *Glycine wightii (G. javanica* L.) and *Paraglycine pentaphylla* (Dalz. in Hook.) F.J. Herm. *(G. pentaphylla* Dalz.) are indigenous to India, only *Glycine max* was being cultivated by the hill farmers...

"The beans were planted during the first 15 days in June and were harvested during the second or third week of October.

"The farmers knew of the yellow seeded types, but they preferred the black seeded beans. They believed the black beans grew better, produced better yields and were tastier than the yellow types." Address: Dep. of Agronomy, Univ. of Illinois.

1122. Banzon, Julian; Steinkraus, Keith H. 1969. How to use soybeans from your garden. College of Agriculture, University of the Philippines. 5 p. Mimeographed circular. Distributed through Los Banos Extension Dept.

• ***Summary:*** Introduction (the importance of protein, of which soybeans are a good source). How to grow soybeans in the Philippines, by Richard Bradfield of IRRI. How to make soybean milk and other nutritious soybean foods: Steamed green soybeans, mature dry soybeans, soybean milk, tokua–soybean curd, taosi (soybeans fermented with *Aspergillus oryzae* mold), tempeh.

Note: This is the earliest English-language document seen (Oct. 2008) that uses the word *taosi* to refer to soy nuggets. Address: 1. Prof. of Chemistry; 2. Visiting Prof., Microbiology and Food Science. Both: Univ. of the Philippines, College of Agriculture, Laguna, Philippines.

1123. Breth, Fred E. 1969. Ersatz-foods: The danger ahead. *British Vegetarian.* March/April. p. 141-45.
• ***Summary:*** Writing in a critical tone, the author discusses the various meatlike and dairylike products now available to American shoppers. "Turkey meat that has never held a feather and milk that has never been near a cow... These foods are making progress in markets around the world. Like the prospect or not, it is obvious we shall have to live with laboratory-bred proteins in the not-too-distant future." For more than a decade, food companies have been developing imitation animal proteins, based largely on soya bean proteins. Soya bean derivatives are being used to "stretch" low-cost meats.

"The American dairy industry has yet to find an answer to soya-protein based coffee whiteners, whipped cake toppings, cream-type and frozen desserts. The consuming public has fully accepted them some time ago–and likes them. Are synthetics a real threat to animal products? Expert opinion on this question is deeply divided." Mr. J.L. Hagle, president of Worthington Foods Inc. ("at present the major producer of 'synthetic foods'") believes that "Granted enough time, the relative efficiency of man-made foods will work in their favour."

"Professor C.O. Chichester, University of California, put it even more bluntly: '... the isolation of plant proteins and their processing into textured products may very well result in a major change in the eating habits of the world.'"

"'Meatless' meats, also called 'synthetic meats,' 'analogue meats' and 'textured meats' are made from isolated soya-protein (90 per cent. protein), which is a tasteless, odorless powder."

"Worthington Foods Inc. is already marketing about 30 different 'meat' items, including fried chicken, dried beef, meat loaf casserole, croquettes, chicken show mein, 'soymeat' sandwiches, sandwich spread, bacon bits and so on."

Experts predict plenty of competition in the field of "high-protein drinks" (H.P.D.s). Large companies like Monsanto (a chemical company), Pillsbury (a flour mill), and Swift (a meat packer) have already entered this market. They are all aware of the success story of "Vita-Soy" [Vitasoy], "a straight, three per cent. protein soya-bean milk drink," which sells 60 million bottles a year and has captured 25% of the Hong Kong soft drink market; it sells for as little as 5 pence per bottle. And they are aware of a similar powdered soy protein drink [Saridele] which contains 18% protein and is being marketed successfully in Djakarta, Indonesia and was introduced in 1957; 300 tons/year are now being produced.

The author concludes that these new foods are a necessity from the viewpoint of global nutrition.

Note: This is the earliest English-language document seen (Nov. 2003) that contains the term "meatless meats" or "meatless meat" (with any combination of quotation marks). Three other publications also used this term later in 1969.

1124. *Soybean Digest.* 1969. Worldwide oils and fats. April. p. 58.
• ***Summary:*** Discusses: Rapeseed. Thailand. Palm oil. Spain. Korea. Asia. World. Iran.

"Thailand: The first Thai International trade fair–held Dec. 12-29 in Bangkok–drew over750,000 people and introduced them to 422 U.S. food products including new textured vegetable protein items made from soybeans."

"Korea: Response to a new U.S. soy beverage tested as part of a Korean school lunch program has encouraged early introduction into the commercial market."

"Iran: Vegetable oil extraction and processing equipment worth $750,000 has been ordered by Iran from a British engineering firm..."

1125. Emerson, R.J. 1969. AID incentives to U.S. commercial operations in developing countries. *USDA Agricultural Research Service* ARS 72-71. p. 137-39. May.
• ***Summary:*** Discusses Saci to be made by the Coca Cola Company in Brazil, Vitasoy concentrate to be made by Monsanto in Southeast Asia and Latin America, and Incaparina made by Quaker Oats in Latin America. Gives details on AID incentives to private investment by U.S. companies in developing nations. Recently AID has established, within the Office of Private Resources, a Private Investment Center and a Private Resources Development Service. Address: Office of Private Resources, Agency for International Development, U.S. Dep. of State, Washington, DC.

1126. Hedges, Irwin R. 1969. Soybeans in the war on hunger. *Soybean Digest.* May. p. 13-17.
• ***Summary:*** Discusses protein-rich cereal-soy blends such as CSM ("the high-protein blend") and WSB (Wheat-Soy Blend) used in the Food for Freedom program. The article begins: "War on hunger: The U.S. government launched a War on Hunger 3 years ago [1966, under President Lyndon Johnson], based on the conviction that next to the pursuit of peace the world faces no issue more important than solving the food / population problem... world population was growing at a rate that would double the number of earth's inhabitants by the year 2000, while food production was lagging considerable behind the population growth rate."

"AID is providing incentive to private industry to develop, test and eventually produce for commercial

distribution low-cost, high-protein foods and beverages. Under these incentive contracts, food processors receive grants to survey the market, determine costs and availability of indigenous commodities, and develop and test market for prototype foods and drinks." Under this plan, contracts have been signed with Monsanto for a soybean drink in Brazil, with Swift & Co. for soybean-based foods in Brazil, with Archer Daniels Midland for textured vegetable protein and other foods in Thailand, and with General Mills for a high-protein product in Pakistan. Monsanto's research in Brazil has already shown good results.

Concerning food and population: "Many developing countries show population growth rates of 2.5% to 3.5% per year, rates that double their population in 20 to 30 years. Two-thirds of the world's population live in the developing countries.

"Must curb population: These same countries also have great potential for increasing food production by the application of modern science and technology. But unless measures are taken to curb population growth, any likely or possible increase in food production will only postpone the crisis."

Photos show: Dr. A.M. Altschul and Dr. Max Milner. Address: Acting administrator, War on Hunger, Agency for International Development.

1127. Wang, Hwa L.; Ruttle, Doris I.; Hesseltine, C.W. 1969. Antibacterial compound from a soybean product fermented by *Rhizopus oligosporus*. *Proceedings of the Society for Experimental Biology and Medicine* 131(2):579-83. June. [11 ref]

• ***Summary:*** "In the course of investigating the proteolytic enzyme systems of *Rhizopus oligosporus* Saito, a mold used for tempeh fermentation, we found that the mold produces a compound that inhibits the growth of bacteria associated with cheese making... the cheese failed to become acid because of failure of the lactic acid bacteria to grow."

Many fungi produce antibiotics. However it is rare for Phycomycetes (such as members of the genera *Rhizopus* or *Mucor)* to produce antibiotics. Thus it was unexpected when this investigation showed that *R. oligosporus* produced antibacterial compound(s) that inhibited the growth of *Streptococcus cremoris*. "The production of antibacterial agents by these species certainly would help to explain the nutritional value of fermented foods as claimed by natives, and the beneficial effects of tempeh on patients with dysentery as observed by Van Veen and Schaefer (1950)...

"The compound may not be an important antibacterial drug, but it is well established that antibiotics, in addition to minimizing infections, elicit growth-stimulating effects in animals. All these results, however, emphasize that antibiotics have a particularly striking growth-stimulating effect in diets that are deficient in any one of several vitamins or proteins, or some growth factors still unknown...

"Oriental people constantly are exposed to overwhelming sources of infection and their diets are frequently inadequate, yet they possess a wonderful resistance to disease. Our finding that an antibacterial agent is produced by *R. oligosporus* possibly offers a clearer understanding of the true value of tempeh in the diet of Indonesians, and perhaps of fermented foods in the diets of Orientals." Address: NRRL, Peoria, Illinois.

1128. *USDA Plant Inventory*.1969. Plant material introduced January 1 to December 31, 1967 (Nos. 317904 to 324307). No. 175. 262 p. July.

• ***Summary:*** Soybean introductions: *Glycine max* (L.) Merrill. Leguminosae.

322689-322695 (p. 184). From Angola. Seeds presented by Instituto de Investigacao Agronomica de Angola, Nova Lisboa. Numbered Sept. 18, 1967." C 8015. Improved. Origin unknown. Maturity 129 days. Nonshattering. Yield 2.550 kg. per hectare. C 8037. Bean No. 279. Origin unknown. Maturity 128 days. Nonshattering. Yield 2.550 kg. per hectare. C 8092. Jubiltan 109. Origin Mozambique. Maturity 129 days. Nonshattering. Yield 2.870 kg. per hectare. E 939. Max C.P.1159A8. Origin Australia. Maturity 128 days. Nonshattering. Yield 2.430 kg. per hectare. E 1151. Bicolor. Origin Angola. Maturity 117 days. Little resistance to shattering. Yield 2.290 kg. per hectare. E 1155. Hernon. Origin unknown. Maturity 126 days. Little resistance to shattering. Yield 2.290 kg. per hectare. E 1217. Bicolor do Cuima. Origin Angola. Maturity 118 days. Nonshattering. Yield 2.290 kg. per hectare.

323275-323278 (p. 196-97). "From Pakistan. Seeds collected by Ralph S. Matlock, Department of Agronomy, Oklahoma State University, Stillwater, Oklahoma. Received Oct. 11, 1967." Col. No. 7. Mirjanhat. Rawalpindi. Presented by Rafig Ahmad. Believed to be of Burmese origin. Yellow. Col. No. 12. Mothi. Ayub Research Institute, Lyallpur. Presented by Shamshad A. Kahn, Oilseed Botanist. Native species. Col. No. 14. K-16. Native variety. Seed small, black. Presented by Manzoor Ahmad A. Baluch, Associate Professor of Botany, Agricultural Research Institute, Tando Jam. Col. No. 15. K-30. Seed small, black. Presented by Manzoor Ahmad A. Baluch, Associate Professor of Botany, Agricultural Research Institute, Tando Jam.

323550-323581 (p. 208). "From India. Seeds collected by Theodore Hymowitz, Agricultural Experiment Station, University of Illinois, Urbana, Illinois. Received Nov. 15, 1967." 12 varieties from Nainital District, elevations 4,000 to 7,500 feet. 17 varieties from Almora District, elevations 3,300 to 5,900 feet. Seoni Yellow. Collected by P.L. Digarsey at Seoni, Madhya Pradesh.

323586-323587 (p. 209). "From Portugal. Seeds presented by Jardin e Museu Agricola do Ultramar, Lisbon.

Received Nov. 15, 1967. Variety names: Dobrangeana, Sangora.

324066-324068 (p. 237-38) "From Rhodesia [Zimbabwe]. Seeds presented by J.R. Tattersfield, Department of Research and Specialist Services, Ministry of Agriculture, Salisbury Research Station, Salisbury. Received Dec. 6, 1967." Variety names: Geduld, Hernon 237, Hernon 273. Address: Washington, DC.

1129. Leng, Earl R. 1969. The soya bean explores new territory. *World Farming* 11(8):8-9, 11-12. 14-15.

• ***Summary:*** Contents: Introduction. The potential. Will soya beans do any better? History of soybean research in India from 1965. Climatic factors. Variety selection. Seedbed preparation. Planting techniques. Weed control. Insect and disease pests. Harvesting and threshing. Seed storage. Utilization: Full-fat soy flour, soy milk.

For the last 3 years, the author has headed the University of Illinois' Coordinated Soya Bean Research Project in India. Under this program, he has conducted India's first extensive field trials using modern soybean varieties suited to Indian conditions. The soybean is almost unknown in many areas of the world, such as India and Africa, where protein is in acute short supply.

"Except for Indonesia, southern China, Taiwan, and the Philippines, soya beans were almost unknown in the tropical and sub-tropical regions of the world until about 1960. In the early 1960's work in southern Brazil rapidly; showed that good yields and high protein content of soya beans could be produced in that area. The varieties used were chiefly those grown in the Gulf Coast states of southern United States. Yields of 1,500 to over 2,000 pounds [per acre] were reported from experimental trials in both southern and central Brazil, and significant acreages are now grown in southern Brazil.

"In 1965 research workers with the University of Illinois, Urbana, Illinois, U.S.A., began intensive soya bean field trials at Pantnagar in northeastern India and at Jabalpur in the central part of the country under a USAID contract. The first year's results were only moderately encouraging; however, the 1966 trials at Pantnagar resulted in some yields over 3,000 pounds per acre. By 1968, it had been shown that yields up to nearly 4,000 pounds per acre could be produced both at Pantnagar and at Jabalpur. These outstanding results were achieved with varieties developed by U.S. Dept. of Agriculture plant breeders for the Gulf Coast states of southern U.S. From these results, it is now clear that high yields of soya beans can be obtained in much of India, between latitudes 23º and 30º."

A photo shows the Leng in a field of soybeans at Jabalpur, India. Address: Agronomist, Univ. of Illionis, Urbana.

1130. Hill, G.D. 1969. Soy bean yields in the lowlands of New Guinea. *Papua and New Guinea Agricultural Journal* 21(2):23-24. Sept. [2 ref]

• ***Summary:*** For many years, farmers in the Markham Valley of New Guinea have been seeking a suitable crop to incorporate into a rotation or to replace peanuts in the monoculture practiced on most farms. In 1964, two trials in the Markham Valley, designed to assess soy bean varieties in the wet lowlands, failed due to poor seed germination.

The following trial was conducted in 1968 in the wet lowlands at Bubia near Lae. Four varieties (obtained from Aiyura in Aug. 1968, inoculated with *Rhizobium* strain CB 1809, and planted on Nov. 7) were tested: NG 4661 Batavian Yellow, NG 4662, SHE 30, and Mission. The first three varieties yielded more than 1,500 lb/acre of soy beans. Address: Formerly: Agronomist, Dep. of Agriculture, Stock and Fisheries, Bubia, via Lae, Papua New Guinea. Presently Dep. of Agronomy, Univ. of Western Australia, Nedlands, W.A. 6009.

1131. Kapsiotis, G.D. 1969. PAG and the FAO/WHO/ UNICEF Protein Food Programme with special reference to soybean products. New York. 4 p. Nov. 13. Soy Products Document 2.1/25.

• ***Summary:*** Contents. 1. Brief history–The FAO/WHO/ UNICEF Protein Advisory Group was established in 1955 with the purpose of advising WHO on nutritive problems concerned with the development of special protein-rich foods. 2. PAG's scope of activities–Focus on development of protein foods for infants and children. 3. Focus on utilization of soy-beans and soy-bean products in human feeding–since 1956. 4. Attention to fermented soya bean products. 5. Saridele project for spray dried soy bean extract [soy milk] in Indonesia.

6. Survey of soy products available for human consumption. 7. Development of processing equipment for full fat soy bean flour. One Wenger unit, donated by UNICEF, has been installed in Taiwan. Another unit, also provided by UNICEF, will be installed at the Kaira Dairy Cooperative in India for the production of protein food mixtures for infants and children. 8. Dairy type foods based on soy protein isolates. 9. Studies on the economics of soy bean production, supply, processing and marketing. Two projects, in Turkey and Madagascar, are discussed briefly. 10. Conclusion.

The two projects: "One refers to Turkey where soy beans are produced in a restricted area on the Black Sea. The remodelling of the soy processing facilities through UNICEF and FAO assistance makes it possible to produce edible soy bean protein concentrates for the production and distribution of an enzyme treated and precooked infant food in Turkey. The second project, in its very early stage of preparation concerns Madagascar where there is a very serious effort of the Government to expand the culture of

soy beans. Here it is anticipated that the commercial production of protein mixtures based essentially on rice and soy for infant and young children could be developed. In the same country, where there is a substantial production of bananas, some development work encouraged by FAO is now under way for the production of soy flour-banana mixtures for feeding of all age groups.

"In conclusion, it could be said that the PAG and its sponsoring Agencies are trying to find ways and means for introducing and expanding the culture of soy and for the utilization of it and its products in human feeding." Address: Nutrition Div., Rome, Italy.

1132. Loring, Kay. 1969. Hancock cafe not ready, but others have fine view. *Chicago Tribune.* Dec. 7. p. F5.
• ***Summary:*** A section titled "Indonesian rice table" mentions the following: *Tahu goreng* (bean cake [tofu] with bean sprouts, green onions, celery, fried onions and soya sauce), and *ajam semur ketjap* (chicken in soya sauce).

1133. **Product Name:** [Magnolia Vitamin Enriched Soya Bean Drink].
**Manufacturer's Name:** Cold Storage (S) Pte. Ltd.
**Manufacturer's Address:** 277 Upper Bukit Timah Rd, Singapore 2158. Or Empire Dock Keppel Rd., Singapore 0409.
**Date of Introduction:** 1969.
**Wt/Vol., Packaging, Price:** Glass bottle with crown cap.
**New Product–Documentation:** Soyfoods. 1981. Winter. p. 29. With photo; Brian Fitzpatrick. 1982. Soya Milk in Asia. p. 261. States that Singapore Cold Storage first launched this soymilk in 1969; Tetra Pak Co. 1983. Brochure. Packaged in Tetra Brik Aseptic 250 ml; Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 121. STS. 1985. Containers for Soymilk. Shows color photo of Tetra Brik carton. Dark blue, light blue, and red on white. Color photo. Tetra Brik carton. Blue and red on white with yellow soybeans. Color photo sent by Anders Lindner of STS. 1987. Nov. 14. Glass bottle with crown cap. Label is red and white. Boi. 1986. Sunday Times (Singapore). Sept. 7. "Soya Bean Milk Packs More Water than Flavor." Magnolia sells for 35 cents per 250 ml. Comments: Carries consumption deadline, sweet, thin, vague soya bean flavour. This product was considered the best among a group of 6 soymilks sold in Singapore because "it was the only brand with a hint of soya bean flavour."

1134. **Product Name:** Magnolia Vitamin Enriched Soya Bean Drink.
**Manufacturer's Name:** Cold Storage (S) Pte. Ltd.
**Manufacturer's Address:** Petaling Jaya, suburb of Kuala Lumpur, Malaysia.
**Date of Introduction:** 1969.
**New Product–Documentation:** Brian Fitzpatrick. 1982. Soya Milk in Asia. p. 261. States that Singapore Cold Storage first launched this soymilk in 1969. Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 121.

1135. Faustino, F.C. 1969. Chemical and physical properties of soybean curd and as related to processing condition. B.S. thesis, University of the Philippines at Los Banos, Laguna, Philippines. *
• ***Summary:*** The best tofu coagulant was found to be magnesium sulfate.

1136. **Product Name:** [Tempeh].
**Foreign Name:** Tempé.
**Manufacturer's Name:** Handelsonderneming van Dappern. Renamed Tempé Produkten B.V. in April 1983.
**Manufacturer's Address:** 66 Kloosterbostraat, 6464 Kerkrade, The Netherlands. Phone: 045-455-803.
**Date of Introduction:** 1969.
**New Product–Documentation:** Soyfoods Center Computerized Mailing List. 1981. Jan. 22. Owner: Robert van Dappern. Largest tempeh plant in the Netherlands. Interview with Ike Van Gessel. 1982. June. The company started in Rotterdam in 1969. They learned how to make tempeh from a Dutch-Indonesian sailor, who had started to make tempeh in the Netherlands in 1949. He made it for family and friends but did not sell it commercially.

Shurtleff & Aoyagi. 1985. History of Tempeh. p. 29. This was Europe's third earliest commercial tempeh company, founded in 1969. In Jan. 1972 the thriving company moved to Kerkrade from Rotterdam. In June 1980 the company bought a $1,000,000 modern factory in Kerkrade and expanded production greatly. By mid-1982 it was the largest tempeh company in the world, making 6,000 to 8,000 lb of tempeh a week. In April 1983 the name was changed to Tempé Produkten B.V.

Letter and Label sent by Ike Van Gessel. 1992. Dec. 20. The man who taught Robert van Dappern to make tempeh was not a sailor but a private person named Mr. Remmert, who passed away in 1970. The company now makes 5,000 kg/week of tempeh. It is located at: Tunnelweg 107, 6468 EJ Kerkrade, Netherlands. Phone: 045-455803.

The Label is 8.5 by 5.5 inches. Orange and black on clear plastic. 450 gm. UPC indicia.

1137. **Product Name:** Tempe.
**Manufacturer's Name:** Toko Baru.
**Manufacturer's Address:** 969A Glendora Ave., West Covina (Los Angeles area), CA 91790. Phone: 213-962-0317.
**Date of Introduction:** 1969.
**New Product–Documentation:** Shurtleff and Aoyagi visited this small Indonesian delicatessen which makes its own tempeh in Jan. 1977. They met Randy Kohler included

the company in a list of tempeh shops in North America in the 1977 edition of "What is Tempeh?" Shurtleff & Aoyagi. The Book of Tempeh. 1979 (July). p. 148. Owner: Rudy Kohler. An Indonesian delicatessen. Soyfoods Center Computerized Mailing List. 1981. Jan. 22. Owner: Rudy Kohler. By July 1982 the address has changed to 16006 Amar Rd., City of Industry, California 91746. Phone: 213-333-6220. The owner is the same.

Shurtleff & Aoyagi. 1985. History of Tempeh. p. 39. America's 2nd earliest tempeh shop.

1138. Altschul, Aaron M. 1969. Low-cost foods: Fortified cereals and protein beverages. In: M. Milner, ed. 1969. Protein-Enriched Cereal Foods for World Needs. St. Paul, MN: American Assoc. of Cereal Chemists. x + 343 p. See p. 82-96. [27 ref]

• ***Summary:*** Contents: The world food problem: Hunger and malnutrition are caused by poverty. Food quality vs. food cost. Improving food quality: Improving the quality of cereals, new protein foods. New foods program. Four generations of protein foods (history). Food distribution within the family. Discussion: The relative importance of adequate nutrition, choosing the most effective approach to improved nutrition, the nature of the problem and the value of improvements. Conclusion.

Tables: (1) New Protein Food Program of the Agency for International Development (Feb. 1967 to July 1968): Countries and products that include soya: Brazil–Krause Milling, Monsanto, Swift. Kenya–Del Monte. Pakistan–General Mills. Thailand–Archer-Daniels-Midland. India–Swift. (2) Conventional and new protein sources (incl. oilseed protein). Address: USDA, Washington, DC.

1139. Brissenden, Rosemary L. 1969. South East Asian food: Indonesia, Malaysia and Thailand. Baltimore, Maryland, USA, and Harmondsworth, Middlesex, England: Penguin Books Ltd. 262 p. Index. 18 cm.

• ***Summary:*** Contents: Acknowledgements. A note on this American edition. Weights and measures. 1. Introduction to South East Asian Food. 2. Utensils, methods, ingredients, glossary. 3. Indonesia. 4. Malaysia and Singapore: Malay, Chinese, Indian, Miscellaneous Malaysian. 5. Thailand.

The glossary of ingredients contains descriptions of: Soya bean curd (fresh or dried), Soya sauce, and monosodium glutamate (also known as Ve-Tsin, Ajinomoto, Mei Ching, Taste Powder, Gourmet Powder, Accent, P'sst!, etc.). The 3 kinds of soya sauce used in this book are light soya sauce, dark soya sauce (which is thicker and heavier; these two kinds are available at Chinese grocers), and Javanese soya sauce, which is sweet and very thick. The latter is available in bottles named Ketjap Manis or Ketjap Benteng, under the Conimex label. To make your own Javanese soya sauce, combine 1 cup dark soya sauce, ½ cup molasses, and 3 tablespoons brown sugar in a small saucepan over medium heat. Stir until the sugar melts. Keep in a covered jar.

Note: This is earliest English-language document seen (May 2010) that contains the term "Ketjap Manis" (regardless of capitalization) used to refer to sweet, thick Indonesian-style soy sauce.

This book has a disproportionate number of recipes based on meat, fish, and poultry. Soy-related recipes include the following. From Indonesia: Ikan semur Djawa (Fish in soya sauce, p. 69, Java). Ajam semur Djawa (Chicken in soya sauce, p. 76-77, Java). Semur daging (Beef in soya sauce, p. 94). Tahu goreng ketjap (Fried bean curd with soya sauce, p. 105). Tahu pong (Bean curd omelette, p. 111).

From Malaysia and Singapore: Fried fish with soya beans (p. 149-50). Stirred tomatoes or silver beet with black beans (with Chinese black beans [soy nuggets], p. 169). Baked bean curd (p. 181). Steamed, dressed bean curd (p. 181-82). Address: Melbourne, Australia.

1140. Iljas, Nasruddin. 1969. Preservation and shelf-life studies of tempeh. MSc thesis, Ohio State University. * Address: Ohio State Univ.

1141. Kapsiotis, G.D. 1969. History and status of specific protein-rich foods. FAO/WHO/UNICEF Protein Food Program and products. In: M. Milner, ed. 1969. Protein-Enriched Cereal Foods for World Needs. St. Paul, MN: American Assoc. of Cereal Chemists. x + 343 p. See p. 255-65. [13 ref]

• ***Summary:*** "History: Protein malnutrition, later termed 'protein-calorie malnutrition,' drew international recognition following the first meeting of the FAO Nutrition Committee held in Baguio, Philippines, in 1948. It was not until the Joint FAO/WHO/Expert Committee on Nutrition met for its first session in Geneva in 1949 and recommended that 'kwashiorkor be investigated in the areas where the condition occurs,' that international action was initiated. That recommendation led to surveys conducted by Brock (WHO) and Autret (FAO) in Africa in 1950 (published 1952) and by Autret (FAO) and Béhar (WHO) in 1951 in Central America (published 1954). Similar surveys were conducted in the following years in other parts of the world and indicated that 'protein-calorie malnutrition' prevails in most of the developing countries." Address: FAO, Rome, Italy.

1142. Khan, Ahmed Mustafa; Ali, Safdar. 1969. Varietal and cultural studies in soybean. *West Pakistan Journal of Agricultural Research* 7(1):67-85. [19 ref]

• ***Summary:*** Soybean is a new crop in Pakistan and trials are being conducted to determine its potential in the country. Studies at the Agricultural Research Inst.,

Tandojam, have shown that soybean can be successfully grown in the whole Hyderabad Division.

A two-year study was conducted during 1964 and 1965 to compare the performance of seven promising exotic soybean varieties: Diashoka (Japan), Loppa (China), I-F/60-1 (China), Palmetto (Taiwan, China), Improved Pelican (USA), E-G-5 (Philippines), and Numa Hung (China). These were compared with K-30, a standard variety from Dacca (East Pakistan) and S.B.L., another standard variety from Lyallpur [Faisalabad] (West Pakistan). The varieties I-F/60-1 (China) and Improved Pelican gave the best yields. Loppa was matured the earliest (89 to 93 days). Planting on June 22 gave a significantly better yield than planting on May 22 or July 22. Address: Agricultural Research Inst., Tandojam, Pakistan.

1143. Kwon, Shin Han. 1969. Soybeans and soybean products in Vietnam. Saigon: Republic of Vietnam: Ministry of Land Reform and Development of Agriculture and Fisheries, Agricultural Research Inst. (Saigon). 113 p. 28 cm. [60 ref. Eng]

• ***Summary:*** Contents: Map of South Vietnam showing all provinces and their names. Preface, by the author. 1. Introduction: History of soybean, production and trade in the world and in Vietnam, utilization of soybean (uses, nutritive value of the soybean). 2. Botany of the soybean plant: Seed, stem and pubescence, leaves, flower parts, root and nodule bacteria, genetics. 3. Ecological requirement: Germination, temperature, rainfall, day length, soil. 4. Cultivation and storage: Planting (land preparation, depth of seeding, methods of seeding, rate of seeding, time of seeding, rotation, erosion), fertilizer (manure, nodule bacteria, nitrogen, phosphorus, calcium, potash, molybdenum, application), insects (maggot fly, soybean insects found in Vietnam, control), diseases (root disease, foliage disease, seed disease), weed control, harvesting and threshing (harvesting time, methods of harvesting, drying). 5. Variety improvement: Aims of improvement (high yielding variety, disease resistance, insect resistance, day length, varieties tolerant to unfavorable soil conditions, seed size, seed color, oil and protein content in seed, palatability), introduction method, pure line selection method, breeding method (making the cross, pedigree method, bulk method), regional trials, variety purification and multiplication (breeder's seed, foundation seed, stock seed, extension seed, maintenance). 6. Seed certification standard. 7. Bibliography.

The author thanks for their help: Dr. Thai-Cong-Tung, Director of the Agriculture Research Institute, and Mr. Nguyen-Huu-Quyen, Manager of Eakmat Experiment Station.

"The history of soybean in Vietnam is meager, but the references by Loureiro (1790) and Rumphius (1747) mentioned the cultivation of soybean in Malaysia and Vietnam. Harmand (1877) collected wild soybean *(Glycine laotica)* in the Hue and Bassac areas, and the herbariums [herbarium specimens] are still available at the Agricultural Research Institute, Ministry of Agriculture, Vietnam." Since the history of Vietnam is closely related to that of China, it seems likely that the soybean has been cultivated for many centuries in what is today Vietnam (p. 1).

In Vietnam, the soybean is still not a very familiar crop to the majority of farmers. Although the acreage has gradually increased since 1958, production had not yet reached 10,000 tons by 1967. According to the *Agricultural Statistics Yearbook of Vietnam,* in 1966 in South Vietnam, total soybean acreage was 6,610 hectares and production was 7,585 metric tons, or 1.148 tonnes/ha (p. 7). The main soybean producing provinces are all in the southern half of South Vietnam: Long-Khanh (40% of total South Vietnamese acreage), An-Giang (20.4%), Chau-Doc, Kien-Phong, and Binh-Dinh (5%). In 1963 some 1,440 tones of soybeans were imported and in 1966 some 100 tonnes were exported (p. 6).

Table 4 shows an estimate of the costs and returns per hectare of growing soybeans at the Eakmat Agricultural Experiment Station in Ban-Me-Thuot in 1968. The net income or profit from one hectare was about VN$26,000, which is larger than for any other field crops, including: cassava (VN$22,766), mung beans ($20,267), sweet potatoes ($19,269), upland rice ($6,828), corn ($6,569), and peanuts (VN$5,100).

Uses: "In Vietnam, the soybean is not commonly used in daily food, but a number of foods such as soysauce, tuong [a soft kind of miso resembling Chinese chiang in consistency, and sold in crocks], bean curd, vermicelli, soymilk, soybean wine, chao [fermented tofu, sold in bottles], soybean oil, [soy] bean sprouts, and green pods [green vegetable soybeans] are available in the market and they are gradually becoming popular among Vietnamese.

Photos (p. 11-12) show: (3) Bean sprouts and cooked beans with tomato sauce. (4) A shop that sells soybean products in a Saigon market. Soybean paste [tuong] is in big chars, chao [fermented tofu] is in bottles in front, and bean curds [tofu] are in the front left corner. (5) A Vietnamese girl frying bean curds in the market. (6) Bottles with labels showing various kinds of soy sauces made in Vietnam.

The highest yielding soybean varieties in Vietnam are presently Palmetto and E-32. In trials, they yield about 1 tonne per hectare. Address: FAO Agricultural Officer. Phone: Saigon 91.746.

1144. Moore, Raymond S. 1969. China Doctor: The life story of Harry Willis Miller. 2nd ed. Mountain View, California: Pacific Press. 215 p.

• ***Summary:*** The original edition of this book was published in 1961. This 1969 edition, although it has been completely re-set, contains only minor revisions: (1) A new color

paperback cover shows a large illustration of Dr. Miller's face. (2) This second edition contains a 3-page Postscript (p. 150-52), which describes his work in Hong Kong (1960-65, 1969), Philippines (1966), expansion of his work with soymilk in Hong Kong ("The Hong Kong soft drink industry dispenses more milks derived from his soybean milk than all others combined"), other work with soy ("His grain-and-soybean-based foods are being adopted as alternates to meat in lands which cannot support animals as a principal diet source. They range from soy cheese, milk, ice cream, and butter-like spreads to simulated steaks, wieners, and sausages. These vegetable foods now are making headway even in the United States and other Western countries. In an era of population dilemmas, Harry Miller reminds the experts that meat, as compared with vegetable protein, takes several times the acreage to produce the same amount of food."), George McGovern and Food for Peace (1961) which resulted in sharply increased exports of soybeans from the USA. (3) The number of pages in the book has been reduced to 152, from the original 215. (4) The valuable index in the first edition has (unfortunately) been omitted. (5) The number of photos has been reduced to 11, from 16 in the first edition, and many photos from the first edition were omitted. New photos (located on unnumbered pages 142-47) show: (1) Harry and Maude Miller at the time of their wedding in 1902. (2) Dr. Miller with a woman victim of goiter in China. (3) Hong Kong Hospital for Chinese refugees at Tsuen Wan, completed in June, 1965. (4) Dr. Miller with little Mohammed Ali, a Bedouin child in Libya. (5) Harry and his wife Mary in 1957 waiting at the airport in Benghazi, Libya. (6) Mr. Chan Shun donates 1 million Hong Kong dollars for the construction of a Seventh-day Adventist hospital in Hong Kong. Dr. Miller looks on. (7) In 1968 at Albuquerque, New Mexico, Dr. and Mrs. Miller are given a red-carpet welcome by Governor David F. Cargo.

1145. Senti, F.R. 1969. Formulated cereal foods in the U.S. Food for Peace Program. In: M. Milner, ed. 1969. Protein-Enriched Cereal Foods for World Needs. St. Paul, MN: American Assoc. of Cereal Chemists. x + 343 p. See p. 246-54. [5 ref]

• ***Summary:*** Contents: Introduction. Blended food product, child food supplement, Formula No. 1 (CEPLAPRO). Blended food product, child food supplement, Formula No. 2 (CSM). Biological value and acceptance for Formula No. 2 (CSM). Distribution and cost of formula No. 2, CSM. Wheat-based formulated foods. Biological testing of Formula No. 3 (WSB). Protein-fortified wheat flour. Rolled wheat-soy flake mixtures. Other high-protein foods considered for the foreign donation programs. Summary.

Formula No. 1 (CEPLAPRO): "The first formulated food purchased by the Department [of Agriculture] for distribution by AID in the overseas donation program was designated as Blended Food Product, Child Food Supplement Formula No. 1. This product was extruded in kernel-like form from a blend of corn meal, wheat flour, soy flour, and nonfat dry milk (58:10:25:5) supplemented with vitamins and minerals. The product was developed by the American Corn Millers Export Institute and was called CEPLAPRO. About 713,000 lb. of Formula No. 1 were purchased for emergency family feeding programs in Vietnam. Cost of the product was approximately 13.3 cents per lb., packaged in 50-lb. bags, and delivered to port. Reports on acceptance of the product were generally satisfactory, but its relatively high cost led to development of Formula No. 2 in which the extrusion step was eliminated. Although the kernel-type product may have advantage in promoting acceptance by adults, a flaked or powdered form appears more satisfactory for child feeding programs."

"The ingredients of Formula No. 2, commonly called CSM, are precooked corn meal, soy flour, nonfat dry milk (68:25:5) plus vitamins and minerals in the form of fine flakes or powder. To date, 437 million lb. of CSM have been purchased for distribution in over 90 developing countries by AID through the voluntary agencies. Biological and clinical testing have demonstrated the high quality of the protein. Acceptance has been good in the recipient countries.

"Formula No. 3, a blend of wheat flour, which may be straight-grade or bulgur flour, wheat protein concentrate, soy flour, and minerals, will be purchased in the near future." Address: Agricultural Research Service, USDA, Washington, DC.

1146. Stanton, W.R. 1969. Some domesticated lower plants in South-east Asian food technology. In: Peter J. Ucko and G.W. Dimbleby, eds. 1969. The Domestication and Exploitation of Plants and Animals. Chicago: Aldine Pub. Co. xxvi + 581 p. See p. 463-690. Proceedings of a meeting... held at the Institute of Archaeology, London University. Illust. 26 cm. [10 ref]

• ***Summary:*** In this paper, "lower plants" refers to microorganisms and algae. These cultivated microorganisms include marine and lacustrine algae (nori, kombu), fungi (Aspergillus, Rhizopus species), yeasts (Saccharomyces species) and bacteria (Lactobacillus, etc.). In Indonesia, tempeh (cakes made by fermenting soybeans) and fermented groundnuts "provide about one-third of the total crude protein requirement the population..." (p. 464). A complex fermentation is used to make miso, a fermented soybean paste, in Japan; a number of different microorganisms take part at different stages. Some 75% of the households in Japan use miso daily as the main soup seasoning–according to a recent survey.

"The Japanese products represent a northward and eastward migration of the 'sho' process (a general term in

Japan for the high salt fermentations). Today these fermentations are carried out under highly industrialized conditions, the organisms being given the benefit of highly specialized environments, and the domestication in consequence has proceeded here further than it has elsewhere in the region" (p. 467). Address: Tropical Products Inst., London.

1147. *Territory of Papua and New Guinea, Department of Agriculture, Stock and Fisheries, Annual Report (Port Moresby).*1969. Division of Plant Industry. p. 39-145. For the year 1966-67. See p. 76-77, 119-20, 138.
• ***Summary:*** A paragraph titled "Soybean" (p. 76-77) states that a soybean spacing trial was planted at Aiyura in Dec. 1966. The best yields were about 1,500 lb/acre. Spacing results were inconclusive. At Tambul the soybean varieties NG4662, Avoyelles Black, Improved Pelican, Nondugl, Batavian Yellow, Hernon 49, SHE 30, Coral Sea and Mission grew slowly; they matured in 6-7 months to yield about 500 lb/acre. The varieties Riggit and CNS took about 11 months to mature and were therefore discarded.

The section on "Plant introduction and quarantine" contains a table (p. 119) showing that 4 soybean varieties were introduced during 1966-67. Several soybean varieties were received from the Department of Agriculture, British Solomon Islands Protectorate (p. 120).

Nutrition samples of 11 soybean plants were conducted.

1148. Ucko, P.J.; Dimbleby, G.W. eds. 1969. The domestication and exploitation of plants and animals: Proceedings of a meeting of the Research Seminar in Archaeology and Related Subjects held [18-19 May 1968] at the Institute of Archaeology, London University. Chicago, Illinois: Aldine Publishing Co.; London: Gerald Duckworth & Co. Ltd. xxvi + 581 p. Illust. General index. Index of sites and localities. Index of authors. 26 cm. [500+* ref]
• ***Summary:*** One goal of this seminar is to gain an "insight into modern man's relationship to his habitat. In the last decade or two a change in methods of investigating these events has taken place, due to the mutual realization by archaeologists and natural scientists that each held part of the key and neither alone had the whole. Inevitably, perhaps, the floodgate which was opened has resulted in a new spate of knowledge..." "This meeting was called so that workers in the archaeological, anthropological, and biological fields could bridge the gap between their respective disciplines..." (p. ix).

"Mankind took an immensely long time to learn how to gain food by any other means than hunting, fishing and gathering. Our record of manufactured tools goes back over one million years but evidence of domesticated animals and plants only starts at a date somewhere near the end of the European Ice Age, i.e. after ca. 10,000 BC" (p. xvii).

While archaeology is presently best suited to study domestication, a movement is taking place in archaeological thought which recognizes the essential unity of the ecological approach; man is increasing being viewed as part of an ecosystem in which he has played a significant, if not dominant, role for some millennia. Increasingly man is seen as "another animal in the world of nature" (p. xxiii).

One cannot solve a problem unless one asks the right questions. And to ask the right questions one must look at the problem from a particular viewpoint. "That viewpoint, so far as the origin of domesticated plants is concerned, is, I am convinced, the ecological one... we must look at wild and cultivated plants associated with man as an ecological complex and view this in relation to the ecology of man himself." Scientists must search for exact "archaeobotanical data."

Vavilov considered the soyabean a primary crop (Hawkes, p. 25). In Indonesia, "fermented cakes of soya beans and groundnut [tempeh and onchom] provide about one-third of the total crude protein requirement of the population..." (Stanton, p. 464). In Japan, advanced fermentation processes are used to make miso and shoyu. Today these fermentations take place under highly controlled, industrial conditions in highly specialized environments (Stanton, p. 467).

This book shows clearly that many crops were domesticated before the soybean. In China, foxtail millet *(Setaria italica* var. *germanica),* broom corn millet *(Panicum miliaceum),* rice *(Oryzae sativa),* and wheats *(Triticum* spp.) have been identified in neolithic contexts (Watson, p. 398-99). In Tehuacan, Mexico, radiocarbon datings for common beans *(Phaseolus vulgaris)* have been reported from 5,300 B.P. [before the present] (Smartt, p. 452-53). Chili peppers *(Capsicum annuum)* share with *Phaseolus* beans and the Cucurbits (squashes) the distinction of being among the first plants cultivated in the New World (Americas). Chili peppers have been found in early sites in both Middle and South America. In Mexico, they have been dated back to about 7,000 BC. "This antedates the development of agriculture and implies that wild plants were being exploited." The first plants cultivated in Peru appear to be gourds and squashes, but by 2,000 BC peppers were grown in the Ancon area on the central coast (Pickersgill, p. 443, 446-47). Address: 1. Dep. of Anthropology, University College, London; 2. Dep. of Human Environment, Inst. of Archaeology, London.

1149. *Sarawak Ministry of Agriculture and Forestry, Annual Report of the Research Branch, Department of Agriculture (Kuching).*1969? Soyabean variety trial. 110 p. For the year 1966. See p. 47-48. Undated. *

1150. Bourne, Malcolm C. 1970. Ingredient cost of soymilk. Mimeographed. 2 p. Jan. Unpublished manuscript.

• ***Summary:*** The main ingredient is whole dry soybeans. These costs are valid as of 1970. Address: Visiting Prof. of Food Science, U.P. College of Agriculture, Los Baños, Laguna.

1151. Dwidjoseputro, Dakimah. 1970. Microbiological studies of Indonesian ragi. PhD thesis in Biology, Vanderbilt University, Nashville, Tennessee. vi + 125 p. Jan. Illust. No index. 29 cm. Published in Indonesia in 1976. [64* ref]
• ***Summary:*** Contents: Acknowledgments. List of tables. List of plates. 1. Introduction. 2. Review of literature. 3. Materials and methods. 4. Experimental results. 5. Discussion. 6. Summary. Literature cited. Address: Nashville, Tennessee.

1152. Iljas, Nasruddin; Peng, Andrew C.; Gould, Wilbur A. 1970. Tempeh: Find ways to preserve Indonesian soy food. *Ohio Report on Research and Development* 55(1):22. Jan/Feb.
• ***Summary:*** Tempeh, a fermented food, is consumed as a main dish rather than a flavoring or seasoning agent. Tempeh was preserved by freezing, canning, or dehydrating. Freezing, the best way, was as follows: Slice tempeh into pieces about ½ inch thick and 3½ inches long. Fill a 303 x 407 can with the pieces and process in boiling water for 5 minutes. Seal the tempeh in 303 cans and immediately store in a freezer at -20ºF.

When ready to serve, thaw the frozen tempeh by exposing it to room temperature for several hours. Soak tempeh pieces in a 5% salt solution (table salt in tap water), then deep-fry in peanut oil for 4 minutes at 350ºF.

The yield of tempeh from raw soybeans was found to be 84.96% on a dry basis.

Photos show: (1) On a shallow tray (right to left): soybeans, slices of fresh tempeh, slices of deep-fried tempeh. (2) Deep-frying tempeh in a basket deep-fryer. Address: 1. Graduate student; 2. Assistant Prof.; 3. Prof. All: Dep. of Horticulture, The Ohio State Univ., Columbus, and the OARDC.

1153. Puertollano, Carmen L.; Bourne, Malcolm C. 1970. How to make soymilk in your kitchen (Leaflet). Dept. of Chemistry, University of the Philippines, College of Agriculture, College, Laguna. 1 p. Feb. 3.
• ***Summary:*** This 10-step process uses the Cornell boiling-water grind method (to give soymilk with little or no beany flavor) and therefore requires a Waring blendor with a glass or stainless steel container.

One cup of dry soybeans makes 6-7 cups of soymilk. "6. For every cup of filtered milk add 2 level tablespoons of refined sugar" [too much sugar for good health!] and (optional, when the milk is cool) ½ teaspoon vanilla essence. "Some people like to flavor it with chocolate or Ovaltine." Address: Dep. of Chemistry, Univ. of the Philippines, College of Agriculture, College, Laguna.

1154. Holthuis, L.B.; Sakai, T. 1970. Ph. F. von Siebold and Fauna Japonica: A history of early Japanese zoology. Tokyo: Academic Press of Japan. xvi + 3223 p. March. Illust. (many color). No index. 30 cm. [Eng; Jap]
• ***Summary:*** Part I of this book (p. 1-206) is in English, many beautiful plates are in the middle, and Part II (p. 207-304) is a translation of the same material into Japanese.

Contents: Preface (#1), by H. Boschma, emeritus prof. of systematic zoology, Leiden University, Netherlands. Preface (#2), by Yaichiro Okada, President, Biogeographical Society of Japan. Part I. Introduction. I. The knowledge of the Japanese fauna in western Europe before 1820: General remarks, Englebert Kaempfer (1651-1716, German), Carl Peter Thunberg (1743-1828, Swedish), the last period. 2. Philipp Franz von Siebold and Heinrich Bürger: Philipp Franz von Siebold (1796-1866, German; youth, voyage to and stay in Java {1822-23}, First visit to Japan {1823-29}, Europe and second visit to Japan {1930-1866}), Heinrich Bürger (ca. 1806-1858), Japanese biologists closely in contact with Von Siebold. 3. Von Siebold's and Bürger's contributions to Japanese zoology: Von Siebold's zoological publications, Von Siebold's and Bürger's collections, Siebold's journey to Edo and his zoological collections. 4. Von Siebold's *Fauna Japonica:* General, mammalia, aves, reptilia, pisces, crustacea, Temminck's "Discours préliminaire," the Tokyo reprint edition of the *Fauna Japonica,* 1934. 5. Revision of the systematic names of Crustacea in Siebold's *Fauna Japonica.* 6. The plates of marine animals made by Kawahara Keiga (1786-18??) for Von Siebold and Bürger. References. Plates (I-XXXII). Part II (in Japanese).

On unnumbered pages of front matter are: (1) Von Siebold's color portrait at age 28 by Kawahara Keiga. Color photo of spines of volumes 104 (1833-1850) first edition of *Fauna Japonica,* by Von Siebold. (2) Black-and white portrait of Von Siebold at age 39 by Joseph Schmeller. Portrait of Von Siebold standing with his servant by Kawara Keiga. Von Siebold's signature dating from 31 July 1830. (3) Map (2 page spread) of Japan showing route from Nagasaki to Edo of members of the Dutch Trading Post (15 Feb. 1826 to 7 July 1826).

Chapter 1, "The knowledge of the Japanese fauna in western Europe before 1820" is extremely interesting, and contains detailed biographies of Kaempfer (p. 9-16), Thunberg (p. 16-20), Von Siebold (p. 23-36), and Bürger (p. 37-42). Kaempfer was in Japan for two years, 1690 Sept. 25 to 1692 Oct. 31; he twice accompanied the journey to the court of the Shogun in Tokyo (13 Feb. to 7 May 1691 and 2 March to 21 May 1692). Thunberg went to the University of Uppsala and became a pupil of Linnaeus. In 1770 he obtained his doctor's degree and his teachers had great

expectations of him. He was in Japan for only one year, 1775 Aug. 13 to 1776 Dec. 3; he joined the yearly visit to the Shogun's court in Tokyo (4 April to 25 June 1776). Von Siebold was in Japan for six years, 1823 Aug. 12 to 1829 Dec. 30; he once joined the delegation to the shogun's court, 15 Feb. 1826 to 7 July 1826. All three were primarily physicians and therefore very good botanists; each published extensive and detailed accounts of his experiences in Japan. Address: 1. Rijksmuseum van Natuurlijke Historie at Leiden, Netherlands; 2. Formerly of Yokohama National Univ., Japan.

1155. Li, Hui-lin. 1970. The origin of cultivated plants in Southeast Asia. *Economic Botany* 24(1):3-19. March. [40 ref]

• ***Summary:*** "Cultivated plants represent man's most important heritage, and we cannot afford to lose sight of this fact even in an age of great and rapid technological advancement... The beginning of scientific studies on origins of cultivated plants stems from the work of Alphonso de Candolle, specifically from his *Géographie botanique raisonée* (1855). The latest botanical methods were employed and correlated with evidence from archaeology, history, and linguistics. The cultivated plants were treated only as a chapter in a work on the distribution of plants as a whole... This chapter was later revised and greatly expanded into his *L'origines des plantes cultivées* (1882), a standard classical treatise on this subject even today...

"At about the same time, Mendel was using cultivated plants in his experimental studies of the nature of variation. His *Versuche über Pflanzen-Hybriden* (1865) lay unnoticed by the scientific world until 1900, when its rediscovery sparked the science of genetics... It was, however, not until Vavilov that genetics was consistently and systematically applied to the elucidation of problems on the origins of cultivated plants. Vavilov's *Studies on the Origin of Cultivated Plants* (1926) has exerted a great influence on later workers. He refined and brought up to date the botanical methods of de Candolle, while the newer approaches of genetics and cytogenetics were introduced and correlated with the older methods." Following continual revision, Vavilov's final scheme indicates 8 world centers of the origin of cultivated plants (including China) and 3 supplemental centers. But while Vavilov was most familiar with Europe, western Asia, and South America, "he seems to have been relatively unfamiliar with eastern Asia. His 'Chinese center' embodies the whole of China from northern cold-temperate regions all the way to the subtropical south."

The author proposes four horizontal belts of origin of cultivated plants in South-East Asia. The Northern China Belt, which includes the Yellow River Valley and the southern part of northeastern China (Manchuria) is the famous loess region, and the place of birth and early development of Chinese civilization. Though the loess soil is especially suitable for the development of agriculture, the climate of this belt is the most severe, the "precipitation is the least and the most unevenly distributed, and it has the fewest types of plants. However the cultural level of the people here is developed to a higher degree, and its system of agriculture is also the most complete. This situation seems to agree with Toynbee's theory that civilization develops as a result of a challenge." One of the cereal crops that originated in this belt is millet, *Panicum miliaceum,* the most important cereal in earliest times. Foxtail millet, *Setaria italica,* also appeared in this belt at an early date. Both were widely cultivated in Neolithic times.

"From ancient to present times, the chief legume crop of northern China has been the soybean, *Glycine max.* It was called in ancient times, *Shu,* and it is now generally called *Ta Tou* (Great Bean)... Today, it is the most wide spread and the most diversely utilized crop in all China...

"The cultivation and utilization of the soybean in ancient China also greatly affected the development of agriculture. The ancient peoples are known to have been at first ignorant of the use of fertilizers, but eventually discovered that the cultivation of soybeans increased the productivity of the soil. Thus the soybean is responsible for the development of crop rotation and the application of fertilizers. Among all the legume crops, the soybean has the most complete protein complex, approaching most nearly that of animal protein. Thus, in human nutrition it can completely replace animal food. The relatively small development of animal husbandry and fishery in northern China could be the effect of the use of soybean...

"The soybean is also the most important edible oil crop in China. The ancient people, because of their limited knowledge and technology, did not know how to extract oil from seeds...

"In ancient times the tender leaves of the soybean, called *Huo,* were also used as a leafy vegetable." Legumes and oil crops are more important in the north than in the south of China. When man domesticates plants and animals, he himself becomes domesticated and civilization begins.

Although the flora of the Japanese Archipelago is fairly rich, no important cultivated crops originated there; all were introduced from outside. Address: Morris Arboretum, Univ. of Pennsylvania, Philadelphia.

1156. Bourne, Malcolm C. 1970. Soybeans, food technology, and improved nutrition in southern Asia. Mimeographed text of a seminar given at the Ford Foundation, New Delhi, India. April 8. 14 p. Unpublished manuscript. [9 ref]

• ***Summary:*** Published in the Proceedings of the 3rd All India Soybean Conference, held 28-30 Sept. 1970 at Jabalpur, India. Tables: 1. Deaths among small children

(ages 1-4) in various countries as a percentage of total deaths in population. 2. Comparison of soybean with other protein sources in the Philippines (As of early 1965 soy provides has the largest amount of protein per peso as purchased [559 gm vs. 287 for mungbean, which is second largest]). 3. Foods made from soybeans (12 types). 4. Comparison of the nutritional composition of soybeans with common dry beans. 5. Material balance in manufacture of soymilk. 6. Volatiles found in cold-grind soybeans. Postulated mechanism of formation of ethyl vinyl ketone in soymilk. 8. Boiling water process for soymilk (bottled or fresh). 9. Ingredient cost of soymilk. 9. Protein supplied by soymilk. Address: Visiting Prof. of Food Science, College of Agriculture, Univ. of the Philippines, College (Los Baños), Laguna, Philippines. Permanent address: New York State Agric. Exp. Station, Geneva, NY.

1157. Bourne, Malcolm C.; Puertollano, Carmen L. 1970. Pilot plant procedure for making PHILSOY [soymilk] at Los Baños, Philippines. Mimeographed. 4 p. June 2. Unpublished manuscript.

• ***Summary:*** The ten steps in the Cornell boiling-water grind procedure are described in the form of a two-column table: (1) Procedure. (2) Comments. The comments are much longer than the procedure.

The procedure is: 1. Soak clean whole soybeans in water at ambient temperature until saturated (about 4-5 hours). 2. Discard soak water. Remove any defective beans. 3. Peheat grinding machine (to ensure that the first lot of material ground does not fall below 80ºC). 4. Grind beans at ambient temperature with boiling water. Temperature of bean-water slurry must never fall below 80ºC (180ºF). It is advisable to hold the slurry at 80ºC. or higher for about 5 minutes before proceeding to next step. Ratio is 1 part of dry beans plus 10 parts by weight of water. This is approximately equivalent to 1 volume of soaked beans to 3 volumes of boiling water. 5. Boil [in open kettle] for 5 to 10 minutes. 6. Filer off insoluble residue. 7. Formulate. 8. Fill into 7 oz. bottles and seal. 9. Sterilize in steam for 12 minutes at 250ºF (15 lbs. pressure). 10. Cool in air.

General notes. "If a fresh product is desired that has not been sterilized, it is necessary to maintain the milk at near the boiling point for approximately 30 minutes in order to destroy the antitrypsin." Address: 1. Visiting Prof. of Food Science and Associate Director (Philippines) U.S. AID-Cornell Contract csd-1815; 2. Food Technologist, Univ. of the Philippines, College of Agriculture, Laguna, Philippines.

1158. U.S. Department of Agriculture. 1970. The annual report on activities carried out under the Public Law 480, 83d Congress, as amended, during the period January 1 through December 31, 1969. Washington, DC: U.S. Government Printing Office. See p. 122-27. Cover reads: Food for Peace: 1969 Annual Report on Public Law 480.

• ***Summary:*** Table 20 is titled "Title II, Public Law 480–Total commodities by program type, fiscal year 1969." The three main program sponsors and distributing agencies are (1) Volag (American voluntary agencies, UNICEF and UNRWA [United Nations Relief and Works Agency] unless otherwise noted), (2) Government to government, and (3) WFP (World Food Program). Each of these are Private Voluntary Organizations (PVO/PVOs), registered with USAID. Only two foods containing soy protein were distributed: CSM (Corn soya mix) and WSB (wheat soya blend). They were lumped together in the statistics and sent in the following amounts (in thousands of pounds) to the following continents and countries: Africa total 89,470 lb: Cameroon 600, Congo 162, Dahomey 80, The Gambia 385, Ghana 976, Kenya 478, Lesotho 775, Malawi 39, Mali 4,500, Morocco 300, Nigeria 78,232, Senegal 80, Sierra Leone 1,810, Tanzania 365, Togo 18, Upper Volta 670.

Near East-South Asia total 222,817: Gaza [occupied by Israel since 1967] 2,653, India 216,176, Jordan 1,527, Jordan-West Bank [occupied by Israel since 1967] 1,042, Lebanon 738, Nepal 18, Pakistan 1, Syria 662.

Far East total 57,861: Burma 360, Indonesia 3,669, Korea 9,698, Laos 53, Macao 113, Malaysia 2,474, Philippines 3,140, Ryukyu Islands [located south of Japan, incl. Okinawa, Sakishima, and Amami island groups. Self governing from 1966. Returned to Japan in 1972] 227, Vietnam 38,127.

Latin America total 45,291: Bolivia 72, Brazil 19,851, Chile 2,605, Colombia 1,696, Costa Rica 142, Dominica 4, Dominican Republic 6,680, Ecuador 608, El Salvador 1,178, Grenada 68, Guatemala 1,773, Guyana 58, Haiti 1,585, Honduras 435, Jamaica 124, Martinique [French] 75, Panama 734, Paraguay 2,477, Peru 4,847, Uruguay 279.

Grand total: 415,439,000 lb of CSM and WSB. The following amounts of CSM/WSB (in 1,000 lb) were distributed by the three groups: Volag 292,587, Government to government 122,851, and WFP 1. Countries receiving more than 1 million lb of CSM and WSB combined (in millions of pounds): India 216.2, Nigeria 78.2, Vietnam 38.1, Brazil 19.9, Korea 9.7, Dominican Republic 6.7, Peru 4.8, Mali 4.5, Indonesia 3.7, Philippines 3.1, Gaza 2.7, Chile 2.6, Malaysia 2.5, Paraguay 2.5, Sierra Leone 1.8, Guatemala 1.8 Colombia 1.7, Haiti 1.6, Jordan 1.5, El Salvador 1.2, Jordan West Bank 1.0.

Note: This is the earliest document seen (Feb. 2002) concerning soybean products (cereal soy blends) in Martinique, or Panama. This document contains the earliest date seen for soybean products in Martinique, or Panama (1969); soybeans as such had not yet been reported by that date. Address: Washington, DC. Phone: 703-875-4901 (1991).

1159. IRAT-RCA (Republique Centrafricaine). 1970. Soja: Généralités, variétiés [Soja: General information and

varieties]. *IRAT-Republique Centrafricaine, Rapport Annuel* For the year 1969. Vol. II. Phytotechnie. p. 24-31. [Fre]

• ***Summary:*** IRAT stands for *Institut de Recherches Agronomiques Tropicales* (Tropical Institute of Agronomic Research). This is a summary of results obtained during previous years. Page 24 states: "The soybean is not well known in the Central African Republic [CAR]. Since 1963, two varieties, San-Kuo and Palmetto have been propagated at the Grimari station. The seeds were planted in May and August of each year on the multiplication plots on centers of 40 by 15 cm, at the rate of 80 kg of seed per hectare, with 40 kg of di-calcium phosphate and 60 kg of ammoniated phosphate fertilizer. The yields remained low, about 500 kg/ha. The only disposal of this production was the consumption by the troop at the station and by infant center *(Centre d'élevage)* at Bambari. In the zone of Agoudou Manga in 1968 some commercial planters undertook the cultivation of soybeans, but this operation was not continued.

In 1967 the Ministry of Development, considering the soybean to be a nitrogen source for the feeding of animals, requested that IRAT start experimentation again. The goal was to find a variety superior to Palmetto and San Kuo, and to find the best cultivation techniques, especially inoculation with soil bacteria. A list shows the 81 soybean varieties that were introduced to the CAR, including 54 from the USA, 3 from Brazil, 7 from Australia, 8 from Ecuador, 4 from Malaysia, 2 from South Africa, and 1 each from Taiwan, Nigeria, and Pakistan.

This collection of varieties was planted late, on June 13. In 1961, they were planted on May 11, and again on Oct. 29. By 1969 it was clear that the black-seeded variety Avoyelles (from Australia) gave the highest yields, the mean being 1,18 kg/ha. Other interesting varieties were Wilson Black, Palmetto, and San-Kuo. Table 8 shows the characteristics of each variety and Table 9 shows that the yield of Avoyelles could be increased to 1,519 kg/ha by inoculation and the use of fertilizers.

Note: This is the 2nd earliest document seen (Aug. 2009) concerning the cultivation of soybeans in the Central African Republic.

This document contains the 2nd earliest date seen for the cultivation of soybeans in the Central African Republic (1963). Address: Central African Republic.

1160. *Chemical and Engineering News.* 1970. Fortified foods: the next revolution. Growing number of AID-funded programs encourage development of low-cost, high-protein foods. 48(33):36-37, 39, 41, 43. Aug. 10.

• ***Summary:*** The magazine talked with three men who direct and assess many of the current projects in this new field. A photo of each man is shown: (1) Dr. Daniel Rosenfield, deputy director of the nutrition and agribusiness group at the USDA; (2) Dr. Martin J. Forman, director of the office of nutrition in the Agency for International Development (AID); and (3) Dr. Max Milner, senior food technologist in the food conservation division of the United Nations Children's Fund.

A table shows some low-cost fortified foods that have found market acceptance (Source: League for International Food Education). Those containing soy are: Cerealina (weaning food) by CPC International (Brazil); Golden Elbow Macaroni by General Foods (Brazil); Kupagani Biscuits by Pyott Ltd. (Union of South Africa); ProNutro Cereal and ProNutro Soup by Food Corp (Pty.) Ltd, Durban, Natal, Republic of South Africa; Puma (soy beverage) by Dih, Ltd. (Guyana) and Monsanto; Vita Bean (soybean milk) by Yeoh Hiap Seng, Ltd. (Singapore); Vitalia (macaroni products) by Instituto de Investigaciones Tecnologicas (Bogota, Colombia); Yoo Hoo (milklike beverage) by Yoo Hoo Beverage Co. (Carlstadt, New Jersey; made from a "blend of animal and vegetable protein products"–soy is not specifically mentioned. Marketed in U.S. and abroad; produced in 14 countries).

The world's food supply and distribution are already failing to keep up with population increases. Each day, 10,000 people die of malnutrition according to Dr. Richard L. Hall, chairman of the executive board for SOS/70. And the situation appears to be steadily getting worse. "Malnutrition can also kill indirectly by leaving people alive but highly vulnerable to disease. The most critical type of malnutrition is caused by a lack of protein, he says." Dr. Rosenfield believes that fortification of traditional foods is the quickest, least expensive, and easiest way to make a real difference in combatting malnutrition. The Green Revolution has brought about dramatic increases in production of some crops, but it has also brought with it "a host of problems that may put a damper on the usefulness of high-yield crops as a short-term solution to the food shortage, according to Dr. Rosenfield."

Dr. Milner sees a growing role for legumes. He feels that the outlook for protein from green plants such as alfalfa is "very sad."

1161. van Veen, Andre G.; Steinkraus, Keith H. 1970. Nutritive value and wholesomeness of fermented foods. *J. of Agricultural and Food Chemistry* 18(4):576-78. July/Aug. [18 ref]

• ***Summary:*** Contents. Introduction. Materials and methods: Tempeh, ontjom, bongkrek, idli, fish sauces, fermented rice, yoghurt-wheat foods. Nutritive value. Digestibility. Vitamins. Acceptability. Wholesomeness of fermented foods. Address: New York State Agric. Exp. Station, Cornell Univ., Geneva, New York.

1162. Hansen, Barbara. 1970. Language of cookery: Soy sauce hails from number of countries. *Los Angeles Times.* Sept. 10. p. K9.

• ***Summary:*** Compares Japanese, Chinese, Indonesian, Hawaiian, and U.S. soy sauces. These can be either brewed [fermented] or mixed from various ingredients to simulate the flavor, color, and texture of the brewed soy sauces. The mixed sauces "are based on hydrolized vegetable proteins and are colored with caramel coloring."

Among imported Chinese soy sauces, there is "the familiar dark soy sauce and also a light soy sauce, which can be used to salt and season food when a dark color is not desired."

Shoyu is the Japanese word for soy sauce.

"If you take up Indonesian cookery, don't assume that ketjap is the thick red sauce which Americans pour on hamburgers. Ketjap is the term for Indonesian-style soy sauce, which is slightly sweetened."

1163. *New York Times.* 1970. Filipino children hurt by poor diet: U.S. aiding effort to end widespread malnutrition. Oct. 4. p. 11.

• ***Summary:*** The village of San Andres Bukid, just off Manila's plush Ermita district, has a community center next to hundreds of shanties. A young nutritionist, Germelina Villarex, is helping to feed 60 village children, who have come to the center with their mothers. In each child's bowl was a mound of American wheat in a "cream soup made from corn-soybean-milk powder supplied by the United States Food for Peace Program and flavored with a local vegetable." Each group of 60 children is "graduated" every 2-3 months so that a new group can benefit.

The U.S. program is administered by the United States Agency for International Development. CARE, a voluntary agency, also helps in distributing the food.

1164. Baens-Arcega, L. 1970. Sauce manufacture. *Process Biochemistry* 5(10):50-51, 56. Oct. [13 ref]
Address: Director, Biological Research Center, National Inst. of Science and Technology, Manila, Philippines.

1165. Wittner, Dale. 1970. Children of war: In Viet Nam the orphans come to live in a tiny village that lies uneasily between American and Viet Cong forces. *Chicago Tribune.* Nov. 8. p. 128-31.

• ***Summary:*** No child is turned away from the Minh-Tam orphanage. Everybody observes both Christian and Buddhist ceremony. Meat is never served and all heads are shaved. Those old enough to work are busy throughout the day. "Besides growing the vegetables that make up the bulk of their diet, the older boys grind rice and make soy bean curd that is sold in nearby markets." The girls weave mats on which the children sleep. Seven photos show the children.

1166. Puertollano, Carmen L.; Bourne, M.C.; Banzon, J.; Melgar, J.C. 1970. Effect of changes in the formulation of soymilk on its acceptability to Filipino children. *Philippine Agriculturist* 54(5&6):227-40. Oct/Nov. [9 ref]

• ***Summary:*** Dr. Bourne is a visiting professor from Cornell University (New York). A large-scale acceptability study using various soymilk formulations was conducted with approximately 400 Filipino school children as tasters. The soymilk was made using the boiling-water grind method, developed at Cornell, because it gives soymilk with little or no "beany" flavor. The various formulations ranged from 77.2% to 91.8% acceptability using a 7 point visual scale.

Soymilk containing 7% sugar had significantly higher acceptability than that containing 5% sugar. Soymilk containing 7% sucrose plus 20 ppm [parts per million] vanilla essence was accepted as the "standard" formula on the basis of acceptability and cost.

The addition of 2% coconut oil fat to the standard soymilk made almost no change in acceptability. The addition of chocolate resulted in a significant increase in acceptability. The use of 0.1% sodium hydroxide in the water used for soaking the soybeans increased acceptability slightly. A mixture of 25% carabao milk and 75% soymilk was not liked as well as pure soymilk. Serving the soymilk cold gave higher scores than serving it at room temperature. A comparative taste study shows that soymilk, when tasted first, has an acceptability approaching that of a popular cola beverage (89.3% vs. 89.8%). "There is a widely held opinion in the Philippines that cow's milk is indigestible because it gives stomach pains and/or flatus [gas] and diarrhea." None of these problems occurred after consuming soymilk. Address: Dep. of Agricultural Chemistry, Univ. of the Philippines' College of Agriculture.

1167. *Soybean Digest.* 1970. A Southeast Asia soy food firm. [Yeo Hiap Seng Ltd.]. Nov. p. 3.

• ***Summary:*** "A company that started as a family business making soybean products is today one of the largest food and beverage concerns in Southeast Asia. Yeo Hiap Seng Ltd. owns a number of manufacturing plants in Singapore and Malaysia and makes soybean products and also soft drinks and canned foods.

"Yeo Hiap Seng Ltd. started off using soybeans as a base for all its products. It made soy sauce, soybean paste, and other products that are basic necessities for Chinese food...

"In 1950, Yeo Hiap Seng Ltd. decided to undertake the processing of soy milk on a commercial scale. The firm successfully launched the first soy milk in bottles in 1952. This is marketed as a food beverage known as 'Beanvit' and retailed at the same price as other soft drinks...

In 1968 the company successfully introduced soymilk in a modern one-way container. "This form of packaging, which has been widely used for milk, is the tetrahedron-shape kraft paper lined with polyethylene-coated aluminum foil. The product is sterilized before filling.

"The soy milk is heated to 142ºC and held for 4 seconds, cooled instantly to the original temperature, then poured into the containers. This method of packaging under sterile conditions will enable the product to be kept for about 8 months without refrigeration. The product is much better in both appearance and taste than with the normal sterilization at 115ºC for 15 minutes. The container can be discarded after use.

"Yeo Hiap Seng Ltd. has recently introduced an improved soy milk, 'Vitabean.' Packed the same way, Vitabean is enriched with vitamins A, B1, B2, B6, C, D3 nicotinamide and pantothenic acid sufficient to provide half the normal daily vitamin requirements for adults. It has been found there are no great losses of heat-sensitive vitamins processed with this UHT [ultrahigh temperature] method.

"The company says it is looking forward to establishing Vitabean plants in other parts of the world." A photo shows a machine packaging Beanvit and Vitabean, with a woman standing nearby.

1168. **Product Name:** Vitabean (Soymilk Fortified with Vitamins).
**Manufacturer's Name:** Yeo Hiap Seng Ltd.
**Manufacturer's Address:** 950 Dunearn Rd., Singapore.
**Date of Introduction:** 1970. November.
**Wt/Vol., Packaging, Price:** Aseptic tetrahedron-shaped container.
**New Product–Documentation:** *Soybean Digest.* 1970. Nov. p. 3. "A Southeast Asia soy food firm." "Yeo Hiap Seng Ltd. has recently introduced an improved soy milk, 'Vitabean.' Packed the same way, Vitabean is enriched with vitamins A, B1, B2, B6, C, D3 nicotinamide and pantothenic acid sufficient to provide half the normal daily vitamin requirements for adults. It has been found there are no great losses of heat-sensitive vitamins processed with this UHT [ultrahigh temperature] method.

"The company says it is looking forward to establishing Vitabean plants in other parts of the world."

E. Orr. 1972. Tropical Products Inst. G73. The use of protein-rich foods for the relief of malnutrition in developing countries: an analysis of experience. p. 15. "More recently a form of Beanvit, with vitamin and mineral additives, called Vitabean has been on sale with Beanvit. The trend of sales is said to be satisfactory and the company has plans to expand production."

Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 101. "It was fortified with half the adult Minimum Daily Requirement of most essential vitamins."

1169. Dwidjoseputro, Dakimah; Wolf, Frederick T. 1970. Microbiological studies of Indonesian fermented foodstuffs. *Mycopathologia et Mycologia Applicata (The Netherlands)* 41(3-4):211-22. Dec. 4. [18 ref]
• ***Summary:*** Ragi is Indonesian starter culture. From ragi-tempe (tempeh starter) and tempe were isolated *Rhizopus oryzae, R. arrhizus, R. oligosporus, R. stolonifer, Mucor Rouxii, M. javanicus* and *Trichosporon pullulans.* From ragi-ketjap, used to prepare Indonesian soysauce, were isolated *Rhizopus oligosporus, R. arrhizus, R. oryzae, Aspergillus oryzae,* and *A. flavus,* the latter species probably being an accidental contaminant. The microflora of *tapé (tapeh)* is also described. Two new species are described: *Candida lactosa* and *Hansenula malanga,* from ragi-tapé from Surakarta and Malang, respectively. Address: Vanderbilt Univ., Nashville, Tennessee. Dwidjoseputra now resides in Malang, Indonesia.

1170. Bhumiratana, A. 1970. How Thailand closes the protein gap. In: Institute of Food Research & Product Development, Kasetsart University, Bangkok, Report on Protein Food Promotion. Nov. 22-Dec. 1, 1970. *
Address: Thailand.

1171. Wang, H.L.; Hesseltine, C.W. 1970. Oriental fermented foods. Paper presented at Part I, Seminar on Protein Food Promotion. 5 p. Typed manuscript. Held Nov. 22 to Dec. 1, 1970 at Inst. of Food Research and Product Development, Kasetsart Univ., Bangkok, Thailand. [13 ref]
• ***Summary:*** Contents: Introduction. Miso. Hamanatto. Sufu. Natto. Tempeh. Nutritional value of fermented foods. Absence of aflatoxin in fermented food products.

A note on page 1 of this manuscript states: "To be published in Part I of Seminar on Protein Food Promotion, November 22-December 1, 1970, Institute of Food Research and Product Development, Bangkok, Thailand." This was an invited paper. Address: NRRL, Peoria, Illinois.

1172. Bourne, Malcolm C. 1970. Recent advances in soybean milk processing technology. *PAG Bulletin* No. 10. p. 14-21. FAO/WHO/UNICEF Protein Advisory Group of the United Nations. [8 ref]
• ***Summary:*** An excellent presentation of the "boiling water grind" technique developed by the Food Technology Group at Cornell University. Table 1 shows that, in the Philippines, the soybean provides almost twice as much protein per peso as its nearest competitor, the mungbean, and 19-times more protein per peso than pork. Address: Visiting Prof. of Food Science, Univ. of the Philippines, College of Agriculture, College (Los Baños), Laguna, Philippines. Permanent address: New York State Agric. Exp. Station, Cornell Univ., Geneva, NY 14456.

1173. Chan, Y.C. 1970. Varietal observations and yield components of soybean. Faculty of Agriculture, University of Malaya, Kuala Lumpur, Malaysia. Unpublished final year research project. *
Address: Malaysia.

1174. Escueta, E. 1970. Effect of alkali additions on pH and flavor of aqueous soybean extracts. BSc thesis, University of the Philippines at Los Banos, Laguna, Philippines. *
• ***Summary:*** Soymilk treated with alkali sodium hydroxide of pH 7.0–7.5 is acceptable to Filipino tastes.

1175. Hermana, -; Soetedja, -. 1970. Advances in the preparation of tempeh. I. New method of preparing tempeh. *Gizi Indonesia, J. of the Indonesian Nutrition Association* 2(3):167-68. [3 ref. Eng]
• ***Summary:*** The traditional method for making tempeh is described. In the new method, soybeans were dehulled by a burr mill. 1 kg of dehulled soybeans was cooked in water heated to the boiling point, then soaked in this water for 22 hours. The beans were washed to remove their seed coats, then reboiled in fresh water for 40 minutes, drained, and left to cool. The soybeans were inoculated with a tempeh mould preparation (1 gram inoculated 1 kg of soybeans) and wrapped in cheese-cloth for 24 hours. Then they were bagged in perforated polyethylene bags having pinholes in a grid pattern 4 cm apart, then fermented for 14 to 16 hours.

Tempe made by this new method had a milder aroma and better texture than traditional tempeh, and had a keeping quality of 3 days. Even after 3 days, the color of the tempeh remained white; changes in texture and aroma were slight. Address: Nutrition Research, Unit Jl. Semboja, Bogor Indonesia.

1176. **Product Name:** Kaset Cookies, Kaset Protein, Soya Milk, Kaset Noodles.
**Manufacturer's Name:** Institute of Food Research and Product Development, Kasetsart University.
**Manufacturer's Address:** Bangkok, Thailand.
**Date of Introduction:** 1970.
**New Product–Documentation:** E. Orr. 1972. Tropical Products Inst. G73. The use of protein-rich foods for the relief of malnutrition in developing countries: an analysis of experience. p. 28. "In Thailand, Kasetsart University, in collaboration with the Nutrition Division of the Ministry of Health, and assisted by USAID, has been experimenting with protein products for a number of years. Its particular interest is in the use of soya and the local mung bean. It manufactures four products: soya milk, cookies, noodles and 'Kaset Protein'–a combination of soya flour and mung bean with a protein content of 60 per cent–on a pilot plant scale. The products are disposed of through a school feeding programme and a few co-operative stores. Attempts to persuade local firms to take over the operation have not been successful."

A. Siegel et al. 1975. Cereal Chemistry 52(6):801-12. Dec. "Development, acceptability, and nutritional evaluation of high-protein soy-supplemented rice noodles for Thai children."

1177. Krisdinamuririn, Y. 1970. Kumpulan beberapa resep masakan dengan tepung kedele [A collection of recipes using soy flour in cooking]. Bogor: Balai Penelitian Gizi Unit Sembodja, Departemen Kesehatan RI (Sembodja Nutritional Research Unit, Ministry of Health). 26 p. [Ind]* Address: Bogor, Indonesia.

1178. Abehsera, Michel. 1970. Cooking for life. Swan House, P.O. Box 638, Binghamton, NY 13902. xiv + 364 p. First Avon Flare Books printing, March 1972. Index. 21cm.
• ***Summary:*** Contains many imaginative and joyous macrobiotic recipes. The author uses the term "black beans" and from his definition on page 18 it seems that he is referring to black soybeans: "Black Beans, twin brothers of the red aduki in size, are sold in Chinese, Japanese and natural-food stores. They are the milk and honey of the bean family, and their flavor and texture impart a delightful sweetness and richness to any soup or vegetable dish." No definition is given of soybeans. In the section titled "Condiments" (p. 20-21), the author defines soya sauce, miso, seitan, salted plums, tofu, kuzu, etc. "Tofu is another name for soya-bean curd. In Chinatown, you'll see it in wooden barrels. It looks like Feta Greek Cheese and some people would swear it tastes like chicken. It is excellent served with sauteed vegetables, sauces, fried or cooked in Miso Soup.

"Seitan: Your guests will almost certainly mistake this for meat. Teeth find it pleasant to chew. A combination of wheat gluten, wheat soya beans [sic], water and salt, it comes in handy when mixed with vegetables, sauces and soups." Note 1. No recipe for making or using seitan appears in this book.

Soy-related recipes include: Cooking beans in a pressure-cooker (p. 66; "Do not pressure cook black beans. Their skins may come off and clog the pressure cooker spout. It is quite dangerous!"). Cooking beans in a pot (incl. soya beans, p. 67). Black-bean stew (with miso, p. 70). Soja jardiniere (with whole soya beans and miso).

In the chapter titled "Soups," the author tells the story of how the famous Japanese physician, Dr. Tatsuichiro Akizuki, used miso to strengthen his constitution and to survive the atomic bomb dropped on Nagasaki on 9 Aug. 1945. Under "Minerals" in that chapter he discusses other virtues possessed by miso, then gives a recipe for Miso soup (p. 86).

Radishes sauteed in miso (p. 114). Sandwich au gratin (with miso spread, p. 114). Macrobiotic marbles (with miso, p. 155). Claudia's pizza (with miso, p. 158). Salade au cresson (with miso, p. 169). Nato [sic, Natto] (Japanese salad with natto, p. 171; Note 2. The author describes "Nato" as "sour soy-beans, bought in a Japanese store"). Miso sauce (p. 178). Miso spread (with tahini, p. 187). Oat-miso spread (p. 188). Scallion spread (with miso, p. 188).

Miso pâté (p. 189). Komoku (with tofu, deep-fried and cut into strips, p. 212). O'Sushi (with tofu, p. 217). Kasha à l'Orientale (with tofu, p. 220). Bi-Cuan (Vietnamese recipe with fried tofu, p. 226). Kagetsu ice cream (with fine soya powder [perhaps Jolly Joan from Ener-G foods in Seattle], p. 334; "Kagetsu is a beautiful restaurant in Seattle"). Yellow pompidou (with soya bean powder, p. 336).

"Ten years ago I was a sick man, struggling to stay alive and to finish a novel. I suspected I might fail in both matters and the doctors of Paris agreed. They abandoned me as a hopeless case. It was then that I discovered a way of life called Macrobiotics. After a year of eating grains and vegetables, my health restored, I ventured to New York to discover America and finish my novel."

Note 3. *Webster's Dictionary* (1985) defines feta, a word first used in English in 1940, as "a white semisoft Greek cheese made from sheep's or goat's milk and cured in brine." Address: New York.

1179. Claudio, Virginia Serraon; De Leon, Sonia Yuson. 1970. Dictionary of foods (rev. and illustrated). Manila, Philippines: G.M.S. Pub. Corp. 249 + [9] p. Illust. 25 cm. *

1180. Hardjohutomo, Harsono. 1970. Pengganti tempe bongkrek [Substitutes for tempeh bongkrek]. Jakarta: Penerbit Pradnja Paramita. 31 p. 18 cm. [Ind]
Address: Dosen Fakultas Perikanan, Institut Pertanian Bogor, Indonesia.

1181. Leng, Earl R. 1970. Summary report, Coordinated Research Project (soybeans), University of Illinois–USAID–India, April 1, 1967-June 30, 1969. Urbana-Champaign: University of Illinois, College of Agriculture. 38 p. Unpublished typescript. 28 cm.
• ***Summary:*** Contents: Summary. General objective. Organization and staffing. Variety trial results [soybeans in India] *(Kharif* season trials), *(Rabi* and "spring" trials). Date of planting studies. Plant population and spacings. Fertilizer trials. Inoculant trials and problems. Diseases and their control. Insect pests and their control. Weeds and weed control. Economics of production and marketing. Utilization. Seed importation, increase, and production. Seed quality problems. Breeding and genetics. Conferences. Future plans.

Note: "The Program for International Research, Improvement and Development of Soybeans (PIRIDS) was established in 1969 at the University of Illinois. It operates as part of the Office of International Agricultural Programs in the College of Agriculture. Dr. Earl Leng was Program Director of PIRIDS since its inception. USAID is the U.S. Agency for International Development.

Source: University of Illinois at Urbana-Champaign (UIUC) archives. 8/1/44 Agriculture, Dean's Office, Box 4, Leng. Address: CRP Coordinator and Program Director, PIRIDS, Univ. of Illinois, Urbana-Champaign, Illinois.

1182. Robeau, Alec. 1970. Cooking the Indonesian way. New South Wales: A.H. & A.W. Reed. 160 p. Index. 21 cm.
• ***Summary:*** The Introduction has good, long definitions of many Indonesian ingredients including: Ketjap, ketjap manis, soya beans, tahu (tofu, and how to make it at home), taotjo ("These are salted soya beans and are readily available in all Chinese stores and shops"), tempe [tempeh].

Soy-related recipes include: Sajur oblok (Smoked fish and vegetable dish, with ¼ lb diced tempe, p. 34-35). Sajur gudek (Spiced vegetables and jackfruit dish, with ¼ lb diced tempe, p. 37). Sajur kangkung (Spiced watercress, with ¼ lb diced tempe, p. 38). Tahu Surabaja (Fried soya bean cakes with vegetables, with ½ lb diced tofu, p. 46). Kuah sate II (Spiced peanut sauce (with ketjap), p. 52). Babi ketjap (Pork in soyabean sauce, with 3 tablespoons soy sauce, p. 74-75). Sambal taotjo (Spiced chilli paste with taotjo, p. 119). Tempe goreng (Fried tempe, p. 128. Serve as a snack or side dish).

1183. Steinberg, Rafael. 1970. Pacific and Southeast Asian cooking. New York, NY: Time-Life Books. 208 p. Illust. (color photos). Index. 28 cm. Series: Foods of the World.
• ***Summary:*** A superb book filled with beautiful recipes, text, and color photos. Accompanied by a 128-page spiral-bound book of recipes. Bean curd [tofu] is mentioned on pages 74 (in Indonesian *gudeg)* and 172 (in Vietnamese soup).

Recipes that call for *ketjap manis* (Indonesian sweet soy sauce) are Broiled skewered marinated chicken (Saté ajam, with 2 tablespoons *ketjap manis,* p. 88) and Spiced peanut sauce (Katjang saos, with 1 tablespoon *ketjap manis,* p. 93). The actual recipe for "Ketjap manis (Indonesian sweet soy sauce)" on page 106, which makes about 1 quart, calls for: 2 cups dark brown sugar, 2 cups water, 1½ cups Japanese soy sauce, 3/4 cup dark molasses, ½ teaspoon ground *laos,* ½ teaspoon ground coriander, and ½ teaspoon freshly ground pepper.

The very interesting headnote states: "The ubiquitous American tomato ketchup, or catsup, gets its name but not its ingredients from the Malayan 'kechop' (in Chinese 'ketsiap') which originally was a pickled fish brine."

1184. Sundhagul, Malee; Smanmathurapoj, Puangpen; Bhodhacharoen, Wanchern. 1970. Thua-nao: A fermented soybean food of northern Thailand. I. Traditional processing method. Bangkok: Applied Scientific Research Corp. of Thailand (ASRCT). 14 p. Traditional Processing Method, Research Project No. 38/3. 30 cm. [8 ref]
• ***Summary:*** Contents: Summary. Introduction. Materials and methods: Microbiological methods. Results and discussions. Microbiology of natural fermentation. Keeping

quality of thua-nao. Chemical composition and nutritional value. Conclusions.

This study is part of the Research Project No. 38/3 (Soybean protein preparations), which aims at developing processes for making soybean, which is a high-protein source, more readily available in a stable and acceptable form in order to provide suitable material for protein food formulation.

Summary: The fermentation was found to be caused by Gram-positive spore-forming bacilli, *Bacillus subtilis.* Two strains were isolated. The product was prepared as dried chips to extend the shelf life.

During a study on the distribution and consumption of fermented fish in Thailand, it was learned that several villages in Northern Thailand, where fish is scarce, make a fermented soybean product called thua-nao, which is used like fermented fish. It adds flavor to vegetable soups and hot [spicy] dishes. In some areas the product had become an article of diet in its own right, not merely a flavoring agent.

Thua-nao was prepared by researchers as follows: Cook whole dry soybeans in boiling water for 3 hours, then drain. Weigh 40 gm into various petri dishes and autoclave for 40 minutes. Cool to room temperature, then inoculate with a pure culture of the bacteria. Incubate at 35ºC for 48 hours.

In Thailand, thua-nao is prepared and consumed mostly in Lampang and Lamphun, two northern provinces. The following method is used. Wash 1-2 kg of whole dry soybeans in clean water. Place in a large cooking pot with excess water and boil until thoroughly cooked–typically 3-4 hours. Add water during cooking if necessary to keep the water level well above that of the beans. The beans are considered cooked when they can be easily crushed between the fingers. Drain and transfer to a bamboo basket lined with banana leaves. Cover with additional banana leaves to prevent loss of moisture or mold contamination. Allow the beans to undergo natural fermentation at room temperature for 3-4 days until they are thoroughly soft in texture, and turn into a thick paste when lightly crushed between the fingers. They should be covered with a sticky, viscous, colorless material and accompanied by a pungent odor of ammonia. Fermented beans are considered spoiled if they are heavily contaminated with mold or if they give off a sour, rancid, or putrid smell, sometimes accompanied by a yellowish slimy material. Fermentation could be shortened to about 2 days if the basket containing the cooked beans is placed in the sunlight during the day or kept in a warm place during the fermentation.

The characteristic beany flavor disappears after fermentation and the color of the soybeans changes from light brownish yellow to greyish brown. Over-fermentation of the beans results in much darkening of the beans which is considered a sign of poor quality. Under-fermentation results in a product which is too hard.

After fermentation the thua-nao is mashed lightly into a paste. Salt and, sometimes, other flavoring agents such as garlic, onion, and red chili peppers are ground into the paste. Small portions of the paste are then individually wrapped in banana leaves. These are cooked (either by steaming at atmospheric pressure or roasting over an open fire) before selling or eating.

Cooked thua-nao paste can be kept for about 2 days under normal conditions. For longer storage: Form the thua-nao paste into small ball of 1-1½ inches in diameter. Press these to form thin chips, then sun-dry them. Dried chips may be kept for several months without spoilage. A flow sheet (p. 6) shows these two methods of traditional processing.

Analyses of raw fermented beans showed a mean bacterial count of 5.2 billion cells/gm, mean moisture content of 62.0%, and mean pH of 8.4. Seven different types of bacteria were isolated. Those responsible for the fermentation were *Bacillus subtilis.* Thus the product is closely related to Japanese natto.

Note: This is the earliest document seen (Dec. 2001) concerning thua-nao. Address: Bio-Technology Group, Technological Research Inst., ASRCT, Bangkok, Thailand.

1185. Varangoon, Pivan. 1970. Development of village scale beverage, coco-soya milk. Bangkok, Thailand: ASRCT Research Project No. 38/9, Report No. 7. 15 p. [3 ref]

• ***Summary:*** Contents: Foreword. Summary. Introduction. Materials and methods. Results and discussion. Ingredients cost. Conclusions. Acknowledgements. References. Appendixes I and II.

"Surveys in Thailand have shown that there is protein malnutrition in many places. Soybean is an important crop available in this country and a good source of protein." Coconut is very popular in Thai cookery for its good flavor.

Mr. Cyril Hunnikin of UNICEF suggested the ideas of combining soymilk and coconut and envisioned the possibility of making it on a village or home scale.

Two formulas for the soymilk are given: (1) Whole dehulled boiled soybeans are used. (2) The milk is extracted from whole soybeans using the "boiling water grind technique," developed by the Food Technology Group at Cornell Univ. (Bourne 1970). Address: Tech. Research Inst., ASRCT, Bangkok.

1186. Robinson, W.B.; Bourne, M.S.; Steinkraus, K.H. 1971. Development of soy-based foods of high nutritive value for use in the Philippines. *National Technical Information Service. U.S. Department of Commerce.* PB-213-758. iv + 100 p. Jan. 31. 28 cm. (Washington, DC). Agency for International Development, Contract AID/csd-1815. [29 ref]

• ***Summary:*** Contents: Introduction. Results in the Philippines: Personnel, the Food Science pilot plant, laboratory studies on soy milk, pilot plant studies on soy milk production, acceptability of soy milks produced in the pilot plant, effect of alkali soaks and alkali addition on flavor acceptability of soy milks, variety trial, tests on soy milk by commercial firms, storage stability of soy milk, other soybean products, quick-cooking mungo beans, coconut milk beverages, coconut protein studies, concentrated coconut water, the future of soymilk research at Los Baños, extension activities. Engineering studies: Grinding, liquid-solids separation, spray drying, concentration of soy milk. Nutritional studies: Complementary and/or supplementary effect of various food proteins, effect of soaking soybeans in NaOH [sodium hydroxide] solutions on flavor and nutritional value, flavor and nutritional attributes of roasted soybeans, utilization of the residue from soy milk manufacture, nutritional value of several soybean varieties. Chemical and physical investigations: Identification of a volatile component in soybeans that contributes to the raw bean flavor, effect of processing methods on off-flavors of soybean milk. Volatile flavor components of coconut meat, effect of physical and chemical processing factors on the redispersibility of dried soy milk proteins, evaluation of monosaccharides, disaccharides, and corn syrups as dispersants for heat-processed dried soy milk proteins, removal of oligosaccharides from soy milk by an enzyme from *Aspergillus Saitoi,* an enzymatic process for a nutritional beverage based on soybean protein and lemon juice. Address: Dep. of Food Science and Technology, New York State Agric. Exp. Station, Geneva, New York.

1187. Bourne, Malcolm C. 1971. Production, acceptability, and nutrition aspects of soy beverages in the Philippines. Paper presented at the meeting on "Potentials for soy beverages in the Philippines" U.P. College of Agriculture, January. 11 p. [1 ref]

• ***Summary:*** An excellent summary, with some history. "About ten years ago the Food Technology Group at Cornell University under the leadership of Dr. D.B. Hand became interested in the soybean as a rich source of low-cost protein. They quickly came to the conclusion that soymilk provided a god vehicle to bring a nutritious, low cost protein food to people in developing countries but that the bad flavor of soymilk was the principal obstacle to its widespread acceptance. A lengthy study of the chemistry, biochemistry and nutritional value of the soybean was initiated. In 1967 the Office of the War-on-Hunger of the U.S. Agency for International Development supported this research program with a grant which enabled the tempo of the research to be greatly increased. When Dr. Hand retired, Dr. W.B. Robinson became the Director of the team working on this project.

"One member of the Cornell team, Dr. K.H. Steinkraus, who was Associate Director of the project, came to Los Baños in 1967 and initiated an important section of the research program, namely to develop a product under Philippine conditions that was highly acceptable to the Philippine palate." A "research project was started and a pilot plant for making soymilk was established in temporary quarters in the Agricultural Chemistry building. Dr. Steinkraus and his group conducted acceptability studies with 6th grade Filipino children in several schools in this area. In this study they found that it was necessary to add sugar to the soymilk in order to make it acceptable to Filipino schoolchildren and that 7% sugar was the optimum level. They found that the addition of vanilla flavoring improved acceptability Ninety five per cent of the children said they liked a formulation containing 7% sugar with added vanilla flavoring. The addition of chocolate flavoring increased acceptability to 96%." The Steinkraus group "also found that 5% coconut milk incorporated into soymilk containing 9% sugar made a good product with a 96% acceptability. Soymilk frozen in plastic bags in 60 ml. portions was very acceptable to the children as an ice candy."

"Dr. Bourne took Dr. Steinkraus' place as leader of the Los Baños group when Dr. Steinkraus returned to Cornel in June 1969 and continued the research program..." Address: College of Agriculture, Univ. of the Philippines, Laguna, Philippines (Visiting Prof.).

1188. *Christian Science Monitor.* 1971. Indonesian flavors furnish variety in Southeast Asian cookery. Feb. 23. p. 10.

• ***Summary:*** This is a book review of *Art of Indonesian Cooking: The ABC's,* by Agnes de Keijzer Brackman (Singapore). "Mrs. Brackman points out that the word 'ketchup' is derived from the Malay word for soya sauce, 'ketjap.'" In the West, however, ketchup now uses tomatoes as its main ingredient.

recipe for "Spicy soya sauce–Sambal ketjap" has as its main ingredient "4 tablespoons sweet soya sauce"–along with red chili, tamarind juice, and fried onions.

1189. Smyth, Jeannette. 1971. Stores do a healthy business in natural food. *Washington Post, Times Herald.* Feb. 28. p. 1291.

• ***Summary:*** The health food industry is divided into two categories: (1) Those the young people call "the pill stores," which sells mostly pills and supplements, not much food. They have been around for decades. (2) The newer natural food stores, run mostly by young people of today's counter-culture, who sell mostly foods and beverages. These stores are based on the philosophy of living in harmony with nature, rather than trying to conquer Nature. Oliver, Cheri, and Krispin are members of the collective which runs

Beautiful Day, a natural foods store in College Park, Maryland.

"Bill Beal tries to eat raw fruit and vegetables because cooking, he says, reduces their nutritional value. A typical day's breakfast is cottage cheese of tofu (soy bean curd), mixed with home-made yogurt, brewer's yeast, wheat germ, dark molasses, and fruit–dried or fresh." Note: This article, with two photos, is written in an unsympathetic tone.

1190. Horan, F.E.; Odell, A.D.; Forman, M.J. 1971. Textured vegetable proteins. *PAG Bulletin* 2(1):22-26. Winter. No. 13.

• ***Summary:*** This paper was compiled from background documents presented by the authors at the 18th PAG [Protein Advisory Group] meeting held on 9-12 Feb. 1971 at Rome, Italy. Contents: Introduction. Spun monofilament products. Extrusion-expansion products (currently marketed at about $0.45/lb). General considerations. Case studies: Thailand (ADM's TVP), Brazil (Swift & Co.'s textured meat analogs), India (Swift & Co., ditto). Textured vegetable protein products: Fibroprotein–Spun Protein Fibers (Worthington Foods Div., Ohio), Textured Edi-Pro (Ralston Purina Co., Missouri), Texgran (Swift & Co., Illinois), Bontrae (General Mills, Minnesota; spun vegetable protein products), Carne Vegetal (Industria e Comercio de Productos Alimenticios Vegetal Ltd., Brazil). LiveLong–VP (Nisshin Flour Milling Co. Ltd., Japan; a wheat gluten extract in the form of a dried or frozen mincemeat-like product. "It seems to be made by a filament extrusion process using isolated wheat gluten protein"). The Farmarco Co. (Far-Mar Co., Kansas), The Fuji Oil Co. (Japan; thermoplastic extrusion), and Shefa Protein Foods Ltd. (Israel) each manufactures texturized soy food products by thermoplastic extrusion.

Introduction: "The chief virtue of the individual members of this new class of foods rests in their ability to supply precisely reproducible balanced dietary inputs of essential amino acids with greatly enhanced agronomic efficiency and with high consumer acceptance... At the moment two broad classes of meat analogues are apparent. The extrusion–expansion products sell for US 10-15¢ per pound; the spun monofilament products sell at present in the USA for 20-25% less than meats, but are still too expensive to be of interest for developing countries."

"General considerations: Meat analogs do not appear to have a negative connotation to vegetarians; there are many examples of eager acceptance of meat analogs by such groups. The textured protein approach is also a stride forward in food efficiency, since conversion of soy to animal protein averages about 7% efficiency."

"Over the past few years US/AID has entered into contracts with twelve different U.S. commercial companies to investigate and evaluate low-cost proprietary protein products in some ten developing countries."

Note: This is the earliest English-language document seen (Dec. 2004) that uses the word "Fibroprotein" to refer to edible spun soy protein fiber. Address: 1. ADM, Decatur, Illinois; 2. General Mills, Minneapolis, Minnesota.

1191. Spilsbury, Calvin C. 1971. Markets for U.S. soybeans and soybean products in Asia and Oceania. *USDA Foreign Agricultural Service.* FAS-M 227. 27 p. Feb.

• ***Summary:*** Contents: Introduction. Hong Kong: The market for soybeans and soybean products, marketing problems. Indonesia: Production of oil-bearing materials, prospects. Korea (South): Domestic oilseed production, the oilseed crushing industry, use of soybeans for food, use of soybeans for feed. The Philippines: Domestic soybean production, the crushing industry, poultry and mixed feed industries. Singapore and Malaysia: Soybean crushing, shipping, feed production and use. Australia: Domestic soybean production, production of other oilseeds, oilseed crushing industry, mixed feed and poultry industries, margarine. New Zealand: Domestic oilseed production, feed situation and imports. Address: Fats and Oils Div.

1192. Anderson, Earl V. 1971. The new priorities. Food: Preventing hunger and malnutrition. *Chemical and Engineering News* 49(10):19-22. March.

• ***Summary:*** This special report looks at new opportunites for chemists and chemical engineers in three areas: food, shelter, and health. Technology can help in solving the problems of world hunger and malnutrition. FAO "estimates that 2 billion people are hungry or undernourished, including several million Americans." USDA's Aaron M. Altschul believes that food technology, properly directed, can help solve these problems. In addition to the Green Revolution, there has been "the other Silent Revolution of this century,"... the explosive growth in our knowledge of foods and nutrition, and in the ability to engineer foods.

The emphasis has been on protein foods "because protein deficiency is the most universal nutritional problem... Of the 82 million tons consumed in the world, only 25 tons [31%] come from animal sources." Most of the animal protein is consumed by the 1 billion people in developed countries.

Protein deficiencies can be overcome by fortifying grains or natural protein concentrates–as from soybeans–with amino acids such as lysine. Or we can use new techniques for converting "inexpensive vegetable proteins into textured foods that look and taste much like the more expensive animal foods. Products have been made from vegetable protein that closely resemble beef, chicken, seafood, ham, and bacon. They cost less than the real thing yet they are nutritious and attractive. Such products from textured soy already are being widely marketed in the U.S., western Europe, and Japan. In time they may become new protein sources in the less-developed countries.

"In fact, AID now is sponsoring studies of textured products in less developed countries. Archer-Daniels-Midland is conducting one in Thailand and General Mills in Pakistan."

But what should we call these new products? You can't call it meat because it isn't. "You can call it soybeans because nobody would buy it. These products have been called animal protein food analogs... But that's not a marketable name either. The name that industry and the Government seem to be settling on is textured protein products (TPP)." The FDA has proposed a standard for TPP.

"Vitasoy, a soybean soft drink that has been sold in Hong Kong for 25 years, has captured 25% of the soft drink market there." Based on that success, "Monsanto is marketing a soy protein beverage called Puma through a franchiser in Guyana. It is now the second most popular soft drink in the country (Coke is first). Coca Cola, meanwhile, is marketing a fruit-flavored beverage, Samson, in Dutch Guiana (Surinam).

"So far, soybeans are the major source of vegetable proteins used in food fortification and TPP products."

Also discusses: Cottonseed protein, proteins from peanuts, sunflower, and safflower seeds, fish protein concentrate (FPC), and single-cell protein from petroleum, computer controlled food processing lines, etc.

Photos show: (1) A line spinning soy protein fibers in a liquid bath, tended by a man in a white hard hat. (2) A black boy drinking Puma in Guyana. (3) "British Petroleum's protein-from-petroleum plant at Grangemouth, Scotland." It produces 4,000 tons/year of animal-grade protein by fermentation of Candida yeasts on a petroleum substrate. Address: Senior Editor, New York City.

1193. Kaw, Ram Nath; Menon, P. Madhava. 1971. Variability of agronomic characters in soybean *(Glycine max* (L.) Merrill) at Coimbatore, S. India. *Madras Agricultural Journal* 58(4):281-90. April. [12 ref]
• ***Summary:*** "The data reported herein were collected from two sets of field plantings of 37 varieties from U.S.A. (22), Australia (7), Thailand (3), India (2), S. Africa (1), Nigeria (1) and China (1). The experiment was laid out in the Central Farm, Agricultural College and Research Institute, Coimbatore (11ºN) during 1969-70..." Address: 1. Senior Research Fellow; 2. Prof. of Genetics. Both: Div. of Genetics, Agricultural College and Research Inst., Coimbatore, Tamil Nadu, India.

1194. Krishnaswami, R. 1971. Introduction and evaluation of soybean varieties in Tamil Nadu. *Madras Agricultural Journal* 58(4):297-300. April. [3 ref]
• ***Summary:*** "A world collection of soybean germplasm consisting of 662 cultures was obtained and the material was screened at Coimbatore in 1968." Tables show: (1) Relative performance of some of the soybean genotypes adapted to Tamil Nadu. Of the five tested, three came from Thailand and two from Australia. The highest yield was 3,776 kg/ha. (2) Performance of some soybean genotypes in two different seasons at Coimbatore. The first sowing was done in March (summer) and the second in July *(kharif).* Of the five tested, two came from Australia, one from Italy, one from the northern USA (Clark-63), and one from the southern USA (Improved Pelican). A variety from Australia, grown during the summer, gave the highest yield. Address: Research Inst. Regional Station (IARI), Coimbatore-3, Tamil Nadu, India.

1195. Hansen, Barbara. 1971. Interest in Asia carries into Kitchen. *Los Angeles Times.* May 20. p. J16.
• ***Summary:*** Rosemary Brissenden, an anthropologist from the Australian National University at Canberra, has written a book (a work of love) titled "Joys and Subtleties," about the foods and cookery of Southeast Asia, especially Indonesia, Malaysia, Singapore, and Thailand. In 1957 she "spent three months in Java and Bali with a student delegation from Australia." They lived with Indonesian families and ate their food. The recipes in her book "are as authentic as close observation of cooks at work could make them." Moreover they call for the same ingredients used by the Indonesian cooks, such as Javanese soy sauce, coconut milk, laos [a root], lemon grass, trasi, tamarind, and curry leaves. These are now available in most big cities, mainly at Chinese markets.

Ms. Brissenden and her husband are just finishing a six month stay in Los Angeles.

1196. Perkins, Louise. 1971. Soybeans spearhead record U.S. farm sales to Japan. *Foreign Agriculture.* Aug. 30. p. 5-6.
• ***Summary:*** Since the mid-1960's Japan has been the top dollar market for U.S. agricultural exports. Australia has ranked first among U.S. competitors in agricultural trade, followed by Japan, since 1965. Canada, Mainland China, Mexico, and Thailand all contribute to Japan's soybean imports.

1197. Samsudin, -. 1971. Some aspects of children nutrition in Indonesia. Lecture presented at Workshop on Nutrition. Held Aug. 28 at Vienna. *
• ***Summary:*** Protein-calorie malnutrition was found in 30 to 50 percent of Indonesian children between the ages of 1 and 3 years. Kwashiorkor, a severe protein-calorie deficiency disease, was found in 1 to 2% of hospitalized children, with a peak incidence occurring in the 12 to 16 month age group. Address: Indonesia.

1198. Harlan, Jack R. 1971. Agricultural origins: Centers and noncenters. *Science* 174(4008):468-74. Oct. 29. [48 ref]

• ***Summary:*** "Agriculture may originate in discrete centers or evolve over vast areas without definable centers. For nearly half a century the charisma of N.I. Vavilov and the elegant simplicity of his methodology have dominated theories and concepts about the origin of cultivated plants. To be sure, it has long been known that a center of diversity is not the same as a center of origin. Using the concept of maximum diversity, Vavilov established eight "centers of origin." P.M. Zhukovsky, an associate of Vavilov, enlarged and added to Vavilov's centers.

"I propose a theory that agriculture originated independently in three different areas and that, in each case, there was a system composed of a center of origin and a noncenter, in which activities of domestication were dispersed over a span of 5,000 to 10,000 kilometers." One system, applicable to the soybean, includes a North Chinese center and a noncenter in Southeast Asia and the South Pacific. Address: Prof. of Plant Genetics, Crop Evolution Lab., Dep. of Agronomy, Univ. of Illinois, Urbana 61801.

1199. Spicer, A. 1971. Synthetic proteins for human and animal consumption. *Veterinary Record* 89(18):482-87. Oct. 30.

• ***Summary:*** Microbial protein can be textured into meat-like strands. "As regards the Eastern world, microfungi are extensively used in the processing of soya beans to make them suitable human food products. Miso and tempeh are but two examples. The average Indonesian eats 154 gm per day of tempeh, thus consuming several grams of *Rhizopus* in his daily diet." Address: The Lord Rank Research Centre, High Wycombe, Bucks, England.

1200. Sastroamidjojo, M.S.A. 1971. An answer to world food crisis? *ANU Reporter (Australian National University)* 2(19). Nov. 26.

• ***Summary:*** "Mr. Setiadji Sastroamidjojo, a Colombo Plan student doing a PhD in physics, believes that commercial food producers are neglecting their responsibility by not taking up the large-scale production of tempeh, a soya-bean based food used by Indonesian people for the past 2,000 years.

"Mr. Sastroamidjojo believes that tempeh, if produced on a large enough scale and distributed throughout the underdeveloped areas of the world, could save countless thousands of people from hunger and possible starvation.

"Until recent years there have been problems of heat transference associated with the commercial production of the food, but Mr. Sastroamidjojo believes he answered these problems in his own research on the subject, the findings of which were published in Japan last year." He believes "that a wheat-based tempeh will be more acceptable to the people of western nations. He sees Australia as an excellent country in which to establish the commercial manufacture of tempeh." It has a surplus of wheat, is close to the obvious markets, and could develop sophisticated, automated process that would allow low-cost, large scale production. "Once the industry was established, Australia would not only be able to export dried tempeh but would be able to export the 'know-how' of its manufacture so that Asian and African countries may benefit." A total of 20 intestinal bacteria are said to be inhibited by tempeh. "Indonesians recognize it as a medicine for dysentery."

1201. Hermana, -; Roedjito, Sri Wismaniah. 1971. Pembuatan laru tempe dan pengamatan kekuatannja selama penjimpanan [Preparation of tempe mold inoculum and observation on its activity during storage]. *Penelitian Gizi dan Makanan (Research on Food and Nutrition)* 1:52-60. [5 ref. Ind]

• ***Summary:*** Methods of preparing 3 kinds of tempeh starter are described. The best is that made by growing tempeh mold inoculum on rice. Its activity did not decrease when it was stored in a closed container at 25* C for 6 months. Address: 1. Balai Penelitian Gizi (Nutrition Research), Unit Jl. Semboja, Bogor; 2. Bag. Gizi dan Makanan, Dep. I.K.K., Faperta, I.P.B., Bogor.

1202. Na Lampang, A. 1971. [More soybean per rai in the paddy field]. *Kasikorn* 44(5):415-26. [Tha; eng]*
Address: Dep. of Agriculture, Bangkok, Thailand.

1203. Black, Patricia Hall; Carey, Ruth Little. 1971. Vegetarian cookery. 5 vols. Mountain View, California, Omaha, Nebraska, and Oshawa, Ontario, Canada: Pacific Press Publishing Assoc. Illust. by Henry Rasmussen. Recipe index. 24 cm.

• ***Summary:*** These are lacto-ovo vegetarian cookbooks. "Most of the recipes in these cookbooks have been collected over many years. Some came from association in years past with Paradise Valley Sanitarium and Hospital and with White Memorial Hospital; others came from more recent association with Loma Linda University." The complete nutritional composition of each recipe is given in that back of each book. Note 1. Monosodium glutamate is used in many recipes (For explanation, see Introduction to each volume). Other interesting meaty seasonings include Savorex, Smokene, and G. Washington Broth. Apparently generic names for meatlike products are used ("gluten burger" rather than "Gluten Burger") when more than one Adventist company makes such a product.

Contents: Vol. 1. Appetizers, beverages, salads, dressings and relishes, cooking guides. Vol. 2. Breads, soups, sandwiches. Vol. 3. Main dishes, vegetables. Vol. 4. Pies, cakes, cookies, desserts. Vol. 5. Exotic foods, candies, cooking for a crowd.

Soy- and gluten-related recipes include: Vol. 1: Nut and Soyameat pinwheels (with light Soyameat, p. 16-17). Soyameat puffs (with canned Soyameat, p. 17). Soybean

milk (homemade, p. 30). Green beans and gluten salad (p. 37; Skallops [also spelled Scallops, gluten based] or Soyameat may be substituted for diced gluten). Chop suey salad (with Soyameat, or light or dark nutmeat, p. 44). Note 2. This is the earliest vegetarian or health food cookbook seen (June 2004) with "Appetizers" as one of the recipe categories.

Vol. 2: Whole wheat soy bread (with soy flour, electric mixer recipe, p. 15-16; Sponge method, p. 17). Soy cheese spread (with canned tofu, p. 44). Soy cheese and egg filling (with tofu, p. 44). Gluten spread (with canned gluten burger, p. 45). Hot burger sandwich patties (with canned gluten burger, p. 46). Hot gluten sandwich (with canned gluten steaks, p. 46). Hot savory sandwich (with Proast or other nutmeat, p. 47). Nutmeat and olive filling (with Proteena or Nuteena, p. 47). Savory Soyameat filling (p. 48). Soyameat and egg filling (with light Soyameat, p. 48). Soyameat, nut and olive filling (p. 48). Grilled gluten sandwiches (p. 52).

Vol. 3: Homemade gluten (. 15). Gluten roast (p. 15). Gluten burger loaf (with canned "gluten burger," p. 16). Primeburger loaf (with Primeburger [gluten], p. 16-17). Normandy loaf (with Proteena, p, 17). Walnut Proteena roast. Holiday roast (with gluten burger). Oatmeal herb loaf (with Vegeburger, p. 18). Nut roast (with Proteena, p. 21). Cashew nut and gluten loaf (p. 22). Seaside loaf (with Soyameat, p. 23). Ocean fillets (with Soyameat, p. 23). Soy soufflé burger (with dry soybeans, p. 24). Savory soy loaf (with canned soy cheese [tofu], p. 24). Soy cheese (or tofu) loaf (p. 24). Tofu loaf (no eggs, p. 25). Tofu (or soy cheese) patties (p. 25). Browned tofu with mushrooms (p. 25). Nuteena balls (p. 26). Basic gluten balls (p. 26). Nutmeat and rice patties (with Proteena and Nuteena, p. 31). Cottage cheese gluten burgers (p. 31). Chum la King (with Vegesteaks, p. 33). Stroganoff (with canned Soyameat, p. 34). Gluten stroganoff (with canned gluten or Soyameat, p. 34). Savory gluten casserole (with canned Chickettes or other gluten preparation, p. 35). Scalloped Soyameat (with light or dark Soyameat, p. 36). Gluten steaks deluxe (with canned gluten steaks, p. 37). Gluten steaks with mushrooms (p. 37). Shish kebab (with gluten steaks or Tender Bits [made of gluten], p. 37-38). Hearty soybean casserole (with canned Zoyburger, p. 42). Garbanzo and cottage cheese loaf (with Vegeburger, p. 44). Stuffed green pepper (with canned Vegeburger, p. 46). Oriental rice casserole (with gluten or Chickettes, p. 49-50). Chop suey (with fresh tofu, p. 51). Quick chop suey or chow mein (with canned Soyameat, p. 51). Spaghetti marzetti (with canned Vegeburger and Smokene, p. 56). Lasagna (with gluten burger, p. 57). Tetrazzini (with canned white Soyameat, p. 57). Quick eggs Benedict (with beef-style smoked Soyameat, p. 61-62). Eggs con burger (with gluten burger, p. 62). Eggs Vienna (with 6 vegetable wieners, p. 63). Baked soybeans (p. 80). Soybeans creole. Soybeans southern style.

Vol. 4: Soy nut cookies (with 1 cup soy flour, p. 97). Vol. 5: Gluten stew (p. 14). Spanish gluten (p. 14). Gluten nut loaf (with canned gluten burger, p. 16). Ocean fillets (with gluten and Soyameat). Browned tofu (p. 22). Chop suey (with soy cheese [tofu], p. 23). Soy cheese patties (with canned tofu, p. 23). Gluten burger sandwiches (p. 31). Chinese sweet-sour gluten (with canned gluten steaks, p. 41). Sweet-sour Tender Bits (with canned Tender Bits or other gluten preparation, p. 42). Chinese evergreen tofu (p. 42). Japanese sukiyaki (with canned gluten, Tender Bits, or Scallops, p. 45). Scrambled tofu (p. 46). Philippine adobo (with gluten, Tender Bits, or Scallops, p. 48). Philippine gluten curry (p. 49). Philippine gluten escabeche (p. 49). Korean seasoned gluten (with canned gluten, p. 50). Indian gluten curry (with canned gluten, p. 52). Kurma (Indian, with Soyameat, p. 53). Soyameat Indian curry (with canned light Soyameat, p. 53-54). Brazilian Palmito soy loaf (with canned or cooked soybeans, p. 57). Brazilian-style gluten (p. 57).

Can sizes: Chickettes (20 oz). Gluten (14 oz or 20 oz). Gluten burger (14 oz, 28 oz, or 30 oz). Gluten steaks (14 oz). Nuteena (14 oz.). Primeburger (20 oz). Proteena (14 oz). Scallops (14 oz). Soyameat (9 oz or 13 oz). Soyameat, white (13 oz). Soy cheese (12 oz or 14 oz; tofu). Tender Bits (20 oz). Vegesteaks (14 oz). Zoyburger (19 oz). Address: 1. M.S.; 2. PhD.

1204. Brissenden, Rosemary L. 1971. Joys and subtleties: South East Asian cooking [1st American ed.]. New York, NY: Pantheon Books. A Div. of Random House. 262 p. Index. 19 cm.

• ***Summary:*** Contents: Acknowledgements. A note on this American edition. Weights and measures. 1. Introduction to South East Asian food. 2. Utensils, methods, ingredients, glossary. 3. Indonesia. 4. Malaysia and Singapore: Malay, Chinese, Indian, Miscellaneous Malaysian. 5. Thailand.

Ingredients include (p. 35-36): Monosodium glutamate (use sparingly), soya bean curd (incl. "dried bean curd [yuba], used only in Chinese cooking, comes in flat sheets or in twists"), soya sauce (the 3 types used in this book are light, dark {which is thicker and heavier}, and Javanese {which is sweet and very thick}. It is "sometimes available in bottles called Ketjab Manis [Ketjap Manis], or Ketjap Benteng, under the label of Conimex"). A recipe is given for Javanese soya sauce containing dark soya sauce, molasses, and brown sugar.

A table (p. 40) gives the name for 3 soyfoods in English, Indonesian, Malay, Chinese, and Thai, respectively. (1) Soya bean curd, tahu, tauhu, tow fu, taw hu. (2) Soya sauce (dark), ketjap, kichup or tauyu, see you, nam pla siiw. (3) Soy sauce (light), -, -, sung chow, nam pla siiw.

Soy related recipes include: Ikan semur djawa (Fish in soya sauce, p. 69, with 2 tablespoons Javanese soya sauce). Ajam semur djawa (Chicken in soya sauce {Java}, p. 76-

77). Saté ajam (Chicken saté, p. 77-78). Semur daging (Beef in soya sauce, p. 94). Tahu goreng ketjap (Fried bean curd with soya sauce, p. 105, with 6 squares soya bean curd). Tahu pong (Bean curd omelette, p. 111-13). Fried fish with soya beans (p. 149-50, with "2 oz. yellow soya beans {available at Chinese groceries in cans})." Baked bean curd (p. 181). Steamed, dressed bean curd (p. 181-82). Address: Melbourne, Australia.

1205. Crawfurd, John. 1971. A descriptive dictionary of the Indian islands & adjacent countries. With an introduction by M.C. Ricklefs. Kuala Lumpur, Singapore, London, New York & Melbourne: Oxford University Press. vii + 459 p. Index. 26 cm. Series: Oxford in Asia Historical Reprints.
• ***Summary:*** This book is about the region now (Feb. 2004) known as Southeast Asia, and especially about the Malay Archipelago (today's Indonesia and Malaysia). It was originally published in 1856 in London by Bradbury & Evans–which see. Address: F.R.S. [London, England].

1206. De, Sasanka S. 1971. Technology of production of edible flours and protein products from soybean. *FAO Agricultural Services Bulletin* No. 11. 151 p. AGS: ASB/11. [37 ref]
• ***Summary:*** Contents: Preface. Introduction. Oil milling operations. Quality control of edible flour and grits. Process procedure for production of soya flour and grits. Production of full-fat soya flour: Wenger process, Buehler process, simple process for villagers. Protein isolate: Advantages, process, yield and quality, Alfa-Laval process, estimated cost and calculations on economic return. Production of other soya products: Soy milk, Saridele, Stork method of soy milk production, pilot plant production of tempeh, protein fibers and meat analogs, extrusion-expansion products (meat analogs), bean curd (tofu). List of equipment suppliers. Annexes: PAG Microbiological requirements. 27 tables. 23 figures.

Note: This is the earliest document seen (Aug. 2002) concerning Alfa-Laval's work with soy products (soy protein isolate). Address: Senior Food and Agricultural Industries Officer, Food and Agricultural Industries Service, FAO.

1207. Food and Agricultural Organization of the United Nations. 1971. Soybeans: Area harvested, yield, and production. *FAO Production Yearbook (Rome, Italy)* 25:229-31.
• ***Summary:*** The following nations are listed for the first time as soybean producers in the *FAO Production Yearbook*. * = Unofficial figure. F = FAO estimate. Peru: Produced 1,000 tonnes (metric tons) in 1961-1965 (yield = 14.6 kg/ha), and 1,000 metric tons in 1967 (yield = 17.2 kg/ha). No production or area statistics are given for Peru for 1968 to 1971, but the yields were: 13.8 kg/ha in 1968, 11.2 kg/ha in 1969, 10.8 kg/ha in 1970, and 11.3F kg/ha in 1971.

Iran: Produced 3,000 metric tons on 5,000* ha in 1967 (Yield: 620 kg/ha), 11,000* tonnes in 1968, 45,000* tonnes in 1969, 47,000F tonnes in 1970, and 50,000F tonnes on 16,000F ha in 1971.

Under Oceania (the first time this term is used): Australia: Harvested 1,000 ha in 1961-1965, 1,000 ha in 1967, 2,000 ha in 1968 and 1969, 4,000 ha in 1970, and 16,000F ha in 1971.

Name changes: Cambodia is changed to Khmer Rep. Congo D. Rep. [Democratic Republic] is changed to Zaire. In 1969 South Rhodesia is changed to Rhodesia. "China, Taiwan" disappears and "China (Main)" is changed to "China P. Rep." [People's Republic].

Other interesting listings: Turkey.

1208. Le, Huu Trac. 1971. Nu Cong Thang Lam [Encyclopedia of Vietnam {18th century}]. Hanoi, Vietnam: [Vie]*
• ***Summary:*** The author of this book lived 1720-1791; he was a famous Vietnamese polymath. Address: Vietnam.

1209. Leng, Earl R. 1971. Report of Earl R. Leng, Crop Production Consultant (short term), MUCIA/ AID/ Indonesian Higher Agricultural Education Project. Urbana-Champaign: University of Illinois, College of Agriculture. 41 p. Unpublished typescript. 28 cm.
• ***Summary:*** Contents: 1. Introduction. 2. General observations on field crop agriculture in Indonesia. 3. Institut Pertanian Bogor (Bogor Agricultural University). 4. Gadjah Mada University. 5. Agricultural research planning in Indonesia–Relation to MUCIA / AID project. 6. Soybeans in Indonesia–A special opportunity for an action program. 7. Comments on the MUCIA / AID/ Indonesia project. 8. Summary of conclusions and recommendations. Appendix I–Proposal for cooperative soybean research project. Appendix II–Chronological activities report.

Note: MUCIA is the Midwest Universities Consortium for International Activities, Inc. Established in 1964 with the support of the Ford Foundation, MUCIA is a not-for-profit consortium of five of America's largest land grant research universities, including: University of Illinois at Urbana Champaign, Michigan State University, University of Minnesota, The Ohio State University, and Purdue University.

Source: University of Illinois at Urbana-Champaign (UIUC) archives. 8/1/44 Agriculture, Dean's Office, Box 4, Leng. Address: Agronomist, Univ. of Illinois, Urbana-Champaign, Illinois.

1210. *PAG Bulletin.* 1971. A low-cost protein soft drink from soybeans [made by Yeo Hiap Seng Ltd. in Singapore]. No. 11. p. 42.

1211. U.S. Department of Agriculture. 1971. The annual report on activities carried out under the Public Law 480, 83d Congress, as amended, during tbe period January 1 through December 31, 1970. Washington, DC: U.S. Government Printing Office. 132 p. See p. 113-20. Cover reads: Food for Peace: 1970 Annual Report on Public Law 480.

• ***Summary:*** Table 19 is titled "Title II, Public Law 480–Total commodities by program sponsor, fiscal year 1970." The main program sponsors and distributing agencies, listed alphabetically, are AJJDC (American-Jewish Joint Distribution Committee), CARE, CRS (Catholic Relief Service), CWS (Church World Service), LWR (Lutheran World Relief), SAWS (Seventh-day Adventist World Service), UNICEF, UNRWA (United Nations Relief and Works Agency), WFP (World Food Program). Each of these are Private Voluntary Organizations (PVO/PVOs), registered with USAID. Only two foods containing soy protein were distributed: CSM (Corn soya mix) and WSB (wheat soya blend). They were sent in the following amounts (in thousands of pounds) to the following continents and countries: Africa (50,362 CSM and 6,087 WSB): Cameroon (82 CSM), Ghana (1,104 CSM and 201 WSB), Malagasy [Madagascar] (425 CSM), Malawi (61 CSM), Nigeria (41,343 CSM and 5,886 WSB), Rwanda (200 CSM), Senegal (5,301 CSM), Sierra Leone (699 CSM), Tanzania (887 CSM), Togo (260 CSM).

Near East-South Asia (192,116 CSM and 2,504 WSB): Ceylon (50 WSB), Gaza [occupied by Israel since 1967] (814 CSM and 1,892 WSB), India (189,044 CSM and 105 WSB), Jordan (680 CSM), Jordan-West Bank [occupied by Israel since 1967] (1,110 CSM), Lebanon (160 CSM), Pakistan (457 WSB), Syria (308 CSM).

East Asia (21,530 CSM and 451 WSB): Hong Kong (384 CSM and 100 WSB), Indonesia (9,245 CSM and 150 WSB), Korea (4,586 CSM), Laos (275 CSM), Malaysia (220 CSM), Philippines (1,545 CSM and 201 WSB), Ryukyu Islands [located south of Japan, incl. Okinawa, Sakishima, and Amami island groups. Self governing from 1966. Returned to Japan in 1972] (50 CSM), Vietnam (5,225 CSM).

Latin America (53,761 CSM and 2,305 WSB): Antigua (37 CSM), Bolivia (555 CSM and 173 WSB), Brazil (29,919 CSM and 506 WSB), Britisb Honduras [Belize] (225 CSM and 20 WSB), Chile (1,726 CSM and 151 WSB), Costa Rica (679 CSM and 100 WSB), Dominica (23 CSM), Dominican Republic (7,429 CSM and 105 WSB), Ecuador (1,295 CSM), El Salvador (836 CSM and 200 WSB), Grenada (114 CSM), Guatemala (1,944 CSM), Guyana (72 CSM), Haiti (1,010 CSM), Honduras (674 CSM), Jamaica (208 CSM and 100 WSB), Montserrat (18 CSM), Panama (765 CSM and 450 WSB), Paraguay (491 CSM and 400 WSB), Peru (5,842 CSM and 100 WSB), St. Kitts (59 CSM), St. Lucia (69 CSM), St. Vincent (30 CSM), Uruguay (81 CSM).

Grand total by commodity: 317,769,000 lb of CSM and 11,347,000 lb of WSB. Agencies distributing the most CSM and WSB (in million lb): CARE 180, CRS 68, UNICEF 42.

Countries receiving more than 1 million lb of CSM and WSB combined (in millions of pounds): India 189.1, Brazil 30.4, Indonesia 9.3, Dominican Republic 7.5, Peru 5.6, Vietnam 5.2, Korea 4.6, Guatemala 1.9, Chile 1.8, Philippines 1.7, Ecuador 1.3, Jordan-West Bank 1.1, Haiti 1.0. Address: Washington, DC. Phone: 703-875-4901 (1991).

1212. *USDA Plant Inventory.* 1971. Plant material introduced January 1 to December 31, 1969 (Nos. 338614 to 346863). No. 177. 278 p.

• ***Summary:*** Soybean introductions: *Glycine max* (L.) Merrill. Leguminosae. 341241-341264 (p. 72). "From Mississippi. Seed grown at Delta Branch Experiment Station, Stoneville. Numbered March 17, 1969." Variety sources and names: Australia via Israel (1); Seminole. Australia via Tanganyika (7); Hernon 237, Red Tanner, Yellow Kedele, Avoyelles, CNS, Sangalo. Australia (1); 16680. Australia via Sudan (1); Congo. Australia via Taiwan (1); Bilofield. Brazil (1); Amerelo Giganti. Sudan (3); CMS, RI 84, HLST. Vietnam (2); E32, Nam Vang.

Tanganyika via El Salvador (6); HLS 154, HLS 167, HLS 219, HLS 239, HLS 241, HLS 263. Liberia Strain. Liberia. Maturity group VI.

Note 1. HLS numbers come from Tanganyika, where the varieties were bred in the early 1960s. The "HLS" designation is probably derived from the names of the parents, Hernon + Light Speckled.

Note 2. The format of this document and the HLS numbers seem to indicate that this "Liberia Strain" came to the USA from Tanganyika via El Salvador. In other words, it started in Liberia, then went to Tanganyika, then to El Salvador, and then to Stoneville, Mississippi. We do not know how it got to Liberia.

Talk with Dr. Randall Nelson, curator of the U.S. Soybean Germplasm Collection, Urbana, Illinois. 1997. Nov. 24. "Liberia Strain" is probably not a varietal name; it just means that this seed probably came from Liberia. We do not know where the variety was before it went to Liberia. Dr. Hartwig, who was the curator of the Southern Soybean Collection in Stoneville, Mississippi at the time, probably received this soybean strain from somebody in Liberia, entered it in the register, then grew it out. There is no additional information about many soybean accessions from the southern collection aside from that which appears in the *USDA Plant Inventory.* Address: Washington, DC.

1213. Wahab, Abdul Hyatt. 1971. Dry matter changes and carbohydrate metabolism of germinating soybeans. PhD

thesis, Iowa State University. 138 p. Page 5655 in volume 32/10-B of Dissertation Abstracts International. * Address: Iowa State Univ., Ames, Iowa.

1214. Winstedt, Richard Olof. 1971. An unabridged English-Malay dictionary. 6th ed., enlarged. Kuala Lumpur, Malaysia: Marican. 390 p. 23 cm. *
• ***Summary:*** States that the Indonesian word *kedelai,* meaning "soybean" comes from the Tamil language of southern India. Sir Richard Olof Winstendt was born in 1878.

1215. Bourne, Malcolm C. 1972. Re: Equipment necessary to establish a small plant for making soymilk. Letter to Purchasing Dep., Rockefeller Foundation, 111 West 50th St., New York, NY 10020, Jan. 7. 4 p. Typed, with signature on letterhead.
• ***Summary:*** Describes 12 pieces of equipment needed to make 3,000 to 5,000 pints per day of soymilk, using the Cornell method, at a pilot plant in the Philippines. Address: Assoc. Prof., New York State Agric. Exp. Station, Dep. of Food Science and Technology, Food Research Lab., Geneva, NY 14456. Phone: 315-787-2255.

1216. Mengenhauser, Jane. 1972. Lightweight foods to send to POWs. *Washington Post, Times Herald.* Feb. 10. p. D1, D6.
• ***Summary:*** The Vietnam war is still being fought, although it is winding down. Many American prisoners of war are being held in Vietnam. Apparently their families, friends, and others are allowed to send them food–with the hope that it will reach them. Many lightweight and freeze-dried foods are discussed, with focus on those that are rich in nutrients. "Health food stores" also have wide variety of suitable foods.

"Kennedy's Natural Foods Stores has a tremendous selection of high-protein foods. Among them are Super Snack, a 6-ounce bag containing raisins, sunflower seeds, figs, sesame seeds, cashews, almonds, pepitas, dates and apricots; and packages of roasted soy beans, 1 ounce for 19 cents, 38 per cent protein," plus numerous vitamins and minerals.

1217. Brown, Dolores. 1972. A face-life for Queen Emma. *Hartford Courant (Connecticut).* May 7. p. 2F.
• ***Summary:*** In Curacao, in the Lesser Antilles, a major restoration project is planned by the current government. "Downtown Willemstad, redolent of history and the cradle of Dutch colonial architecture, is being restored... The dear old Queen Emma pontoon bridge will be improved.

Cruise-ship passengers bound for the Caribbean and Curacao will find many bargains there. Any suburban supermarket has shelves full of interesting ingredients reflecting the Dutch heritage: "spices for bambi goreng, a favorite national dish; Indonesian soy sauce, which makes the Japanese product taste like a Japanese copy;..."

1218. Barbaix, Erik. 1972. La verification scientifique du projet soja [Scientific verification of the soya project]. In: Comité de Coordination pour le Developpement en République du Zaire (CODEZA). Séminaire National sur le Soja [National Seminar on Soya]. Kananga, Zaire. 191 p. See p. 94-103. Published in 1986. [2 ref. Fre]
• ***Summary:*** Discusses the nutritional value of soya, commercial products containing soya (such as Fortifex from Brazil, Pronutro from South Africa, or Saridele from Indonesia) from other countries, suggestions for establishing statistical health means (such as average birth weight, and infant growth curves) in Kananga, results of a survey measuring infants in Kananga. The author concludes: Theoretically, the soya project offers an ideal solution to the problem of protein deficiency. A series of verification tests will be necessary to prove that this project is living up to hopes. The first results of surveys have furnished a growth curve. These initial experiences have confirmed the beneficial effect of adding soya to the diet in a boarding situation. Address: Dr. at the Military Center, 1st Military Region, B.P. 1773, Kananga, Zaire.

1219. Farmilant, Eunice. 1972. Macrobiotic cooking. New York, NY: New American Library. 224 p. Foreword by Herman Aihara. May. Index. 18 cm. [31 ref]
• ***Summary:*** This pocketbook has a color (beige) photo on the cover of ears of wheat, one wooden spoon filled with soybeans and one filled with unpolished rice. It is "A basic introductory guide to cooking and eating the macrobiotic way." The author's interest in macrobiotics began in April 1968. Basic information on soyfoods (especially miso, tamari, and tofu) is given on pages 29, 33-38, 213-14. Soy-related recipes include: Wheat berries and black beans (i.e. black soybeans, p. 78). Sprouts (incl. soy sprouts, p. 82-83). Miso pickles (p. 124-25). Miso soup (p. 128-29). Cream of miso soup (p. 135). Black beans and wheat berries (p. 139).

There is an entire chapter on miso and tofu (p. 142-46) including: What makes miso so beneficial? Barley miso (nutritional analysis). Miso-vegetable stew. Miso-rice. Miso stew with vegetables. Miso-vegetable spoon bread. Homemade tofu (curded with fresh lemon juice).

Pizza–Macrobiotic style (with miso, p. 149). Chop suey (with tofu and miso, p. 151-52). Miso bechamel sauce (p. 159). Miso gravy. Simple tahini and tamari sauces (p. 160). Tempura dip (with tamari). Simple miso spreads (p. 161). Miso-vegetable spread. Miso-watercress spread.

There is a directory of macrobiotic stores and restaurants in the U.S. (p. 191-203, subdivided alphabetically by state, and within each state alphabetically by city). The following states have the following number of stores and restaurants: Alaska 1, Arizona 4, Arkansas 1,

California 32, Colorado 4, Connecticut 18, District of Columbia 3, Florida 14, Georgia 7, Hawaii 2, Illinois 7, Indiana 2, Iowa 5, Louisiana 4, Maine 14, Maryland 7, Massachusetts 51, Michigan 12, Minnesota 3, Mississippi 2, Missouri 3, Nevada 1, New Hampshire 20, New Jersey 9, New Mexico 3, New York 61, North Carolina 5, Ohio 14, Oklahoma 3, Oregon 2, Pennsylvania 8, Rhode Island 5, South Carolina 1, Texas 4, Utah 1, Vermont 26, Virginia 4, Washington 3, Wisconsin 2.

There is also a directory of stores, restaurants, and centers outside the U.S. (p. 204-07, subdivided by country). The following countries have the following number of stores, restaurants, or centers: Australia 1, Belgium 2, Brazil 2, Canada 15, Denmark 4, France 29, Germany 1, Holland (Netherlands) 2, India 1, Italy 1, Japan 3, Portugal 1, Puerto Rico 1, Spain 1, Sweden 1, Switzerland 2, United Kingdom: England 13, Scotland 1, Vietnam 2.

A list of wholesale distributors in the U.S. (p. 208-09) includes Shiloh Farms (Route 59, Sulfur Springs, Arkansas), Erewhon Trading Co. (8003 W. Beverly Blvd., Los Angeles, California 90048), Chico San Foods (1262 Humboldt Ave., Chico, California 95926), Erewhon Trading Co. (33 Farnsworth St., Boston, Massachusetts 02210), Deer Valley Farms (Guilford, New York 13780), Infinity Food Co. (171 Duane, New York, NY 10013), Mottel Foods (451 Washington, New York, NY 10013), Juniper Farms (Box 100, Sugar Loaf, NY 10981), Pioneer Specialty Foods (Fargo, North Dakota 58100), Merit Food Co. (Pill Hill Lane, Box 177, Bally, Pennsylvania 19503), Essene (58th & Grays Ave., Philadelphia, PA 19143).

1220. Gandjar, I.; Hermana, -. 1972. Some Indonesian fermented foods from waste products. In: W.R. Stanton, ed. 1972. Waste Recovery by Microorganisms: Selected Papers for the UNESCO / ICRO Work Study Held at the University of Malaya, 1-18 May 1972. Kuala Lumpur: Published by the Ministry of Education, Malaysia, for the Malaysian National Commission of UNESCO. 221 p. See p. 49-54. Held at Kuala Lumpur, Malaysia [9 ref]

• ***Summary:*** Contents: Introduction. The products: Ontjom, dage [pronounced dageh or dagé], tempe bongrek, tempe mata kedele, tempe gembus (okara inoculated with the tempe mold, *Rhizopus* species) and ontjom tahu (okara inoculated with *Neurospora sitophila).* Nutritive value. Toxicity studies (have been carried out for ontjom from peanut press cake, for ontjom tahu, and for tempe bongkrek). Discussion.

Table 1, titled "Various kinds of Indonesian fermented foods from waste products" contains 3 columns: Name of food, raw material, and microorganism(s). For example: Ontjom is made from peanut press cake inoculatd with *Neurospora sitophila* or *Monilia sitophila.* Address: Indonesia.

1221. Ibrahim, -. 1972. Soy-sauce processing. In: Science Meeting on Food Protein and Soy-bean Processing, Bandung, Lembaga Kimia Nasional, LIPI. Held 1-2 June 1972. *
Address: Indonesia.

1222. Yutono, -; Darmosuwito, S. 1972. Proses pembuatan kecap [Process for making Indonesian soy sauce]. In: Science Meeting on Food Protein and Soy-bean Processing, Bandung, Lembaga Kimia Nasional, LIPI. Held 1-2 June 1972. [Ind]*

• ***Summary:*** Describes the 6 steps in the process for making fermented soy sauce.

1223. Orr, Elizabeth. 1972. The use of protein-rich foods for the relief of malnutrition in developing countries: an analysis of experience. *Tropical Products Institute Report* No. G73. 71 p. Aug. Summary in PAG Bulletin (1973) 3(2):59. 28 cm. [17 ref]

• ***Summary:*** Contents: Acknowledgements. Foreword. I. Introduction: the protein problem and approaches to it. II. Protein-rich food schemes (69 schemes are described): Introduction, schemes no longer in operation–and which ceased within a year of inception or after a market trial period, schemes no longer in operation–but which ran for more than one year before termination, schemes operating irregularly, schemes currently in regular production (beverages, other products), schemes at exploratory stages. III. Some aspects of protein-rich food schemes: Location, source of the idea, ownership of the enterprise, characteristics of the products (ingredients, composition, type of product), promotion, external assistance. IV. Evaluation of the protein-rich food approach: Summary of the outcome of the various schemes: Operational status, sales volume (the largest are Bal-Ahar, Vitasoy, and Pronutro), sales trend, distributive outlets. Reason for the outcome (success or failure). Impact on the protein problem: Production capacity, sales of Incaparina in Guatemala, income levels, prices of protein-rich foods (Bal-Amul is the most expensive since it is canned, followed by Pronutro), prices in relation to incomes, prices of competing products, distribution of protein-rich foods in rural areas. Impact made by protein-rich food schemes on the protein problem: Summary (very small). Future contribution of protein-rich foods to the protein problem. V. Initiation of protein-rich food schemes: guidelines for Government Administrators. References. Statistical appendix.

List of tables: Text: I. Daily protein requirements. II. Protein contents and protein biological values. III. Protein products/enterprises. IV. Cost of product allowances per child at retail prices. Appendix: I. Ownership of enterprise. II. Ingredients of protein-rich foods. III. Composition of protein-rich foods. IV. Outlets for protein-rich foods. V.

Capacity of plant/sales. VI. Retail prices/protein prices. VII. National income in selected countries.

The following foods containing soya are discussed (see Table II, p. 66, for full list of ingredients, and Table III, p. 67, for nutritional composition). The percentage of soya in the product, when known, is shown in parentheses: Brazil: Incaparina (38%), Golden Elbow Macaroni (30%), Fortifex (47.5%), Solein, Cerealina, Saci (3% protein). Colombia: Incaparina Blanca (30%), Colombiharina (30%), Incaparina (20.9%), Duryea, Pochito (20.0% protein). Ethiopia: Faffa (18%). Guyana: Puma. Hong Kong: Vitasoy (3% protein). India: Bal-Amul (20-25%). Indonesia: Saridele (18-19% protein). Madagascar: Weaning Food (38%). Malaysia: Vitabean (2.75% protein). Mexico: Conasupo products (30%), Protea (24.0% protein). Mozambique: Super Maeu (10%). Singapore: Vitabean (2.75% protein). South Africa: Kupangi Biscuits, Pronutro. Taiwan: Weaning Food (30%). Thailand: Noodles, Poluk, Kaset Cookies, Kaset Protein. Turkey: Weaning Food (20%). Uganda: Soya Porridge (38%; 21.0% protein), Soya Maize (16.0% protein), School Porridge (15.0% Protein). U.S.A.: WSB (Wheat-soya blend, 20%), CSM (Corn-soya milk, 25%). Venezuela: Incaparina (19%). Zambia: Milk Biscuit (7.1%). Address: Foreign and Commonwealth Office (Overseas Development Administration), TPI, 56/62 Gray's Inn Rd., London WC1 8LU, England.

1224. Na Lampang, Arwooth. 1972. Production and research on food legumes in Thailand. *Tropical Agriculture Research Series* No. 6. p. 93-100. Sept. Symposium on Food Legumes. [3 ref]

• ***Summary:*** Note: The author is a man. Address: Oil Crop Project Leader, Dep. of Agriculture, Bangkok, Thailand.

1225. Somaatmadja, Sadikin. 1972. Problems of soybean production in Indonesia. *Tropical Agriculture Research Series* No. 6. p. 69-74. Sept. Symposium on Food Legumes. [3 ref]

• ***Summary:*** Contents: Introduction. Average yield. Factors affecting yields. Efforts to increase soybean production: Varietal improvement, use of good seeds, control of insect pests, disease control, other approaches. Summary. Discussion.

Tables show: (1) Five year average harvested acreage and production of soybean in Indonesia, 1950-1969. The number of hectares harvested has increased from 431,742 in 1950-54 to 601,644 in 1965-69. Soybean production has increased from 294,834 metric tons (tonnes) in 1950-54 to 410,197 tonnes in 1965-69. The average soybean yield in Indonesia seems to be about constant at 6.81 quintals pr hectare (1 quintal = 100 kg); this is quite low.

(2) Infestation and percentage of damage to soybean plans, caused by several species of insects during the dry season of 1971. (3) Improved soybean varieties in Indonesia. The four columns are variety, seed color, weight of 1,000 seeds (in gm), maturity (days). Three of the eight varieties have black seeds; the rest have yellow. Named varieties are Ringgit, Sumbing, Merapi (black), and Wakashima.

(4) Yields of new soybean varieties in trials conducted during the dry season of 1970 and the wet season of 1971/72 (quintals per hectare) at seven locations. (5) Yields of soybean with and without weeding or pest control at 3 locations, dry season of 1969.

Although soybean has long been known as a food crop in Indonesia, its cultivation has expanded steadily during the 20th century. It is cultivated using three different systems: simple / traditional, semiintensive, and intensive. About 80% of the soybeans are planted in paddy fields in the dry season. The harvested acreage of rice in Indonesia is more than ten times that of soybean. Address: Central Research Inst. for Agriculture, Bogor, Indonesia.

1226. Weisberg, Samuel M. 1972. Developing and marketing low-cost protein foods in developing countries. Experience indicates that private industry must play a major role. *Food Technology* 26(9):60, 62, 64, 66, 68. Sept.

• ***Summary:*** Presents case histories of the following low-cost protein foods: Reconstitutable powder products–ProNutro (Durban, South Africa), Nutresco (Salisbury, Rhodesia), Incaparina (Guatemala, Colombia, El Salvador, Brazil). Milky beverages–Vitasoy (Hong Kong), Vitabean (Yeo Hiap Seng Ltd., Singapore), Vitamilk (Bangkok, Thailand), Miltone (India). Soft drinks–Puma (soft drink developed by Monsanto and franchised to D'Aguiar Brothers (DIH) Ltd., Georgetown, Guyana), Samson (made by Coca-Cola Co., sold in Paramaribo, Surinam). Soup products–Nutrovite (Salisbury, Rhodesia; it "has been marketed for 7 years in Rhodesia, Mozambique, and Angola"), Protone (South Africa, no soy). Baked goods–Modern bread (India. "It is planned to improve the protein quality of the bread by means of groundnuts or soybeans, instead of through the use of amino acids)." Pasta products–Golden Elbow Macaroni, Sam Yang Noodles.

"Production of Vitasoy at present is at the rate of over 100 million 6½- and 8½-oz. bottles/yr, and sales have recently been exceeding the sales of conventional soft drinks such as Coca-Cola." Six reasons for the product's success are given, including strong marketing and advertising (5% of sales price goes for promotion and advertising). Address: Executive Director, League for International Food Education.

1227. Leung, W-T.W.; Butrum, R.R.; Chang, F.H. 1972. Food composition table for use in East Asia. Atlanta, Georgia: Center for Disease Control, U.S. Dept. of Health, Education, and Welfare. xiii + 334 p. Dec. No index. 30 cm.

• ***Summary:*** Part I. Proximate composition, mineral and vitamin contents of East Asian foods, by Woot-Tsuen Wu Leung, Ph.D. (Nutrition Program, Center for Disease Control, Dep. of Health, Education and Welfare), and Ritva Rauanheimo Butrum, M.S., and Flora Huang Chang, B.S. (Federation of American Societies for Experimental Biology).

Part II. Amino acid, fatty acid, certain B-vitamin and trace mineral content of some Asian foods, by M. Narayana Rao, Ph.D., and W. Polacchi (Food Policy and Nutrition Division, Food and Agriculture Organization of the United Nations).

In Part I, Food Group 3 titled "Grain legumes and legume products" (p. 16-22) gives the composition of the following (100 grams edible portion and as purchased): Adzuki beans *(Phaseolus angularis;* incl. "Azuki-an," and boiled sweetened). Asparagus bean: See Cowpea, yardlong. Asparagus pea: See Goabean. Bambara groundnut or jugo bean *(Voandzeia subterranea).* Bengal gram: See Chickpea. Blackeyed pea: See Cowpea, catjang. Blackgram: See Mung bean. Broad bean or horse bean *(Vicia faba;* incl. "Fuki-mame" and "Otafuku mame"). Burma bean: See Lima bean. Butter bean: See Lima bean. Catjang pea: See Pigeonpea. Chickpea or Bengal gram *(Cicer arietinum).* Cowpea, all varieties *(Vigna* species). Cowpea, yardlong: See Cowpea, all varieties. Dhal: See Lentil. Dolichos, Australia pea *(Dolichos lignosus).* French bean: See Kidney bean. Goabean [goa bean], asparagus pea, or winged bean *(Psophocarpus tetragonolobus).* Golden gram: See Mung bean. Green gram: See Mung bean. Haricot bean: See Kidney bean. Hindu cowpea: See Cowpeas, all varieties. Horse grain or horse gram or Madras gram *(Dolichos uniflorus; D. biflorus).* Horsebean: See Broadbean. Note 1. This is the earliest English-language document seen (Jan. 2005) that uses the word "horsebean" or the word "broadbean" to refer to *Vicia faba.*

Horsegram: See Horse grain. Hyacinth bean or Indian butterbean *(Lablab niger; Dolichos lablab).* Indian bean: See Mung bean. Indian butterbean: See Hyacinth bean. Jackbean, common *(Canavalia ensiformis).* Jugo bean: See Bambara groundnut. Kidney bean, French bean, navy bean, pinto bean, snap bean, or string bean *(Phaseolus vulgaris;* incl. "Usura-mame"). Lentil or dhal *(Lens culinaris; Lens esculenta; Ervum lens).* Lima bean, butter bean, or Burma bean *(Phaseolus lunatus; Phaseolus limensis).*

Note 2. This is the earliest English-language document seen (May 2003) that uses the scientific name *Lens culinaris* to refer to lentils.

Note 3. This is the earliest English-language document seen (Jan. 2009) that uses the name "Burma bean" to refer to the lima bean.

Madras gram: See Horse grain. Mung bean, Indian bean, red bean, green gram, golden gram, or blackgram / black gram *(Phaseolus aureus; Vigna radiata;* incl. vermicelli, dried starch, starch jelly, instant powdered green or red products with sugar and flour added). Mung bean, black gram or urd *(Phaseolus mungo; Vigna mungo).* Navy bean: See Kidney bean. Peanut or groundnut *(Arachis hypogaea;* incl. raw, roasted, with or without shell, salted, parched, seasoned, fried, peanut flour, peanut butter, peanut milk, peanut cake–defatted, peanut cake–defatted and fermented [onchom]). Peas, garden or field *(Pisum* species; incl. parched–salted, "Uguisu-mame"). Pigeonpea, or catjang pea *(Cajanus cajan; Cajanus indicus).* Pinto bean: See Kidney. Red bean: See Mung bean. Rice bean *(Phaseolus calcaratus; Vigna calcarata).* Soybean and soy products (Glycine max; G. hispida; G. soja; p. 19-21), incl: Whole mature seeds–dried (yellow, black), whole immature seeds dried, whole seeds–salted (black, green, green soaked, fried, fermented {natto}, pickled, roasted), flour of roasted soybeans, defatted soybeans–whole seeds. Soybean products: Curd–unpressed, curd–tofu–raw (plain, kinugoshi, fukuroiri), curd–tofu–fried (moist type, dried type–regular size, dried type–small size, canned, abura age), curd–roasted [grilled], curd–tofu–fermented (home-prepared, jarred), curd–tofu (dried–spongy square, preserved, dried–rope-like, commercial {fermented with chili pepper}–jarred), curd cheese, curd sheet (milk clot sheet {yuba}) (moist type, dried type, pickled in soysauce), curd–pressed–raw (plain, fermented, spiced, strips–semi-dry), miso (Japan) (plain, sweet {5.3% salt added}, salty–light {10.4% salt added}, salty–dark {11.7% salt added}, mame-miso {9.7% salt added}, powdered {18.5% salt added}), paste [jiang] (plain, fermented, red pepper added, sweet, malt), soybean milk (unenriched–unsweetened, "Kaset" {Thailand; canned–concentrated, fluid}, Saridele {a mixture of soybeans, sesame seeds or peanuts, with vitamins and calcium added–Indonesia}), soybean sauce (dark–thick, light–thin, unspecified), tempeh (fermented soybean product, Indonesia), "Budo-mame" (cooked–Japan), Soybean residue [okara] (liquid, powder). Urd: See Mungo bean. Velvetbean *(Mucuna utilis; Stizolobium utilis;* incl. dried or mold-treated {tempeh}). Winged bean: See Goabean, Indes.

Food Group 4 titled "Nuts and seeds (p. 23-29) includes: Almonds, hemp seeds–whole, perilla–common *(Perilla frutescens),* safflower seeds, sesame seeds, sunflower seeds *(Helianthus annuus),* watermelon seeds.

Food Group 5, titled "Vegetables and vegetable products" (p. 30-75) includes: Amaranth, mungbean sprouts, seaweeds (many types), soybeans–immature seeds [green vegetable soybeans], soybean sprouts (raw, cooked).

Note 4. This is the earliest English-language document seen (March 2004) that mentions silken tofu, which it calls (in a table): "Curd, tofu, raw: 'Kinugoshi,' Japanese preparation."

Note 5. This is the earliest English-language document seen (Dec. 2005) that contains the term "flour of roasted

soybeans."

Note 6. This is the earliest English-language document seen (Oct. 2006) that uses the term "Blackeyed pea" to refer to the cow pea. Address: Dep. Health Education and Welfare.

1228. Leung, Woot-Tsuen Wu; Butrum, R.R.; Chang, F.H. 1972. A selected bibliography on East-Asian foods and nutrition arranged according to subject matter and area. Atlanta, Georgia: Center for Disease Control, U.S. Dept. of Health, Education, and Welfare. vii + 296 p. Dec. 27 cm. [1500* ref]

• ***Summary:*** The references are arranged by country, and within each country by subject. Contents: Map of East Asia. Foreword. Whole region- East Asia. Burma. Cambodia. China, Mainland. China, Republic of (Taiwan). Hong Kong. Indonesia. Japan. Korea. Laos. Malaysia. Philippines. Singapore. Thailand. Vietnam.

Subject matter within each country: General. Food resources. Food composition. Food supplements. Food technology. Food habits. Nutrition and dietary surveys. Nutritional status. Nutrition education. Address: 1. Nutrition Program, Center for Disease Control, Dep. of Health, Education, and Welfare; 2-3. FASEB.

1229. Cagampang, I.; Lantican, R.; Tilo, S. 1972. Management of soybean production. *Agriculture at Los Banos* 11. UPLB, College, Laguna. *

1230. Cagampang, I.; Lantican, R.; Ballon, F.; Legaspi, B. 1972. Growing soybeans in the Philippines. *ICPP Technical Bulletin* No. 6. UPLB, College, Laguna. *

1231. Jutono, -; Darmosuwito, Suhadi. 1972. Proses pembuatan kecap [The process for making Indonesian-style soy sauce (kechap)]. In: Bandung, disajikan pada Science Meeting on Food Protein and Soysauce Processing. Held 1-2 June 1972. [Ind]*
Address: Indonesia.

1232. Lompang, A.N. 1972. [Soyabean seed–how to harvest and store it]. *Kasikorn* 45(1):37-42. [Tha; eng]*
Address: Dep. of Agriculture, Bangkok, Thailand.

1233. National Institute for Chemistry. 1972. Research design for soybean processing and utilization. In: ASEAN Expert Meeting for Soybean Sauce Processing and Utilization. Bandung, Indonesia. Appendix 7, p. 16-24. *

• ***Summary:*** A research project to improve the quality and nutritional value of soybean sauce, including Indonesian "Kecap."

1234. Onate, L.; Aguinaldo, A.; Uesebio, J.S. 1972. Eat more soybeans, "The meat that grows on vines." (Leaflet). Mimeographed sheet. Institute of Human Ecology, UPLB, College, Laguna. *

1235. *Sabah Department of Agriculture, Annual Report of the Department of Agriculture (Kota Kinabalu).* 1972. Soya bean. p. 24-28. For the year 1970. *

1236. Slamet, Dewi Sabita. 1972. The nutrient content of some protein-rich fermented foods and by-products from beans and nuts. Paper presented at International Course in Food Science and Nutrition, Leuven, Netherlands. 15 p. *
Address: Indonesia.

1237. Sudigdo, P.; Waeoroentoe, S.A.; Sutarni, Ratna. 1972. Penelitian mengenai komposisi dan karakteristik kecap, serta proses pembuatannya [Research on the composition and characteristics of soy sauce, and its preparation process]. In: Bandung, disajikan pada Science Meeting on Food Protein and Soysauce Processing. Held 1-2 June 1972. [Ind]*
Address: Indonesia.

1238. Sundhagul, Malee; Smanmathuroj, P.; Bhadocharoen, W. 1972. Thua-nao, a fermented soybean food of northern Thailand. I. Traditional processing method. *Thai J. of Agricultural Science* 5(1):43-56. *

• ***Summary:*** This food is fermented with *Bacillus subtilis.* Address: Thailand.

1239. Bhumiratana, A.; Nondasuta, A. 1972. Report on protein food development project. Bangkok, Thailand: Nutrition Div., Health Dep., Ministry of Public Health. *

• ***Summary:*** Kaset full-fat soy flour is prepared semicommercially by the Institute of Food Research and Product Development (IFRDP), Bangkok, by the procedure described in this report. This soy flour contains 40-49% protein and 21-23% fat. Address: Inst. of Food Research & Product Development, Kasetsart Univ., Bangkok, Thailand.

1240. Brissenden, Rosemary. 1972. South East Asian food: Indonesia, Malaysia and Thailand. Harmondsworth, Middlesex, England; Baltimore, Maryland: Penguin Books. 264 p. 18 cm. A Penguin handbook.

• ***Summary:*** After a three-month stay in Indonesia as a member of a student delegation from Melbourne University, Rosemary "realized that she could not live without Indonesian food. So she set about learning as much as she could from Asian students in Melbourne." In 1964 she was invited to write a weekly column in the Australian on South East Asian food. She is married and has three children.

"A note on this American edition. This book has been especially adapted for the American audience. British weights and measures have been converted into their American equivalents. Sources for obtaining unusual

products mentioned in the recipes are given for most large American cities."

Note: This book is almost identical to the edition published in 1969 in the USA and England by Penguin Books. This American edition was published in 1972 by Penguin Books, Inc. Address: Australia.

1241. Chen, Nung Che. 1972. Yield and protein content of green vegetable soybeans as affected by time of harvest and date of planting. MSc thesis, University of the Philippines. 144 leaves. Charts. 28 cm. *
Address: Los Baños, Philippines.

1242. Clark, Sydney; Zellers, Margaret. 1972. All the best in the Caribbean, including Puerto Rico and the Virgin Islands. New York, NY: Dodd, Mead & Company. x + 420 p. See p. 68. Illust. 21 cm. Series: All the Best travel books.
• ***Summary:*** In Chapter 6, "Some things to know," a section titled "The foods of the Caribbean" (p. 68) talks about the "Dutch islands" which are famous for their dining display, the Indonesian *rijsttafel.* "The proprietor of the Bali Restaurant in Aruba can prepare a simple ten-ingredient meal in half an hour. This will include... a 'soft-boiled' vegetable affair called *lablabs,* flavored with a Chinese sauce called *ketjab* (hence our word ketchup); and a variety of raw appetizers such as green mango, cucumber, onion shoots..."

1243. Food and Agricultural Organization of the United Nations. 1972. Soybeans: Area harvested, yield, and production. *FAO Production Yearbook (Rome, Italy)* 26:229-31.
• ***Summary:*** The following nations are listed for the first time as soybean producers in the *FAO Production Yearbook.* F = FAO estimate. Dahomey: Produced 1,000F metric tons in 1970.

Ecuador: Harvested 1,000 ha in 1970, 1971, and 1972F.

Uruguay: Harvested 1,000 ha in 1961-65, 1970F, 1971F, and 1972F.

Burma: Harvested 5,000 ha in 1961-65, 7,000F ha in 1970, 1971, and 1972F.

Laos: Harvested 3,000 ha in 1961-65, and 4,000 ha in 1970F, 1971F, and 1972F.

1244. Gandjar, Indrawati; Slamet, Dewi Sabita. 1972. Tempe gembus hasil fermentasi ampas tahu [Okara tempeh, a fermented product from soymilk residue]. *Penelitian Gizi dan Makanan (Research on Food and Nutrition)* 2:70-79. [11 ref. Ind]
• ***Summary:*** Okara tempeh contains 84.9% moisture, 8.4% carbohydrate, 4.0% protein, 2.1% fat, and 0.7% ash, plus 226 mg of calcium per 100 gm. Address: 1. Balai Penelitian Gizi Unit Diponegoro, Departemen Kesehatan R.I., Jakarta; 2. Balai Penelitian Gizi Unit Semboja, Departemen Kesehatan R.I., Bogor, Indonesia.

1245. Herklots, G.A.C. 1972. Vegetables in South-East Asia. London: George Allen & Unwin, Ltd. xii + 525 p. See p. 238-41, 270-72. Illust. Index. 25 cm. [189* ref]
• ***Summary:*** In Thailand, the soybean is called *Too-a leu-ang.* Two of the leading soybean varieties grown in China are *wong tau* (yellow soybean), and *hak tau* (black soybean). An illustration (p. 240) shows the mature plant with dried pods. "Cultivation: This bean is not grown in Hong Kong or to a very small extent, and is a field crop rather than a garden vegetable."

The protein content is higher in black-seeded varieties and the oil content is higher in yellow-seeded. "The unripe green seeds may be used as a vegetable."

Pages 228-32 discuss groundnut, with two illustrations.

Pages 268-69 discuss the Bambara groundnut (*Voandzeia subterranea* (L.)), with a full-page illustration.

Pages 270-72 discuss [soy] "bean sprouts," with a nice illustration comparing soy sprouts with the sprouts of green gram. The description of how to grow and cook soy sprouts follows that of Trelease and Trelease (1943).

Page 356-58 discuss sunflower. Address: Hong Kong.

1246. Hermana, -; Sibarani, Sujana; Herlinda, Judith. 1972. Percobaan perbaikan campuran "Tempe Fish Rice" [Experiment on the improvement of Tempeh Fish Rice mixture as a protein source]. *Penelitian Gizi dan Makanan (Research on Food and Nutrition)* 2:57-61. [4 ref. Ind]
• ***Summary:*** The previous composition of Tempeh Fish Rice was modified for the consumption as a food supplement by pre-school children. Composition the of the TFR was 30% tempeh powder, 30% rice flour, 10% fish meal, 25% sucrose, and 5% peanut oil. Improvement of quality was achieved. Even though the nutritional components were about the same, the NPU (Net Protein Utilization) was higher. The flavor, color, and aroma of the mixture were stable during the 10-week storage period. Address: 1. Balai Penelitian Gizi Unit Semboja, Departemen Kesehatan R.I., Bogor, Indonesia; 2. Bagian Gizi dan Makanan Departemen Ilmu Kesejahteraan Keluarga Fakultas Pertanian, Institut Pertanian Bogor; 3. Balai Penelitian Gizi Unit Diponegoro, Departemen Kesehatan R.I., Jakarta.

1247. Iljas, Nasruddin. 1972. Development and quality evaluation of soybean-based food–Tempeh. PhD thesis, Ohio State University. xi + 135 p. Page 3127 in volume 33/07-B of Dissertation Abstracts International. [132 ref]
• ***Summary:*** One part of fresh tempeh was mixed with 2 parts of chili sauce and 2 parts of tomato sauce, then cooked for 10-15 minutes. The flavor acceptability of the product was good. Address: Ohio State Univ., Columbus, Ohio, & Indonesia.

1248. Nakano, Sasuke. 1972. Ryôri no kigen [The origin of foods]. Tokyo: Nihon Hoso Shuppan Kyokai. 225 p. [Jap]
• ***Summary:*** The important chapter titled "The natto triangle and miso," by Sasuke Nakao (p. 118-27) discusses natto, its relatives and ancestors in East Asia, and the "natto triangle" theory (with a map). Nakao hypothesized that natto originated in the monsoon area of Southeast Asia, where there are East Asian evergreen forests. He considered Yunnan province in China to be the original center of natto. His theory is based on the observation that there are many varieties of non-salted fermented soyfoods and soy condiments inside the "natto triangle." Yunnan province in southwest China, Thailand, Myanmar (Burma), Bhutan, Nepal, Indonesia, and Japan all fall within this triangle.

Note: The term "natto triangle" can be misleading, especially for non-Japanese. Natto is the only non-salted fermented soyfood or soy condiment indigenous to Japan. Natto is made by fermenting whole, cooked soybeans with bacteria *(Bacillus natto,* or *Bacillus subtilis)* in a warm place (ideally 104ºF or 40ºC) for about 24 hours. According to various Japanese legends, natto originated almost 1,000 years ago in northeast Japan when cooked soybeans were placed in a rice-straw sack strapped over the back of a horse. The natto bacteria are found abundantly on rice straw, and the warmth of the horse's body aided the fermentation. Under these conditions, the fermentation would take place naturally, without intentional inoculation. The "natto triangle" refers to the geographical area within a large triangle in East-, South-, and Southeast Asia–the only place in the world where non-salted fermented soyfoods and soy condiments are indigenous. A number of these–such as tempeh in Indonesia and unsalted soy nuggets in China–are fermented primarily with molds (e.g., *Rhizopus, Aspergillus)* rather than bacteria. The triangle has its three corners in northeastern Japan (on the northeast, for natto), northeastern India and Nepal (on the west, for kinema and thua-nao), and Java (Indonesia, on the south, for tempeh).

1249. Nurrachman, -. 1972. Beberapa proses bahan makanan fermentasi secara tradisional di Indonesia [Several traditional Indonesian food fermentation processes]. Thesis (Skripsi), Akademi Gizi, Jakarta. 50 p. [Ind]*
• ***Summary:*** A bibliographic study on fermented foods, among which are tempeh and onchom (oncom). Address: Jakarta, Indonesia.

1250. Philippine Council for Agricultural Research (PCAR), Crops Research Div. 1972. Soybean & other field legumes: National program of research. Los Banos: University of the Philippines. 34 p. 25 cm.
• ***Summary:*** Contents: The situation. Benchmark information. Problem areas. Program of research. Manpower requirement. Budgetary requirements. Address: Los Baños, Philippines.

1251. Slamet, Dewi Sabita; Gandjar, Indrawati. 1972. Pengaru *Rhizopus oryzae* dan *Aspergillus oryzae* terhadap kwalitas kecap [The influence of *Rhizopus oryzae* and *Aspergillus oryzae* on the quality of Indonesian soy sauce, kechap]. *Penelitian Gizi dan Makanan (Research on Food and Nutrition)* 2:88-95. [16 ref. Ind]
Address: 1. Balai Penelitian Gizi Unit Diponegoro, Departemen Kesehatan R.I., Jakarta; 2. Balai Penelitian Gizi Unit Semboja, Departemen Kesehatan R.I., Bogor, Indonesia.

1252. Smith, A.K.; Circle, S.J. 1972. Historical background (on soybeans and soybean foods). In: A.K. Smith and S.J. Circle, eds. 1972. Soybeans: Chemistry and Technology. Westport, CT: AVI Publishing Co. xiii + 470 p. See p. 1-26. Chap. 1. [53 ref]
• ***Summary:*** Contents: 1. Introduction. 2. U.S. history: Introduction of soybeans, processing for oil, soybean oil. 3. Soybean meal and protein: Animal feed industry, poultry industry, industrial uses. 4. Soybean production. 5. Oriental history: Ancient history, Oriental fermented foods (shoyu, miso, tempeh, ontjom, natto, hamanatto, tao tjo [Indonesian-style miso], kochu chang, ketjap), Oriental nonfermented foods (soybean milk, tofu), wedge press. 6. Soybeans and world food problems: Green Revolution, protein supplements (high protein food formulations, AID funded), amino acids, CSM, cottage industries.

Concerning industrial uses (p. 8-9): Soybeans rose in popularity as an agricultural crop in the USA at a time when other crops such as corn, wheat, cotton, and tobacco were being produced in surplus quantities. Soybeans took over much of the acreage vacated by these crops. "At that early period it was the hope of many leaders of agriculture, government, and industry that much of the oil and protein of the soybean could be diverted from the food and feed industries into industrial products such as paints, varnishes, soap stock, plastics, adhesives, plywood glue, paper coating and lamination, paper sizing, textile fibers, and other uses... In 1936 the US organized the Regional Soybean Industrial Products Laboratory for this purpose. These new industrial uses were expected to help relieve the problem of farm surpluses... In 1935 the Glidden Company built the first plant for the isolation of industrial grade soybean protein (transferred to Central Soya in 1958). The largest use of industrial grade protein is in the paper-making industry, for coating and sizing of paper board.

"After World War I, soybean meal, because of its low cost, replaced casein as an adhesive for Douglas fir plywood glue, where it still retains a substantial part of the market for the interior grade product."

"While soybean proteins have several important industrial applications, especially in the paper industry for coating and sizing paper, which are expected to continue for years to come, the original dream of an ever-expanding industrial market [for soy proteins] has faded. In the polymer market it appears that for most applications the proteins cannot be made competitive with the increasing number of low cost, high quality synthetic resins... It is generally recognized that the increasing demand for proteins for feed and food will greatly surpass the anticipated industrial uses."

A graph (p. 1) shows: Soybean production in the United States for seed, 1940-1970. Address: 1. Oilseeds Protein Consultant, New Orleans, Louisiana; 2. Director, Protein Research, W.L. Clayton Research Center, Anderson Clayton Foods, Richardson, Texas.

1253. Stanton, W.R. ed. 1972. Waste recovery by microorganisms: Selected papers for the UNESCO/ICRO Work Study. Kuala Lumpur: Ministry of Education, Malaysia. 221 p. Held at the University of Malaya.
• ***Summary:*** UNESCO stands for the United Nations Educational, Scientific, and Cultural Organization. Address: Prof. of Botany, Univ. of Malaya, Kuala Lumpur, Malaysia.

1254. Stanton, W.R. 1972. Microbially produced foods in the tropics. In: Proceedings of the [Sixth] International Symposium on Conversion and Manufacture of Foodstuffs by Microorganisms. Tokyo: Saikon Publishing Co. viii + 297 p. See p. 133-39. Held 5-9 Dec. 1971 at Kyoto, Japan. [21 ref. Eng]
• ***Summary:*** Includes a discussion of tempeh and ontjom. Address: Univ. of Malaya, Malaysia.

1255. Oka, H.I. 1973. Performance in Central Luzon of soybean varieties selected in Taiwan for wide adaptability. *SABRAO Newsletter* 5(1):29-38. [4 ref]
• ***Summary:*** "Ten soybean varieties from Thailand and two local varieties were tested in three different seasons at the Central Luzon State University, Muñoz, Philippines." Eight of the ten had been selected for yield stability following the breeding method of "disruptive seasonal selection." The results showed that, if cultivated with a package of recommended practices, these varieties have a high yield potential (about 2.5 tons/ha). Address: National Inst. of Genetics, Misima [Mishima] City, Japan 411.

1256. Winarno, F.G.; Fardiaz, Srikandi; Daulay, Djundjung. 1973. Indonesian fermented foods. Bogor: Agricultural University Bogor. 25 p. Originally presented as a lecture by Winarno to Regional Graduate Nutrition Course, SEAMEO, Jakarta, in Jan. 1973. [11 ref]
• ***Summary:*** Also titled "Indonesian Traditional Food Processing." Address: Dep. of Agricultural Product Tech., Bogor Agricultural Univ.

1257. Townsend, Dorothy. 1973. Hanoi days filled by shared memories, ex-POW reports: 'Telling' movies and books. *Los Angeles Times.* March 5. p. A1.
• ***Summary:*** During the Vietnam war, POWs would re-tell movies to try to kill time. The food, which featured cabbage soup from Christmas on, is described. "Other side dishes might be [mung] bean sprouts or soy bean cake [tofu]." The latter wasn't bad, recalled Capt. John H. Nasmyth Jr., especially in the later years when "they started putting a sauce on it and it was pretty tasty." Note: This sauce was probably fish sauce (nuoc-mam), but it might have been soy sauce.

1258. Aykroyd, W.R.; Doughty, J. 1973. Anyone for tempeh? A recipe. *Nutrition Today* 8(2):31. March/April. Reprinted from the author's book Legumes in Human Nutrition (1964). Rome: FAO. [1 ref]

1259. Johnson, P.E. 1973. High-protein foods for peace. *Cereal Science Today* 18(5):138-41, 148. May. [1 ref]
• ***Summary:*** A photo shows Nigerian children, suffering from acute malnutrition, being sweetened and flavored Instant CSM (corn-soya-milk) by UNICEF. There is a great need to fortify cereal foods in developing countries. Recently bread flour (fortified with soy flour at 6 parts per 100) has been approved for worldwide distribution. The first purchases of this soy-fortified flour on 18 Oct. 1972 totaled 6 million lb. As a start, it is planned to use soy-fortified flour in biscuits and buns for child-feeding programs in India and the Philippines. "In Hong Kong, a beverage called Vitasoy, made with a soya base, fortified with vitamin A, B vitamins, and sugar, has been highly successful, being marketed over a 30 year period. Present production is at the rate of more than 100 million bottles per year. A major expansion is now underway which will provide capacity for production of 400 million bottles of Vitasoy annually within 3 years." Address: Chief, Operations Div., Office of Food for Peace, Agency for International Development.

1260. Mogi, Yuzaburo. 1973. Kikkoman–American plant project–From planning to start up. Paper presented at the Governor's Conference on Business Development. 14 p. Held 16 May 1973 at American Baptist Assembly, Green Lake, Wisconsin.
• ***Summary:*** With an introduction by William C. Kidd, Secretary, Department of Business Development, Wisconsin. Mr. Mogi earned a B.A. degree from Keio Univ. in Japan, and a Master's of Business Administration (MBA) at Columbia University in New York City.

"Kikkoman soy sauce was first shipped to Hawaii in the 1860's... Kikkoman also had extensive operations in Asian

countries until 1945. We had production plants in China, Korea, Malaysia, and some other countries. Our exports reached a peak before the war in 1939 and sales in the United States were about 50% of the total sales in foreign countries at that time. After the war we again started exporting in 1950. However, we lost the market in China, and in addition, because of an import duty and restrictions, it became quite difficult for us to export to other Asian countries...

"At the present time, our main overseas market is America where we are selling more than 60% of our total export... The main consumers of Kikkoman soy sauce in the United States before World War II were Japanese Americans... Our sales increased as the number of Japanese immigrants increased... After the war, we changed sales targets. Instead of limiting ourselves to the Japanese-American market we started to aim for the general American. In order to penetrate the American market we decided to market small size bottles. Before the war we sold soy sauce only in large bottles, casks, and cans... In 1957, we established an American subsidiary for Kikkoman International Incorporated, with its head office located in San Francisco. The purpose of Kikkoman International is to import Kikkoman products and distribute them in the United States. In the 1950's our first efforts were concentrated in large cities on the West coast, mainly in San Francisco and Los Angeles. The Los Angeles branch office was opened in 1958. In the early 1960's we started to approach large cities on the East coast, for example, New York City. We opened a branch in New York in 1961... and one in Chicago in 1965...

"In order for us to effectively penetrate the American market it was a must for us to have the services of good food brokers. Fortunately we have found very good brokers in various parts of the United States. For example, Myers and Sumder in California are the outstanding food brokers in the nation... Three years ago Kikkoman bought about 55% of the stock in Japan Food Corporation (JFC), the largest Oriental wholesaler in the United States...

"As to the advertising,... in 1956 when Eisenhower was elected President, Kikkoman bought election day T.V. time for vote-count announcements in San Francisco all day long... As we came to spend more money for advertisement we have broadened our advertising strategy. Now we have some national and continuous campaigns...

"About three years ago we built a test kitchen and cooking center in San Francisco, adjacent to the head office of Kikkoman International. We now have home economists there. We have been utilizing these facilities to develop new recipes for soy sauce and to educate customers as to how to use soy sauce not only for Oriental food but also American food...

"In December, 1970... we sent the first investigation team to America. The task of this team was to gather data to enable us to compare the cost of having an American plant rather than exporting the product from Japan. Then it was to find the cost difference among different possible locations for the plant, whether in the West coast, the Mid-West, or the East coast. We asked Mr. Mark Pennington, a consultant in New York, to act as a consultant for the project... We decided that it should be in the Mid-West. The reasons why we made the first decision are as follows: 1. Sales of Kikkoman soy sauce, as I mentioned, have been increasing steadily and have almost reached the stage of making it economically feasible to build a plant. 2. We have to get out from a heavy freight burden. We have been buying most of our main raw materials from the United States, mainly soy beans and wheat from the Mid-West... These freight rates have been increasing sharply every year. Still more, almost every year we suffer from strikes of dock workers. 3. Gradually the cost advantage of Japanese business over the American business has been disappearing. In the past,...labor costs in Japan were much lower than those in the United States... We do not have cheap labor in Japan any more. 4. The yen was devalued. The yen devaluation was not the main factor in our decision...

"The reasons why we made the decision to build the plant in the Mid-West are the following: 1. The present main market for Kikkoman products is the West coast... However, we can expect by looking at the various marketing indexing factors, that there is more market potential for our product in the Mid-West and the East coast. Having a plant in the Mid-West means that we are able to ship the product from there both to the present main market and to the future potential market easily... 2. Our main raw materials are soy beans and wheat, as I mentioned. The Mid-West is the main center for growing these grains. By having the plant there, we can expect to be able to buy the raw materials at lower costs. 3. In the Mid-West there are many food companies. We can expect to sell our product to them for industrial use.

"We chose the Austin Company, Des Plaines, Illinois, as the general contractor... In September, 1971, the president and other top people from Kikkoman, Tokyo, visited the United States and compared six final candidates for the plant site. Then we finally chose Walworth, Wisconsin. The reasons for the decision are as follows: 1. The labor climate there is excellent. 2. The local people are quite friendly. 3. Walworth is a convenient place for transportation. We can expect to keep freight cost and warehousing costs to a minimum... 4. The state of Wisconsin was receptive to Kikkoman from the beginning. I first visited this state in December, 1970, as a member of the first investigation team... 5. The state of Wisconsin is regarded as a state which produces the best quality foods... 6. In Wisconsin we can enjoy beautiful nature. The air is clean, the water is pure, and we have a lot of green here...

"The total investment will be about 9 million dollars." Address: Vice-President, Kikkoman Foods, Inc., Walworth, Wisconsin.

1261. Ho, Coy Choke; Koh, Chong Lek; Chong, C.N. 1973. The *ontjom* fungus, its identification and hybridization with other *Neurospora* species (Abstract). *Genetics* 74(2, Part 2):s116. June. Supplement. Proceedings of the Thirteenth International Congress of Genetics.
• ***Summary:*** The authors use analyses of conidia color and crossing experiments based on meiotic sterility to show that the cultures on okara onchom *(ontjom tahu)* belong to a single species, *Neurospora intermedia.* Address: Dep. of Genetics and Cellular Biology, Univ. of Malaya, Kuala Lampur, Malaysia.

1262. Harper, Anne. comp. 1973. Soybean processing and utilization: A partially annotated bibliography. Jakarta, Indonesia: Lembaga Ilmu Pengetahuan Indonesia (Indonesian Inst. of Sciences), Jl. Tjhik Ditiro 43, Jakarta. vi + 56 leaves. 30 cm. [440 ref. Eng]
• ***Summary:*** Contents: Preface (by Prof. Sarwono Prawirohardjo, Chairman, ASEAN Permanent Committee on Science and Technology). Introduction: The soybean (Glycine max), soybean meal and oil, food uses, industrial uses, scope of the bibliography ("excludes references to non-alimentary utilisation of soybeans" and to "references to alimentary utilisation where the harvested plant has not undergone processing by either fermentation or oil extraction"), terminology of soybean processing (soybean meal, soy flours and grits, solvent extraction, miscella, desolventizer-toaster, defatted soy flour, low-fat soy flour, high-fat soy flour, full-fat soy flour, lecithinated soy flour, soy protein concentrates, soy milk, Saridele, yuba, soybean curd [tofu], aburage, koritofu [kori-dofu, dried frozen tofu], soy protein isolate, protein fibre products {spun, spinnerettes}, extrusion-expansion products, fermentation products {ontjom, Neurospora sitophila, soysauce, shoyu, Aspergillus oryzae, koji, moromi, tamari, koikuchi, natto, miso, tempeh, Rhizopus oligosporus, soybean cheese, sufu, Mucor sufu}, Zygosaccharomyces).

General (p. 1). Fermentation products (p. 2-16). Soybean oil, meal, and protein (p. 17-42). Nutrition (p. 43-56). Note: 500 copies were printed. Address: Indonesia.

1263. L.V.N. / L.V.D. 1973. [The role of enzymes and molds in Vietnamese soy sauce production]. *Khoa Hoc Thuong Thuc (Hanoi).* Oct. 30. [Vie; eng+]*
• ***Summary:*** For a translation of this article, see HOANG, Van Chi (25 May 1979). A table gives the composition of Vietnamese soy sauce. The mold most suited for soysauce production is *Aspergillus oryzae.* Address: Vietnam.

1264. Leng, Earl R. 1973. Breeding soybeans for high productivity under conditions of developing areas. In: International Inst. of Tropical Agriculture. Proceedings of the First IITA Grain Legume Improvement Workshop. See p. 42-52. Held 29 Oct.–2 Nov. 1973 at Ibadan, Nigeria.
• ***Summary:*** Tables show results of variety trials in Costa Rica (1972), Nigeria (1971), Madhya Pradesh, India (1972), Thailand (1971), Jogjakarta, Indonesia (1971), Brazil (1970-71).

"While a few years ago there were grounds for believing that the USA could supply all the soybeans needed in world grain trade, at the present time it is very clear that this crop is in acutely short supply on a world-wide basis, and that many countries which previously have imported their soybean requirements will be considering means by which they may produce part or all of their needs.

"Development of the soybean from a forage crop into a major grain crop in the USA was made possible by a breeding breakthrough at the University of Illinois in the early 1920's. Dr. C.M. Woodworth developed types which had an upright, non-branching growth habit, rather than the prostrate, vining habit which previously had been most common. As a result, it became possible to harvest the crop with normal field machinery. Growth in acreage and productivity was explosive."

"In the USA there is at present a sharp distinction between 'northern' and 'southern' types. The 'northern' varieties are almost all of indeterminate growth habit and are based primarily on Manchurian and Hokkaido germ-plasm. The Manchurian types predominate, except in varieties adapted to extreme northern areas. While these 'northern' varieties are considered to be especially day-length sensitive, recent evidence indicates that their early maturity under warmer conditions is influenced more by high temperatures than by actual day-length."

"The 'southern' types may be traced generally to germ-plasm imported from Taiwan or southern China. All the modern U.S. varieties in this class are of determinate growth habit; that is, increase in height virtually ceases once flowering begins. Although these varieties are popularly regarded as less sensitive to day-length, they actually tend to be more day-length sensitive and less temperature-sensitive than the 'northern' types."

"In our experience with variety trials on a worldwide basis, we have found that some of the 'southern' types from the USA give superior performance when grown under favorable conditions, as compared with nearly all other germ-plasm tested."

"Soybean breeding is generally not well developed in countries other than the USA and Canada. Recently, however, Brazil and India have undertaken programs on a significant scale." Address: Univ. of Illinois, Urbana, IL.

1265. Fung, W.P.; Tye, C.Y. 1973. Evaluation of soya bean milk as an antacid. *Singapore Medical Journal* 14(4):515-18. [5 ref]
• ***Summary:*** Soymilk has neutralizing properties like an antacid but is significantly less effective than a standard antacid like SIMECO, although it has no side effects. Address: Dep. of Medicine, Univ. of Singapore.

1266. Iljas, N.; Gould, W.A.; Peng, A.C. 1973. New soybean food made from tempeh. *Ohio Report on Research and Development* 58(6):125-26. Nov/Dec.
• ***Summary:*** Eight tempeh-based foods were developed using tomato products as the second ingredient. The most acceptable of these was a sort of tempeh sloppy joe. The recipe is given. Address: Dep. of Agricultural Research and Development Center, Ohio Stat Univ.

1267. Pan, C. 1973. The present, future soybean utilization in the Philippines. In: The Philippines Food and Nutrition Program Seminar-Workshop on Indigenous Food. Held 3-4 Dec. 1973 at Paulino J. Memorial Hall, Taft, Herrera, Manila. *

1268. Escueta, E. 1973. Development of a process for the preparation of soymilk in rural areas. MSc thesis, University of the Philippines at Los Banos, Laguna, Philippines. *
• ***Summary:*** Presoaking soybeans in boiling water shortens the time of boiling necessary to inactivate the soybean trypsin inhibitor.

1269. Ketupanya, W. 1973. [Soybean thresher]. *Kasikorn* 46(5):383-85. [Tha]*
Address: Dep. of Agriculture, Bangkok, Thailand.

1270. Nga, B.H. 1973. *Aspergillus oryzae* in the production of soy sauce and related foodstuffs: Strain improvement and increased production. Singapore: Applied Research Corp., Research Report. *
Address: Singapore.

1271. Tôn-Thât-Trinh. 1973. [The situation of oilseed crop cultivation in S. Vietnam]. *Oleagineux* 28(4):185-88. [Fre; eng; spa]
Address: Ecole Supérieure Agronomique, Saigon, S. Vietnam.

1272. Waranyuwat, A. 1973. Soybeans and soybean research at the Northeast Agricultural Center, 1970-1971. *Thai J. of Agricultural Science* 6(1):75-87. *
Address: Northeast Agricultural Center, Khon Kaen, Thailand.

1273. Warnayuwat, A.; Kotama, P. 1973. Influence of plant population and weed control on soybeans. *Thai J. of Agricultural Science* 6(2):101-13. [23 ref]*
Address: Northeast Agricultural Center, Khon Kaen, Thailand.

1274. Agricultural statistics of Sabah 1973. 1973. Kota Kinabalu, Sabah: Department of Agriculture. 113 p. *

1275. Food and Agricultural Organization of the United Nations. 1973. Soybeans: Area harvested, yield, and production. *FAO Production Yearbook (Rome, Italy)* 27:130.
• ***Summary:*** The following nations are listed for the first time as soybean producers in the *FAO Production Yearbook.* * = Unofficial figure. F = FAO estimate. Bolivia: Harvested 1,000 ha in 1971 and 1972, and 2,000* ha in 1973.

Guyana: Harvested 1,000 ha in 1971*, 1972*, and 1973F. Mal W Malays [Malaysia and West Malaysia]: Achieved yields of 1,417 kg/ha in 1961-65, 1,607 kg/ha in 1971, and 1,500 kg/ha in 1972.

Spain: Harvested 2,000 ha in 1971 and 1972, and 13,000 ha in 1973.

British Solomons [British Solomon Islands Protectorate]: Achieved yields of 1,000 kg/ha in 1961-65, 1971, 1972, and 1973.

1276. George Ohsawa Macrobiotic Foundation. 1973. Useful names and addresses. 1471–10th Ave., San Francisco, CA 94122. 55 p. 21 cm.
• ***Summary:*** This macrobiotic directory lists names and addresses of macrobiotic people, organizations, food stores and restaurants, and bookstores in the United States (each category broken down by state), Canada, and abroad. The leading states for individuals are California (7.3 pages), New York (1.5 p.), and Massachusetts (1 p.).

There are listings for the following foreign countries: Argentina, Australia, Austria, Belgium, Brazil, Costa Rica, Denmark, England, France, Germany, India, Ireland, Italy, Japan, Mexico, Netherlands, New Zealand, Norway, Portugal, Spain, Sweden, Switzerland, South Vietnam.

There are ads for the following companies: Sunflower, The Queensberry Bakery (112 Queensberry St., Boston 02215), East West Foundation Center, Sanae Inc. at 2 locations (Sanae Restaurant at 272A Newbury St., Boston, and The Seventh Inn at 288 Boylston St. in Boston), Prasad (1956 University Ave., Berkeley, California) (p. 0). Eden whole earth grocery and delicatessen, and Sun Bakery (330 Maynard St., Ann Arbor, Michigan) (p. 18). Janus Natural Foods (712 7th Ave. South, Seattle, Washington 98104. Phone: 206-MA4-1084) shows that they distribute (import) tamari and miso, as well as sea vegetables. They carry the following brands: Erewhon, Spiral Foods, Deaf Smith, Pure & Simple, Chico-San, Arrowhead Mills (p. 27). Cliffrose (129 Coffman, Longmont, Colorado). Ceres Harvest Natural Foods (3632 W. Colorado Ave., Colorado Springs, CO 80904; wholesale and retail) (p. 39). The Good Karma Cafe

(501 Dolores St., San Francisco), and The Good Earth (123 Bolinas Rd., Fairfax, CA 94930) (p. 50). Greenberg's Natural Foods, Inc. (125 1st Ave., New York, NY 10003).

The George Ohsawa Macrobiotic Foundation is a non-profit organization located at 1471–10th Ave., San Francisco, California 94122. It was founded in 1971. The aim of the Foundation is to spread the teaching of the unifying principle and its practical applications in daily life. Address: San Francisco, California.

1277. Hermana, -; Roedjito, S.W.; Karyadi, Darwin. 1973. Advances in the preparation of tempe. II. Preparation of tempe mold inoculum and observation of its activity during storage. *Gizi Indonesia, J. of the Indonesian Nutrition Association* 5(1-2):2-7. Presented initially at the 4th International Fermentation Symposium. Held 19-25 March 1972 at Kyoto, Japan. 9 p. [5 ref]

• ***Summary:*** "Tempeh mold inoculum can be made by growing mold on rice or steamed cassava flour. The mold culture is then dried in the sun when the spores have fully matured. It is then ground to a powder. The spores may also be taken off from the dried culture by rubbing them off with wheat flour. Rice flour or tapioca flour may be used as substitutes for wheat flour. The flours are also used to dilute the concentration of the spores in the inoculum.

"Another type of tempeh mold inoculum can be made by grinding dried tempeh into powder.

"Inoculum made by growing tempeh mold on rice is the best of the three, is easily prepared and is inexpensive. The shelf life is at least 6 months when stored in a closed container at room temperature (25ºC)." Address: 1. Research Associate, Nutrition Research Inst., Bogor; 2. Dep. of Botany, Bogor Agricultural Univ., Bogor; 3. Director, Nutrition Research Inst., Bogor, Indonesia.

1278. Hermana, -. 1973. Tempe: An Indonesian fermented soybean food. In: W.R. Stanton, ed. 1972. Waste Recovery by Microorganisms: Selected Papers for the UNESCO/ ICRO Work Study held at the University of Malaya. Kuala Lumpur: Ministry of Education, Malaysia... 221 p. See p. 55-62. Held 1-18 May 1972 at Kuala Lumpur, Malaysia. Illust, Maps. 27 cm. [34 ref]

• ***Summary:*** An excellent early summary. Contents: Introduction. Methods of preparation: Dehulling, packaging. The mold *(Rhizopus* species): Characteristics desirable for a strain of mold used to manufacture tempe, requirements for mold growth. The inoculum: Methods used to prepare it. Nutritive value: Changes in protein (soluble nitrogen, changes in amino acids and free amino acids), changes in lipids (strong lipolytic activity, changes in fatty acid composition, changes in linolenic acid, acid number and pH), changes in carbohydrates, changes in B vitamins, changes in solids (and soluble solids), changes in nutritive value of protein (changes in PER). Uses of tempe (keeping quality, extending shelf life by sun drying or deep frying).

A table (p. 60) shows the nutritive value of tempe per 100 gm. Address: Bandung, Indonesia.

1279. Hudayah, Haryati. 1973. Mampelajari kemungkinan penggantian proses pengupasan kulit biji kedele dengan perlakuan bahan kimia pada pembuatan tempe [The possibility of chemical treatment as an alternative to soybean dehulling in tempeh processing]. Thesis (Skripsi), Fakultas Teknologi Pertanian Universitas Gadjah Mada, Yogyakarta, Indonesia. 23 p. [Ind]*
Address: Yogyakarta, Indonesia.

1280. Hunter, Beatrice Trum. 1973. Fermented foods and beverages. New Canaan, Connecticut: Keats Publishing Co. 116 p. Index. 18 cm. [38 ref]

• ***Summary:*** In the chapter titled "Soybeans" (p. 31-49), the author discusses tofu (and how to make it at home with or without fermentation), meitauza (fermented okara), hakko tofu (a newly developed high protein food; fermented soybean curd), sufu (Vietnamese call it Chao), shoyu, miso, ketjap (thick Indonesian soy sauce), tempeh, Hamanatto, natto, Tao-cho from Malaysia, and Tao-si from the Philippines.

Note: The author has collected her information (both correct and incorrect) for a number of sources, which she does not cite directly, although she does have a bibliography.

1281. Iljas, Nasruddin; Peng, A.C.; Gould, W.A. 1973. Tempeh: An Indonesian fermented soybean food. Wooster, OH: Ohio Agricultural Research and Development Center, Dept. of Horticulture. Horticulture Series No. 394. 36 p. [134 ref]

• ***Summary:*** An excellent review of the literature with a large bibliography. Contents: Introduction. Production and consumption of soybeans (worldwide). Nutritive value. Deficiencies inherent in soybeans: Amino acid, beany flavor, antinutritional factors. Tempeh: The tempeh mold, methods of preparation, Changes in chemical composition (proteins and amino acids, lipids, carbohydrates, vitamins, minerals), nutritive value, preservation, acceptance and potential use.

Footnote (p. 1): "Part of the review was from a Ph.D. dissertation by the senior author at The Ohio State University. Present address: Fakultas Pertanian, Universitas Negeri Seriwidjaja, Djl. Bukit Besar, Palembang, Indonesia." Address: Ohio State Univ.

1282. International Rice Research Institute. 1973. Annual report for 1972. Los Banos, Laguna, Philippines. Soybeans: p. 23-24, 26-27, 29-30, 32. *

1283. Sundhagul, Malee; Daengsubha, W.; Suyanandana, P. 1973. Thua-nao: A fermented soybean food of northern Thailand. II. Improved method of processing. Bangkok: Applied Scientific Research Corp. of Thailand. 10 p. Traditional Processing Method, Research Project No. 38/3. 30 cm. [2 ref]
Address: Bio-Technology Group, Technological Research Inst., ASRCT, Bangkok, Thailand.

1284. Sundhagul, Malee; Daengsubha, W.; Suyanandana, P. 1973. Thua-nao: A fermented soybean food of northern Thailand. III. Development of a low-cost high protein food. Bangkok: Applied Scientific Research Corp. of Thailand. 11 p. Traditional Processing Method, Research Project No. 38/3. 30 cm. [8 ref]
Address: Bio-Technology Group, Technological Research Inst., ASRCT, Bangkok, Thailand.

1285. Theroux, Paul. 1973. Saint Jack. Boston, Massachusetts: Houghton Mifflin Co. 247 p. See Chap. 5, p. 46, 50. 22 cm.
• ***Summary:*** This novel is set in Singapore. "Smale, Yates, and Coony were at the bar and over in an armchair drinking soybean milk and absorbed in the *Reader's Digest* sat old Mr. Tan Lim Hock" (p. 46).

"When Mr. Tan left the bar I sometimes did an imitation of him with his *Reader's Digest* and bottle of Vimto soybean milk" (p. 50).

1286. U.S. Department of Agriculture. 1973. The annual report on activities carried out under the Public Law 480, 83d Congress, as amended, during the period January 1 through December 31, 1972. Washington, DC: U.S. Government Printing Office. See p. 103-10.
• ***Summary:*** Table 18 is titled "Title II, Public Law 480, total commodities shipped by program sponsor, fiscal year 1972." The main program sponsors and distributing agencies, listed alphabetically, are AJJDC (American-Jewish Joint Distribution Committee), CARE, CRS (Catholic Relief Service), CWS (Church World Service), LWR (Lutheran World Relief), SAWS (Seventh-day Adventist World Service), UNICEF, UNRWA (United Nations Relief and Works Agency), WRC (World Relief Commission). Each of these are Private Voluntary Organizations (PVO/PVOs), registered with USAID. The following foods containing soy protein were distributed: CSM (corn soya mix), WSB (wheat soya blend), and small amounts of soya flour. The vegetable oil which was shipped to many countries was soybean oil; it is not recorded here. The foods containing soy protein were sent in the following amounts (in thousands of pounds) to the following continents and countries: Africa (8,131 CSM and 5,311 WSB): Botswana (2,198 CSM), Burundi (99 CSM), Cameroon (220 CSM and 245 WSB), Central African Republic (153 CSM), Gabon (33 WSB), Gambia (271 CSM), Ghana (1,056 CSM and 150 WSB), Guinea (100 CSM), Liberia (243 CSM and 111 WSB), Malawi (132 CSM), Morocco (676 CSM and 54 WSB), Nigeria (867 CSM and 4,124 WSB), Rwanda (173 CSM), Senegal (300 CSM), Sierra Leone (1,510 CSM), Tanzania (96 CSM), Tunisia (4 CSM and 43 WSB), Upper Volta (33 CSM and 41 WSB), Zaire (510 WSB and 30 soya flour).

Near East-South Asia (348,766 CSM and 97,345 WSB): Afghanistan (699 CSM), Ceylon (1,462 WSB), Gaza [occupied by Israel since 1967] (1,622 CSM and 1,410 WSB), India (234,993 CSM and 27,006 WSB and 8,726 soya flour), Jordan (2,137 CSM), Jordan-West Bank [occupied by Israel since 1967] (758 CSM and 1,067 WSB), Lebanon (385 CSM), Nepal (55 WSB), Pakistan (1,197 CSM and 325 WSB), Syria (570 CSM), Turkey (275 WSB), NESA regional; emergency feeding of East Pakistani children by UNICEF (106,405 CSM and 65,745 WSB).

Far East [East Asia] (27,014 CSM and 4,121 WSB): China, Republic of [Taiwan] (15 CSM), Indonesia (6,791 CSM and 2,380 WSB), Korea (2,347 CSM), Laos (1,699 CSM and 1,741 WSB), Malaysia (102 CSM), Philippines (9,107 CSM), Vietnam (6,953 CSM).

Latin America (63,980 CSM and 31,274 WSB): Bolivia (2,197 CSM and 660 WSB), Brazil (25,171 CSM and 11,204 WSB), British Honduras [Belize] (507 CSM and 215 WSB), Chile (300 CSM and 2,812 WSB), Colombia (6,284 CSM and 4,608 WSB), Costa Rica (3,042 CSM), Dominica (2 CSM), Dominican Republic (8,118 CSM and 3,309 WSB), Ecuador (2,013 CSM and 1,722 WSB), El Salvador (1,195 CSM), Grenada (11 CSM), Guatemala (2,037 CSM and 962 WSB), Guyana (370 CSM and 474 WSB), Haiti (1,121 CSM), Honduras (716 CSM and 51 WSB), Jamaica (364 CSM and 198 WSB), Nicaragua (375 CSM and 760 WSB), Panama (409 CSM and 639 WSB), Paraguay (759 CSM), Peru (7,850 CSM and 3,806 WSB), St. Vincent (17 CSM), Surinam (2 CSM), Uruguay (950 CSM and 284 WSB).

Grand total by commodity: 447,891,000 lb of CSM and 138,051,000 lb of WSB. Agencies distributing the most CSM and WSB (in million lb): CARE 268, UNICEF 174, CRS 89.

Note: This is the earliest document seen (Aug. 2009) concerning soybean products (Corn-Soy Meal) in Botswana. This document contains the earliest date seen for soybean products in Botswana (1972); soybeans as such had not yet been reported by that date. Address: Washington, DC. Phone: 703-875-4901 (1991).

1287. Chung Ngee, L.T.; Kang, E.V.B. comps. 1973? Agricultural statistics of Sarawak, 1971. Kuching, Sarawak: Department of Agriculture. 126 p. Undated. *
Address: Agricultural Economics Div., Dep. of Agriculture, Sarawak.

1288. David-Perez, Enriqueta. comp. and ed. 1973? Recipes of the Philippines. Philippines: Published by the author. Printed by Cacho Hermanos, Inc., Corner Pines, and Union Streets, Mandaluyong, Metro Manila, Philippines. 170 p. Undated. 22 cm.

• ***Summary:*** The title page of this book states that the 19th printing was 1973 (Copyright by the author), but no initial date of publication is given. The rear cover states: Reprinted and exclusively distributed by: National Bookstore Inc. Other editions include 1953 (at Library of Congress), 1954, 1960, 1965, and 1968. Contents: Acknowledgement. Introduction. Reminder, Fiesta fare. Everyday dishes. Sweets and desserts. Breakfast and merienda. Pickles and relishes. Refreshments. Glossary. Contains 19 black-and-white photos.

Soy-related recipes include: Baguio onion with tokua [firm tofu] (p. 28). Bañgus en tocho–1 (with tajure, p. 32). Bañgus en tocho–2 (with tajure, tausi, and tokua). Bañgus in soy sauce (p. 33). Bawang guisado (with tokua, cubed and fried, p. 33). Beef steak (with soy sauce, p. 34). Misu-tomato sauce (with miso, p. 74). Paksiw (Pork with soy sauce, p. 78). Paksiw na pata (with soy sauce, p. 78). Pancit "luglug" (with tokua, p. 80). Pork tapa (with toyo soy sauce, p. 88). Taguba (pork with soy sauce, p. 102).

The glossary defines the following soy-related terms: Misu–paste made of fermented rice and soy beans. Tajure–fermented soy beans, caked. Tausi–fermented soy beans. Tokua–soy bean curd. Toyo–soy sauce. Address: Philippines.

1289. Parman, G.K. 1974. Agency for International Development's program for development and utilization of soybeans in the developing world. *J. of the American Oil Chemists' Society* 51(1):150A-151A. Jan. Proceedings, World Soy Protein Conference, Munich, Germany, Nov. 11-14, 1973.

• ***Summary:*** Contents: Abstract. Introduction. Problems face soybean adaptation. Approaching these problems. International resource base for soybeans.

The Agency for Industrial Development (AID, in the Department of State) is sponsoring a development program to increase soybean yields and utilization in tropical and subtropical countries. This research is being conducted under grants ($500,000 each awarded in Sept. 1973) to the University of Illinois (Champaign) and the University of Puerto Rico (Mayaguez). The Illinois-Puerto Rico research is further coordinated with various international centers which are directly interested in developing soybean production: International Institute of Tropical (IITA) in Nigeria, International Rice Research Institute (IRRI) in the Philippines, and the International Center for Tropical Agriculture (CIAT) in Colombia.

The Food Science Department at the University of Illinois has recently developed a simple method for direct utilization of whole soybeans for human food. Broken or cracked beans are removed, the whole beans are soaked for 6-8 hours in a 0.5% solution of sodium bicarbonate and baking soda, then they are drained and cooked for 20-30 minutes in a similar solution. The resulting beans are tender and bland in taste. Address: Agency for International Development (AID), Dep. of State, Washington, DC.

1290. Nasution, S.; Sari Hasuda, P.N.; Nagera, D.J.L.K. 1974. Consumer acceptance and marketing of Saridele. In: International Symposium on Protein Foods and Concentrates, Proceedings. Mysore, India: Central Food Technological Research Inst. (CFTRI). See p. 398-406. Held 27 June–4 July 1967 at CFTRI, Mysore. * Address: Indonesia.

1291. Saono, Susono; Gandjar, Indrawati; Basuki, Triadi; Karsono, Herry. 1974. Microflora of ragi and some other traditional fermented foods of Indonesia. *Annales Bogorienses* 5(4):187-204. Feb. [14 ref]

• ***Summary:*** "Studies have been conducted on the microflora of samples of 'ragi", 'tapé ketéla' [tapeh ketela, from cassava] or 'peuyeum', 'tapé ketan hitam' [from black glutinous rice], 'oncom hitam' [onchom from peanut presscake or cassava presscake], and 'oncom mérah' [onchom merah] or 'oncom beureum' [from peanut presscake or okara; both terms mean "red onchom"] from various places in West Java. Genera found in ragi include *Candida, Mucor* and *Rhizopus* species.

Appendix I, titled "Fermented products of Indonesia" lists 26 different traditional fermented products. Those made from soybeans and related products include: Kécap–Soy sauce made from black soybeans. Oncom mérah–Okara onchom. Témpé kedelé–Tempeh made from soybeans. Témpé bengook–Tempeh made from the ripe seeds of *Mucuna pruriens* var. *utilis.* Témpé lamtoro–Tempeh made from the seeds of Leuceuna leucocephala. Témpé gembus–Okara tempeh. Témpé bongkrék–Tempeh made from the solid refuse of coconut meat. Many of these foods are prepared with the help of a starter called "ragi," a small, slightly flattened dry ball consisting of rice powder, spices, and microorganisms. Ragi témpé, for example, is the type of ragi used to make tempeh.

Appendix II, titled "Methods of preparation of 'ragi,' 'tapé ketela, 'tapé ketan,' 'oncom hitam,' and 'oncom merah' in West Java" contains 1-2 paragraphs on each. On pages 200-204 are detailed illustrations showing the morphology of 14 species and varieties of yeast.

Note 1. The Treub Laboratory was named after Dr. Treub, who was associated with the founding of the Buitenzorg Botanical Gardens in the 1880s. He was there in the mid-1890s.

Note 2. This is the earliest document seen (March 2010) that contains the word "oncom" (spelled in that way). Address: 1,3-4. Treub Lab., National Biological Inst., Bogor; 2. Nutrition Research Inst., Dep. of Health, Bogor.

1292. *Soybean Digest.* 1974. Soybeans high income crop in Philippines. Feb. p. 38b.

• ***Summary:*** "The shortage and resultant soaring prices of soybeans have made them a profitable crop for the Republic of the Philippines. The government reports gross income per acre of $453.00 with production costs of $69.00/acre and production at 36 bu/a.

"Present production in the Republic is far short of meeting local requirements with soybean imports from 1969-73 exceeding 4.4 million bu and valued at $24 million.

"The Philippines government is, therefore, attempting to encourage production of soybeans by offering a 'price support plan' to assure reasonable profits for the farmers regardless of the world market and with a government guarantee of foreign loans and remittances of profit in foreign exchange for foreign investors.

"Production should increase with the knowledge that the soybean crop, which is planted in late September or early October, can be produced successfully in many areas of the Republic. Many varieties of soybeans have been found adaptable to the Philippines soil and climate."

1293. Wang, Hwa L.; Kraidej, Lavanya; Hesseltine, C.W. 1974. Lactic acid fermentation of soybean milk. *J. of Milk and Food Technology* 37(2):71-73. Feb. [8 ref]

• ***Summary:*** "Growth rates of 8 *Lactobacillus acidophilus* strains and four *Lactobacillus bulgaricus* strains were compared in soybean milk and soybean milk enriched with glucose, lactose, and sucrose. Four *L. acidophilus* strains grew well in soybean milk; the remainder grew better in soybean milk supplemented with glucose or lactose. In general, soybean milk was not an adequate media for strains of *L. bulgaricus*. Almost all these cultures, however, could adapt themselves to the environments of the media tested. A soybean milk drink fermented by *L. acidophilus* NRRL B-1910 was prepared and evaluated by a taste panel. The drink had a refreshing sweet-sour taste, and the beany flavor of soybeans was masked by the fermentation process."

In making a yogurt-like product from soybean milk, *Lactobacillus acidophilus* consistently produced a better product than the other strains. This soy yogurt was "eggshell (white) in color, had a sour but not harsh flavor, and had a smooth custardlike texture. When it was spooned out of its container, the appearance of free whey indicated the need for a stabilizer." When 4% sucrose was added to the soymilk prior to fermentation, the yogurt-like product had a pleasant sweetish-sour taste. The sucrose was added to give a balance between the acidity and sweetness of the product. Address: NRRL, Peoria, Illinois.

1294. Steinkraus, Keith H. 1974. Research on traditional Oriental and Indian fermented foods. *Current Science and Technology, Special Report* No. 16. p. 10-13. April. (Cornell University). [13 ref]

• ***Summary:*** Discusses tempeh, ontjom, idli, Ecuadorian "yellow" rice, Indonesian tape (tapeh, tapé), fermented soy milks, and fish paste, including their nutritive value, digestibility (apparent digestion coefficient), vitamins, and acceptability, plus thoughts on the wholesomeness of fermented foods. Address: Prof. of Microbiology, Dep. of Food Science & Technology, New York State Agric. Exp. Station, Geneva, New York.

1295. Whigham, D.K. 1974. International variety trials. *INTSOY Series* No. 2. p. 20-37. Proceedings of the Workshop on Soybeans for Tropical and Subtropical Conditions (College of Agric., Univ. of Illinois at Urbana-Champaign). [Eng; spa]

• ***Summary:*** "The INTSOY variety evaluation trials were established in early 1973 to determine the adaptability of soybeans throughout the tropical and subtropical areas of the world. Commercially available soybean varieties were used because of the quantity of seed required. Large quantities of experimental lines were not available."

In 1973, soybean trials were conducted in 33 different countries. In 11 of these countries, FAO cooperated in the trials. The 1973 trials consisted of 20 varieties which were replicated four times in a randomized complete block design. Table I titled "1973 INTSOY variety evaluation trials" (p. 22) lists the names of the 33 cooperating countries and the number of variety trials conducted by each country during 1973. A total of 90 trials (the number for each country is shown after the country name) were conducted during the year. An asterisk (*) shows the 11 countries in which FAO cooperated. Africa: Egypt* 1, Ethiopia* 3, Ghana 3, Kenya 1, Sierra Leone 2, Somalia* 2, South Yemen* 1, Sudan* 1, Tanzania 3.

In Somalia, the two soybean trials in 1973 were conducted by: Mr. M.A. Dukseyeh, Head, Agricultural Research Service, Ministry of Agriculture, Central Agricultural Research Station–Afgoi, Mogadishu, Somalia. Note: These are the first soybean trials conducted in Somalia since 1927 (see Vivenza 1928).

Asia: Afghanistan* 1, India 2, Indonesia 5, Malaysia 2, Pakistan* 3, Philippines 3, South Viet Nam 3, Sri Lanka 12, Taiwan 2, Thailand 7, Tonga 2.

Mesoamerica: Belize 3, Costa Rica 4, Guatemala 2, Mexico 3, Nicaragua 1, Puerto Rico 6.

Middle East: Iran* 1, Iraq* 1, Jordan* 2, Syria 1.

South America: Colombia 3, Ecuador 2, Peru 2.

Specific results for all varieties tested are given for Sri Lanka (4 sites), Philippines (2 sites), Puerto Rico (2 sites), Pakistan, and Indonesia. At most locations the protein and oil content was greater than when the same varieties were grown in the USA.

A comparison of the Appendix of this report (p. 33-37, unnumbered) with the "International soybean variety experiment: First report of results" (Whigham, Oct. 1975. INTSOY Series No. 8) shows that cooperators in six countries who were sent soybeans for trials did not send back any results: They were: (1) South Yemen–Dr. H. Idris, Agricultural Research Station, El Kod, Aden, South Democratic Yemen. Note: This is the earliest document seen (Dec. 2007) concerning soybeans in Yemen. (2) Sudan–Dr. M.O.M. Salih, Director of Agric. Research Corp., Wad Medani, Sudan; (3) Tonga–Mr. Merle M. Anders, Agronomist, Dep. of Agriculture, Box 14, Nuku'alofa, Tonga. Note, however, that Mr. Anders reported his results in 1976 in the *Fiji Agricultural Journal* 38(2):77-80.

Note: This is the earliest document seen (March 2010) concerning soybeans in Tonga; they arrived there in 1973 and were planted by Anders on 27 June 1973 (See Anders 1976). The source of these soybeans was INTSOY at the University of Illinois.

(4) Guatemala–Dr. Albert N. Plant, USAID, Guatemala City, and Dr. Ricardo Bressani, Jefe de la Div. de Ciencias Agricolas y de Alimentos, Carretera Roosevelt, Zone 11–AP Postal 1188, Guatemala; (5) Iran–Dr. N.C. Amirshahi, Head, Dep. of Agronomy, Karaj Agric. College, Univ. of Tehran, Iran; (6) Iraq–Mr. Haji Abdul Sattar, Director, Research Ind. Crops, Abu Ghraib Agricultural Research Station, Baghdad, Iraq. For a report on the results of these trials, see Fadhil-Alzubaidi 1975. Note: This is the earliest document seen (Dec. 2007) concerning soybeans in Iraq.

The cooperator in Belize in 1973 was (p. 35): Dr. J.P. Cal, Agronomist, Department of Agriculture, Central Farm–Belmopan, Caijo District, Belize, British Honduras. No results for soybeans in Belize are given.

The cooperator in Nicaragua in 1973 was (p. 36): Mr. Mack H. McLendon, Deputy Food & Agri. Officer, USAID/Nicaragua, c/o American Embassy, Managua, Nicaragua. No results for soybeans in Nicaragua are given. Address: Asst. Prof., Dep. of Agronomy, INTSOY, Univ. of Illinois at Urbana-Champaign.

1296. Lacy, K.H. 1974. Soybean production costs, South Cotabato. Quezon City: Special Studies Div., Planning Service, Office of the Secretary, Dep. of Agriculture. 8 p. June. Reprinted in 1978 in Studies in Philippine Agriculture 74-16 (Diliman, Quezon City).

• ***Summary:*** "Soybean production in South Cotabato is a relatively recent development... The objectives of this study were to determine, given the 1973-74 growing conditions, (a) the costs incurred in the production of soybeans, and (b) yields and income from soybeans in the 2 major soybean producing areas of South Cotabato. A total of 51 producers were interviewed." Address: Special Studies Div. Planning Service, Office of the Secretary, Dep. of Agriculture, Diliman, Quezon City 3008, Philippines.

1297. *Soybean Digest.*1974. Edible oils background. July. p. 11-13.

• ***Summary:*** Contains detailed information on edible oils and fats worldwide. As of 22 May 1974, soy oil costs 2.8 times as much as it did, on average, in 1972. However the price of every other edible oil and fat has increased about that much and, in some cases much more. Coconut oil is 4.7 times as expensive and palm kernel oil is 5.5 times as expensive. Tables show: (1) World production (in million metric tons) of leading oils and fats. Those with the largest production worldwide are: Soy 23.2%, butter 14.3%, sunflowerseed 11.3%, lard 8.8%, cottonseed 7.7%, groundnut / peanut 7.1%, rapeseed 6.5%. (2) World production and export of soybeans and soy oil (1973-74). The top producers of soybeans are: USA 67.4% of total, China 15.3%, Brazil 11.4%, Argentina 0.9%. Top net exporters of soybeans are: USA 87.2%, Brazil 12.1%. Top next exporters of soy oil are: USA 73.7%, Brazil 21.4%, Argentina 4.7%. (3) World production and export of coconut oil (1973-74). Leaders are Philippines, Indonesia, and West Germany (processor only). (4) World production and export of cottonseed and cottonseed oil (1973-74). Leaders are USA, USSR, and China. (5) World production and export of sunflowerseed and sunflowerseed oil (1973-74). Leaders are USSR, Argentina, and Rumania. (6) World production and export of rapeseed and rapeseed oil (1973-74). Leaders are India, Canada, and China. (7) World production and export of groundnuts and groundnut oil (1973-74). Leaders are India, China, and USA.

A bar chart shows price increases (%) of edible oils since 22 May 1974.

1298. Bennett, Jean. 1974. Filipino food: A blending of flavors. The dentist cooks. *Los Angeles Times.* Aug. 1. p. K22.

• ***Summary:*** About Ida Del Mundo, a fine chef, and her cooking. Philippine cuisine has a long and complex tradition. "Much of it is Spanish in origin. Some of it is of Chinese origin such as the use of wheat, rice, noodles, soy bean curd, [mung] bean sprouts, egg rolls, and the very extensive use of steamed foods." A recipe for Sweet and sour sauce dip calls for soy sauce. A photo shows Ida cooking Filipino foods.

1299. Gandjar, Indrawati; Steinkraus, K.H. 1974. Biochemical, nutritional, and organoleptic changes occurring during production of indigenous fermented foods. In: UNESCO/ICRN/ITB Training Course on Indigenous

Fermented Foods. 25 p. Held 12-31 Aug. 1974 at Bandung, Indonesia. *
• ***Summary:*** Discusses kecap ([kechap], soy sauce), tauco ([taucho] Indonesian-style miso), tempeh, idli, tapeh ketan, and terasi.

Note: This is the earliest English-language document seen (March. 2009) uses the word "tauco" (spelled in that way) to refer to Indonesian-style miso.

1300. Areekul, S.; Thearawibul, R.; Matrakul, D. 1974. Vitamin B-12 contents in fermented fish, fish sauce and soya-bean sauce. *Southeast Asian J. of Tropical Medicine and Public Health* 5(3):461.
• ***Summary:*** Not: This is the earliest English-language document seen (Jan. 2006) that uses the term "soya-bean sauce" to refer to soy sauce. Address: Dep. of Radioisotopes, Faculty of Tropical Medicine, Mahidol Univ., Bangkok, Thailand.

1301. Rusmin, Simon; Ko Swan Djien. 1974. Rice-grown *Rhizopus oligosporus* inoculum for tempeh fermentation. *Applied Microbiology* 28(3):347-50. Sept. [15 ref]
• ***Summary:*** A method of growing tempeh starter culture on cooked rice is described and evaluated. The spores of *Rhizopus oligosporus* survived best at low temperature (4ºC) and intermediate humidity (50% relative humidity). "The activity of the rice-grown inoculum to ferment soybeans into tempeh did not decrease appreciably when stored desiccated for one year at 4ºC or room temperature. Bacterial contaminants as high as 100 million counts per gram of cooked soybeans did not seem to affect the fermentation."

In Indonesia, tempeh starter is sometimes grown on the crushed leaves of *Musa* [banana] species, *Kothrina* species, *Hibiscus similis,* or *Tectona grandis,* which are placed inside the package of inoculated soybeans. The leaves, which become covered with mycelium during fermentation, are sun-dried and stored for inoculum.

Present addresses: Rusmin: School of Biological Sciences, University of Kentucky, Lexington, KY 40506. Ko: Food Science Dep., Agricultural University, Wageningen, The Netherlands. Address: Laboratorium Mikrobiologi, Institut Teknologi Bandung, Bandung, Indonesia.

1302. Flores, L.B. 1974. Make soy sauce comparable with the imported kind. *NIST News (The) (Manila).* NIST-142. Nov. 18. 3 p.
• ***Summary:*** NIST stands for National Institute of Science and Technology, in Manila. Address: Philippines.

1303. Dosti, Rose. 1974. Gustatory treats to tempt a Santa. *Los Angeles Times.* Dec. 19. p. K14.
• ***Summary:*** In the section on "Fancy fruits and vegetables" is a subsection titled "Philippines," which states that the Philippine Commercial Center (1144 W. Temple St., Los Angeles) "has some food to go, plus tropical fruit preserves, salted black beans, duck's eggs and chorizos made daily."

1304. Predicasts, Inc. 1974. World manufactured soybean foods. Special Study No. 108. Predicasts, Inc., 200 University Circle Research Center, 11001 Cedar Ave., Cleveland, OH 44106. vi + 93 p. Dec. 24. No index. 28 cm. Research Analyst: Frederick M. Ross.
• ***Summary:*** Contents: 1. Introduction. 2. Summary. 3. Economics of Soybean Foods: Soybeans, soy flour, meat extenders (based on extruded textured soy flour), synthetic meat (based on spun isolates). 4. Industry structure: General, $1,000 million food and feed giants (ADM, Cargill, Central Soya, General Mills/Takeda Chemical, Nabisco, Ralston Purina/Fuji Oil, and Esmark [Swift]), other major manufactured soy food companies (Unilever, General Host [New York], Miles Laboratories/Worthington & Kyowa Hakko Kogyo, A.E. Staley Mfg. Co., Stange [Chicago, Illinois], Chambers & Fargus [Humberside, England]), food industry structure. 5. Demand for manufactured soybean products: Demand for meat & substitutes, supply of natural meat, demand for meat substitutes, demand for soy flour. 6. North America: United States, Canada. 7. Latin America: General, Argentina, Brazil, Mexico, Other Latin America (Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay). 8. West Europe: General, France, West Germany, Italy, Spain, United Kingdom, Other West Europe. 9. East Europe: General, Hungary, Poland, USSR, Other East Europe. 10. Africa: General, Egypt, Nigeria, South Africa, Other Africa & Mideast. 11. Asia: General, China, India, Indonesia, Japan, Pakistan, Other Asia. 12. Oceania: Australia, New Zealand, Other Oceania.

Most sections contain numerous tables, mostly on meat and meat substitute consumption, and raw protein consumption, by country. Address: 200 University Circle Research Center, 11001 Cedar Ave., Cleveland, Ohio 44106. Phone: 216-795-3000.

1305. Bromfield, K.R. 1974. Soybean rust and soybean rust research. *Soybean Genetics Newsletter* 1:45-52. *
• ***Summary:*** Summarizes the distribution of soybean rust and studies conducted by researchers in Australia, Taiwan, Indonesia, Thailand, and the USA. Stresses the epidemiology of the disease. Address: USDA ARS, Plant Disease Research Lab., P.O. Box 1209, Frederick, Maryland 21701.

1306. Central Bureau of Statistics (CBS), Indonesia. 1974. [Industrial census]. Indonesia. [Ind]*

• ***Summary:*** Contains the first statistics seen on commercial production of tempeh, tofu, Indonesian soy sauce *(kecap)*, and Indonesian miso *(tauco)* in Indonesia. Producers are divided into 2 groups by size: Home industry (1-4 workers) and small scale industry (5 or more workers). The amount of soybeans processed in tonnes/year is as follows for home industry/small-scale industry: tempeh (1.8/12.3), tofu (3.8/15.2), soy sauce (0.8/3.7), and miso (4.7/6.3).

1307. Haque, M.M.; Rahman, K.; Begum, J.A. 1974. Studies on the utilization of soybean and soybean products. A Project Report: BSc (Agric. Engineering) Final Exam. Dept. of Food Technology and Rural Industries, Bangladesh Agricultural University, Mymensingh. Summarized in Soybean Research Abstracts (Bangladesh). 1978. p. 58.
• ***Summary:*** Three locally grown soybean varieties (C.N.S., Barmili, and C-Malaya) were analyzed for their nutritional composition. They contained 10.35% moisture, 45.2% protein, 18.35% fat, and 5.42% ash. They were made into soy biscuits (with wheat flour, and containing 18% protein) and soymilk, both of which were found to be acceptable to a taste panel.

Note: This is the earliest document seen concerning soybeans in Bangladesh, or the cultivation of soybeans in Bangladesh after it became an independent nation in 1971. It was named East Pakistan from 1947 to 1971. Before 1947 it was part of Bengal. Address: Dep. of Food Technology and Rural Industries, Bangladesh Agricultural Univ., Mymensingh, Bangladsh.

1308. Hermana, -. 1974. Saving the protein waste from processing of legumes in Indonesia. Bogor, Indonesia: Ministry of Agriculture, Nutrition Research Institute. ASEAN 7FA/Wrks. GL1/Wop-13.
• ***Summary:*** See Hermana. 1976. "Saving the protein waste from processing of legumes in Indonesia." Address: Bogor, Indonesia.

1309. Konno, S.; Na Lampang, Arwooth; Chotiyarnawong, A. 1974. Introduced soybean varieties in Thailand. Bangkok: Thailand Department of Agriculture (Mimeo). Unpublished manuscript. *

1310. Kwon, S.H. 1974. [Soybean culture under tropical environment]. *Korean J. of Breeding* 6(2):56-59. [Kor] Address: Applied Genetics Lab., Korea Atomic Energy Research Inst., Seoul, South Korea.

1311. Sarengat, Hs.; Winarno, Baskoro. 1974. Pemasaran kacang-kacangan di Jawa Timur [Marketing of legumes in East Java]. Sarjana thesis, Bogor Agricultural University. 108 p. Also published in Jakarta by the Survey Agro Ekonomi (1974). [Ind]*

1312. Sumaro, -. 1974. Soybean breeding program in CRIA, Bogor. In: First ASEAN Workshop on Grain Legumes. Ministry of Agriculture, Indonesia. *

1313. Tongpan, S.; et al. 1974. Production and utilization of selected food legumes and oilseeds in Thailand. Bangkok, Thailand: Kasetsart University. 81 p. *
Address: Thailand.

1314. Yang, Charles Y. 1974. Soybean rust. *AVRDC, Seminar Series.* 22 p. *
• ***Summary:*** A good overview of soybean rust. This fungal disease "has been recorded in the northeastern, central, and southwestern provinces of China. It has also been reported in the USSR, Korea, Okinawa, Taiwan, the Philippines, Australia, Ceylon, India, Malaysia, Thailand, Cambodia, and Vietnam. Cultivated varieties of soybean known to be rust resistant in the past are now susceptible. Taichung 4 had much more field tolerance to soybean rust, with relatively fewer pustules, than other cultivated varieties. Two physiological races of this rust have been identified through their characteristic pathogenic reactions... It is believed that there can be 6-8 cycles of the rust produced within one growing season" (from AVRDC 1992, #452). Address: Kyushu Univ., Japan.

1315. Altschul, Aaron M. 1974. Protein food technologies and the politics of food: An overview. In: A.M. Altschul, ed. 1974. New Protein Foods. Vol. 1A. Technology. New York: Academic Press. 511 p. See p. 1-38. Chap. 1. [43 ref]
• ***Summary:*** Contents: 1. The food problems–Political imperatives: General considerations, problems of insufficiency, problems of affluence. 2. The special role of protein: When food supply is limited, when food is abundant, protein in the abstract, implications. 3. Means for increasing protein supply. 4. The introduction of new food technologies: The role of the technology community, technology assessment. 5. The role of government: In the development of technology, reorientation of ongoing activities, food regulations, setting priorities. 6. Politicians and the scientific and technology community. 7. Commentary.

Page 26 states: Incaparina, developed by the Institute of Nutrition of Central America and Panama (sponsored by USAID), showed that "solely vegetable food mixtures could be formulated to supply all the protein and other nutrient needs of infants."

CSM, consisting of corn, soy flour, and dry milk, has been widely distributed by the U.S. government as a donation in times of crisis; it is not sold commercially.

"Bottled protein beverages on the soft drink model, pioneered by Vitasoy in Hong Kong, are being sold in Guyana, Surinam, Brazil, Thailand, and India. Some of these are carbonated." Most use soy as the source of low-

cost protein. Address: Georgetown Univ. School of Medicine, Washington, DC.

1316. Archer Daniels Midland Co. 1974. The growing challenge: Protein cereal products for world needs (Portfolio). Decatur, Illinois. 28 p.
• ***Summary:*** The jacket of this portfolio has color illustrations on the front, and a two-page table with 3 columns containing information about ADM's operations and plants, products, and markets. The 24-page booklet inside has a girl's face looking out through a globe-shaped hole; below that is a huge field of grain harvested by five combines.

Contents: Introduction. World population and world food supply. The protein gap. Protein calorie malnutrition–A global struggle. Early detection of PCM can save lives. Treatment of protein calorie malnutrition. Solving the protein calorie malnutrition problem. Protein quantity and protein quality are essential to good health. Wheat and soybean blends provide low cost high quality protein sources. The situation in the United States. Key nutrients. The macronutrients. Address: Box 1470, Decatur, Illinois 62525.

1317. Brackman, Agnes de Keijzer. 1974. Art of Indonesian cooking: The ABC's. Singapore: Asia Pacific Press. 127 p. 23 cm. First published in 1970.
• ***Summary:*** This recipe book, with a long introduction to each chapter, contains numerous soy-related recipes: Soya fish (Ikan ketjap, p. 24; Ketjap is "sweet soya sauce"). Soya fish, large (Ikan ketjap besar, p. 25). Soya chicken (Ajam ketjap, p. 38). Braised soya duck (Bebek smor ketjap, p. 48). Spicy soya sauce (Sambal ketjap, p. 74). Fermented soya beans (Sambal goreng tempe, p. 77; a must for the rijsttafel [rice table]). Peppered bean cakes [with tofu] (Sambal goreng tahoe, p. 82). Indonesian salad [with tofu] (Gado-gado, p. 85). Spiced soya (Sambal ketjap, p. 106).

The back matter notes that the best source of Indonesian ingredients is the Dutch company Conimex, in Baarn, Netherlands. There is a page of ideas for ingredient substitutes in the West (for sweet soya sauce substitute "equal amounts of Chinese or Japanese soya sauce and molasses"), and a 3-page Indonesian-English kitchen glossary. Address: Brookfield Center, Connecticut.

1318. Crisostomo, L.C.; Corpuz, L.; Celes, F.F. 1974. A comparative study on the utilization of mecan pea for soy sauce preparation. Manila: Bureau of Plant Industry. Laboratory Services Div. 8 p.
Address: Philippines.

1319. International Rice Research Institute. 1974. Annual report for 1973. Los Banos, Laguna, Philippines. Soybeans: p. 25-26, 32-34. *
Address: Los Baños, Laguna, Philippines.

1320. Ko Swan Djien. 1974. Self-protection of fermented foods against aflatoxin. In: Proceedings Fourth International Congress Food Science and Technology. Madrid, Spain: International Union of Food Science & Technology. 6 vols. See vol. 3, p. 244-53. [7 ref]
• ***Summary:*** When making tempeh or onchom, the ability of *Aspergillus flavus* to produce aflatoxin B-1 was considerably suppressed when grown together with *Neurospora* species on a peanut substrate, or when it was grown together with *Rhizopus oligosporus* on soybeans. Large amounts of the aflatoxin mold (10 to 100 times normal levels) were used during inoculation, yet little or no aflatoxin was detected during the first 3 days of incubation at 30ºC. Therefore accumulation of aflatoxin during traditional fermentation of tempeh or onchom is unlikely when a natural contamination with *A. flavus* occurs. Address: Lab. of Food Microbiology & Hygiene, Dep. of Food Science, Agricultural Univ., Wageningen, The Netherlands.

1321. Leng, Earl R. 1974. Development & food utilization of soybeans: Summary report of activities and findings. Urbana-Champaign: University of Illinois, College of Agriculture. 151 p. Contract No. AID/csd-3292. July 1, 1971–March 31, 1973. [4 ref]
• ***Summary:*** Contents: Summary of program and activities. Agronomy: Trial locations and cooperating agencies. Variety trials, inoculum trials, general results from trials at overseas locations, computerized soybean germ plasm data bank, studies on soybean diseases, agronomy trial results by country (Costa Rica, Colombia, Ecuador, Brazil, Sierra Leone, Nigeria, Pakistan, India, Thailand, Indonesia).

Entomology: Soybean Insect Research and Information Center, International Synoptic Collection of Soybean Arthropods.

Food utilization: Basic principles and processes, prototype foods. Demonstrations of the process and prototype foods.

Appendices: I. Summary: Highlights of University of Illinois soybean research in India. II. Summary: Development of a dry, stable dal for India and other countries. III. Using soybeans as a human food: Basic home preparation of cooked soybeans. Home preparation of roasted soybeans. Manufacture of whole-soybean powder by roller (drum) drying. Manufacture of soybean-corn (1:1) powder by roller drying. Manufacture of soybean-rice (1:1) powder by roller drying. Manufacture of soybean-banana (1:1) powder by roller drying.

Note 1. The file folder in which this contract report appears states that Leng was the author; however his name does not appear on the document. No publication date is

given on the document. We have assigned the date 1974 based on the contract dates; it could have been 1973.

Note 2. This report was the predecessor of the first INTSOY ISVEX report which was published at the University of Illinois in Oct. 1975. Its full title: *International soybean variety experiment: First report of results,* by D.K. Whigham.

Source: University of Illinois at Urbana-Champaign (UIUC) archives. 8/1/44 Agriculture, Dean's Office, Box 4, Leng. Address: Agronomist, Univ. of Illinois, Urbana-Champaign, Illinois.

1322. Moosdean, Fardian. 1974. Diteksi dan evaluasi jamur penghasil antibiotika yang tumbuh pada makanan tradisi Indonesia yang difermentasikan [Detection and evaluation of antibiotic producing fungi on traditional Indonesia fermented foods]. Thesis (Skripsi), Bagian Biologi, Institut Teknologi Bandung, Bandung, Indonesia (PBITB. Biology Dep., Inst. of Technology at Bandung). 50 p. [Ind]*
• ***Summary:*** Discusses tapai (tapeh; fermented cassava), onchom, and tempeh. Address: Bandung, Indonesia.

1323. Onate, L.; Aguinaldo, A.R.; Eusebio, J.S. 1974. 36 ways of cooking soybeans. Los Banos, Philippines: University of the Philippines. *

1324. Rachie, K.O.; Roberts, L.M. 1974. Grain legumes of the lowland tropics. *Advances in Agronomy* 26:1-132. See p. 83-85. [493 ref]
• ***Summary:*** The main plants discussed are peanuts, pigeon peas, cowpeas, and mung beans. However under "Humid Tropics" (p. 83-85) is a rather long discussion of soybeans, which "has been extensively grown for a long time as a basic food crop of the low elevations in southeastern Asia (Indonesia, Philippines, Malaysia). More recently, investigations in India, the West Indies, and both East and West Africa have demonstrated that soybeans can be very successfully grown in the lowland tropics under favorable conditions. At present there is no other species that can so consistently produce on a hectare per day basis both high yields of good quality protein and oil. The main deterrent to increasing production of this species in many tropical regions is lack of markets and understanding of its cultivation and utilization." Discusses: Adaptation and problems. Utilization ("green beans (vegetable)," split, sprouted, soy milk, soy sauce, tofu, tempeh). Recent investigations.

"Perhaps the most successful campaign to introduce soybeans and find solutions to production and utilization problems has been in India with assistance from a USAID-sponsored contract with the University of Illinois. In Africa, French-sponsored research organizations have centered their activities mainly in Madagascar with testing and management experiments in the Cameroons [Cameroon] and Centralafrique [central Africa]." In English-speaking Africa, breeding programs are in place in Tanzania and Nigeria. Address: 1. International Inst. of Tropical Agriculture, Ibadan, Nigeria; 1-2. The Rockefeller Foundation, New York, New York.

1325. Soewarbo, Sri Lawihana. 1974. Kemungkinan pemakaian usar dari kedelai kuning dalam pembuatan [The possibility of using usar from yellow soybeans in tempeh processing]. Thesis (Skripsi), Fakultas Pertanian Universitas Gadjah Mada, Yogyakarta, Indonesia. 29 p. [Ind]*
Address: Yogyakarta, Indonesia.

1326. U.S. Department of Agriculture. 1974. The annual report on activities carried out under the Public Law 480, 83d Congress, as amended, during the period January 1 through December 31, 1973. Washington, DC: U.S. Government Printing Office. See p. 94-101.
• ***Summary:*** Table 18 is titled "Title II, Public Law 480–total commodities shipped by program sponsor, fiscal year 1973." The main program sponsors and distributing agencies, listed alphabetically, are AJJDC (American-Jewish Joint Distribution Committee), CARE, CRS (Catholic Relief Service), CWS (Church World Service), LWR (Lutheran World Relief), SAWS (Seventh-day Adventist World Service), UNICEF, UNRWA (United Nations Relief and Works Agency), and WRC (World Relief Commission). All of these are Private Voluntary Organizations (PVO/PVOs), registered with USAID. The following foods containing soy protein were distributed: CSM (corn soya mix), WSB (wheat soya blend), and small amounts of soya flour. The vegetable oil which was shipped to many countries was soybean oil; it is not recorded here. The foods containing soy protein were sent in the following amounts (in thousands of pounds) to the following continents and countries: Africa (24,340 CSM and 6,8857 WSB): Algeria (1 WSB), Botswana (1,398 CSM), Burundi (464 CSM), Cameroon (47 CSM), Central African Republic (67 CSM), Chad (1 CSM and 1 WSB), Congo (115 WSB), Dahomey (124 CSM), Ethiopia (395 CSM), Gabon (46 WSB), Gambia (211 CSM), Ghana (843 CSM and 1,272 WSB), Ivory Coast (546 WSB), Kenya (409 CSM and 400 WSB), Lesotho (299 WSB), Liberia (1,247 CSM and 487 WSB), Malagasy (365 CSM and 2 WSB), Malawi (210 CSM), Mali (230 CSM), Mauritania (235 CSM), Morocco (908 CSM and 890 WSB), Niger (289 CSM), Nigeria (1,197 CSM), Rwanda (82 CSM and 570 WSB), Senegal (643 CSM), Sierra Leone (2,309 CSM), Sudan (3,826 CSM), Swaziland (57 CSM), Tanzania (3,991 CSM and 5 WSB), Togo (1,083 CSM and 1,562 WSB), Tunisia (2,368 CSM and 485 WSB), Upper Volta (878 CSM and 14 WSB), Zaire (419 WSB and 190 WSB), Zambia (44 CSM).

Europe (27 CSM): Malta (27 CSM).

Near East-South Asia (269,188 CSM and 94,141 WSB): Afghanistan (1 CSM), Bangladesh (99794 CSM and 54,631 CSB), Egypt (3,593 CSM and 2 WSB), Gaza [occupied by Israel since 1967] (1,509 CSM and 3,564 WSB), India (156,216 CSM and 15,768 WSB and 775 soya flour), Iraq (997 CSM), Jordan (2,319 CSM and 536 WSB), Jordan-West Bank [occupied by Israel since 1967] (549 CSM and 1,186 WSB), Lebanon (227 CSM and 411 WSB), Nepal (1,000 CSM and 55 WSB), Pakistan (9,933 WSB), Sri Lanka (1,000 WSB and 50 soya flour), Syria (470 CSM and 473 WSB), Turkey (6,582 WSB), Yemen (People's Democratic Republic of Yemen, or South Yemen) (151 CSM), Yemen (Yemen Arab Republic) (2,513 CSM).

East Asia (41,450 CSM and 20,694 WSB): Fiji (2 CSM and 2 WSB), Indonesia (268 CSM and 12,981 WSB), Korea (1,997 CSM), Laos (2,378 CSM and 750 WSB), Macao (29 CSM), Malaysia (1,124 CSM and 65 WSB), Philippines (22,416 CSM), Singapore (10 WSB), Vietnam (13,236 CSM and 6,886 WSB).

Latin America (94,598 CSM and 42,404 WSB): Bolivia (1,534 CSM), Brazil (33,197 CSM and 5,676 WSB), British Honduras [Belize] (333 CSM and 110 WSB), Chile (548 CSM and 6,038 WSB), Colombia (13,043 CSM and 5,202 WSB), Costa Rica (2,792 CSM), Dominica (78 CSM), Dominican Republic (11,584 CSM and 3,486 WSB), Ecuador (2,253 CSM and 5,446 WSB), El Salvador (1,343 CSM and 2,466 WSB), Grenada (41 CSM), Guatemala (4,007 CSM and 1,090 WSB), Guyana (631 CSM), Haiti (1,581 CSM and 3,395 WSB), Honduras (1,297 CSM and 1,523 WSB), Jamaica (1,150 CSM and 657 WSB), Nicaragua (6,850 CSM and 4,126 WSB), Panama (853 CSM and 699 WSB), Paraguay (3,385 CSM), Peru (7,522 CSM and 1,993 WSB), St. Lucia (81 CSM), St. Vincent (51 CSM), Trinidad and Tobago (2 CSM and 1 WSB), Uruguay (442 CSM and 496 WSB).

Grand total: 429,603,000 lb of CSM and 164,124,000 lb of WSB. Agencies distributing the most CSM and WSB (in million lb): CARE 204, UNICEF 163, CRS 151.

Note: This is the earliest document seen (Aug. 2009) concerning soybean products (soy flour, CSM, or WSB) in Chad, Mauritania, and Niger. This document contains the earliest date seen for soybean products (cereal-soy blends) in Chad, Mauritania, and Niger (1973); soybeans as such had not yet been reported by that date. Address: Washington, DC. Phone: 703-875-4901 (1991).

1327. Wahyunto, Winarto Bangun. 1974. Kemungkinan pemakaian jamur murni pada pembuatan tempe [The possibility of using pure-culture molds in tempeh processing]. Thesis (Skripsi), Fakultas Pertanian Universitas Gadjah Mada, Yogyakarta, Indonesia. 21 p. [Ind]* Address: Yogyakarta, Indonesia.

1328. *New York Times.*1975. A correction. Feb. 6. p. 28.

• ***Summary:*** In the recipe for Chicken ketjap, published in yesterday's edition of the *Times.* "one-half cup of ketjap manis, a sweet Indonesian soy sauce, should have been added to the onion and garlic mixture in step 4. Ketjap manis is available at the Culinary Arts; Aphrodisia, 28 Carmine Street Bloomingdale's and other outlets that sell imported spices."

1329. Ashaye, T.I.; Afolabi, N.O. 1975. The effect of pedoclimatic factors and agronomic practices on soybean performance in the Western State of Nigeria. *INTSOY Series* No. 6. p. 254-63. D.K. Whigham, ed. Soybean Production, Protection, and Utilization: Proceedings of a Conference for Scientists of Africa, the Middle East, and South Asia (College of Agric., Univ. of Illinois at Urbana-Champaign). [10 ref]

• ***Summary:*** Contains a brief history of the soybean in Nigeria from 1908 to the present, based largely on earlier publications.

"Ezedinma (1965) reviewed the history of the crop in Nigeria. According to him, soybean was introduced into Nigeria in 1908. An attempt to grow the crop at Moor Plantation at that time failed. In 1937, ten new varieties were introduced from the United States, one from Malaya, and one from British Guyana. Of these, only one U.S. introduction (oto otan), the Malayan, and Creole from British Guyana survived; the rest either failed to germinate or failed in the second year of planting due to poor handling. Between 1954 and 1960, the number of varieties in the Samaru collection increased from 38 to 60." Note: This citation for Ezedinma is incorrect. It should be: Ezedinma. 1964. "The soybean in Nigeria." *Proceedings of the Agricultural Society of Nigeria* 3:13-16.

"A number of varieties were introduced to Western Nigeria by the International Development Service Mission (IDS). There was hardly any trace of this latter collection by 1969. Gowen (1965) reported that two variety collections–imported in 1960 and 1963–failed to germinate.

"The success of the early introduction into Samaru in 1928 led to the introduction of the crop into other parts of Northern Nigeria. With the high demand for oilseeds during the second World War, the Malayan variety, which had a promising yield of over 1,100 kg per hectare, was rapidly multiplied and led to an initial export of 10 tons in 1947. Soybean soon became a cash crop in the Tiv division of Benue province. Its cultivation later extended to Ogoja and Abakaliki provinces of Eastern Nigeria." Address: 1. Acting Director, Inst. of Agricultural Research and Training, P.M.B. 5029, Moor Plantation, Ibadan, Nigeria; 2. Research fellow.

1330. Mustam, Muhammad. 1975. How to make tempeh at home and prepare Indonesian-style recipes using it (Interview). Conducted by William Shurtleff in Tokyo, March. 1 p. transcript.

• ***Summary:*** Note: William Shurtleff and Akiko Aoyagi, living in Tokyo, were first introduced to tempeh in March 1975, when friends at The Farm, a large spiritual community in Tennessee, sent them *The Farm Vegetarian Cookbook*, which had just been published. They read the section on tempeh with great interest. That same week, on an introduction from the Indonesian Embassy, they visited Mr. Muhammad Mustam, a former tempeh maker living in Tokyo. He and his wife showed Shurtleff and Aoyagi how to make tempeh on a home scale; they were surprised at how quick and easy the process was. Two days later the Mustams invited Shurtleff and Aoyagi back to their home and used the freshly-made tempeh to prepare a feast of their favorite tempeh recipes. Their guests later wrote in the preface to their *Book of Tempeh:* Such appealing textures and savory flavors we had rarely tasted before. We were so impressed that we included the Mustams' tempeh making method and five recipes in our *Book of Tofu* that was just going to press."

In Indonesia, typical tempeh makers use 10 liters of soybeans at a time, and they prepare the tempeh in their own home. They soak the beans for 24 hours, then tread them underfoot in tightly woven bamboo baskets that are about 50 cm deep and 3 feet in diameter; the water drains out slowly due to the tight weave.

At home, rub soaked soybeans with one hand to remove the hulls, then float them off with running water. It is okay if the beans are split lengthwise into halves (two cotyledons), but try not to break the beans into small pieces. Then simmer the dehulled beans for 45 minutes over low heat and allow them to stand in the cooking water overnight; this causes a mild acid to form. Rinse and drain 5-6 times to give a milder, finer flavor. Add fresh water and cook over low heat for 15 minutes (the beans are still quite firm), then pour into a strainer and allow to cool to room temperature. Wash hands. Crumble 1½ teaspoons ragi (Indonesian tempeh starter cake, which looks like a tan cake of pressed sawdust) over the beans and mix it in. Spread the inoculated soybeans on a piece of aluminum foul (7 by 9 inches). Fold over all 4 sides to form a cake 4 by 3 by ½ inch thick. Seal the packet. Allow to stand at room temperature for 48 hours. The Mustams prepared the following recipes: Tempeh Goreng, Tempeh Kemul, Tempeh Bacham, Tempeh Kering. Address: Former Indonesian tempeh maker, living in Tokyo, Japan.

1331. von Oppen, M. 1975. Economic evaluation of simultaneous development of production and processing of soybeans in India. *INTSOY Series* No. 6. p. 108-23. D.K. Whigham, ed. Soybean Production, Protection, and Utilization: Proceedings of a Conference for Scientists of Africa, the Middle East, and South Asia (College of Agric., Univ. of Illinois at Urbana-Champaign). [13 ref]

• ***Summary:*** Contents: Introduction. Agricultural production of soybeans. Marketing and processing of soybeans and soy products. Role of government. Conclusion. "Over the past ten years several countries have experienced large increases in soybean production. Some of these countries, such as Argentina, Paraguay, Romania, and India, have started their soybean production from virtually zero levels...

"The higher the absolute levels of production the more rapid are the increases in area under soybeans until an upper limit is approached. During the early stages, soybean development is restricted by a lack of processing facilities, and processing facilities generally are slow to come up until certain minimum quantities of soybeans are available in sufficient densities for processing in large-scale industrial operations...

"When a production density of 0.1 tonnes/sq. km is reached, it will be possible for a plant with a capacity of 50 tonnes/day to assemble its required 15,000 tonnes/year from an area of about 150,000 sq. km, i.e., an area which, if circular, would have a radius of about 230 km. Even though the radius would be the maximum and the average distance would be about 150 km, these are fairly long but feasible distances to assemble soybeans by truck. It is at this level of about 0.1 tonnes/sq. km that we expect several sizeable plants to begin to process soybeans quite economically. In the soybean development program special efforts should be made to concentrate, rather than spread, further development and extension work, preferably in areas where there is already a processing plant."

Tables: (1) "Production and export-import of soybeans and soy products in selected countries." Gives statistics for Brazil, Argentina, Paraguay, Mexico, Romania, Thailand, and India–for four time periods: 1961-65, 1970, 1971, and 1972. For each country and time period the following are given: (1) Soybean production (1,000 metric tons). Net exports or imports of: (2) Whole soybeans, (3) Soy oil, and (3) Soy meal. Footnote (a) states that in each of these countries, the area planted to soybeans has increased by at least about 200% or more between 1961-65 and 1972. (2) "Weekly prices of soybeans and competing crops in selected primary markets of North India in November and December of 1972 and 1973 in rupees per quintal." Groundnuts in the shell bring the highest price, followed by soybeans, with Jowar (yellow) and maize (white) far behind. (3) Recorded soybean processing [crushing] capacity in India in 1974 and 1975, producing either edible quality soy meal or industrial quality soymeal. Statistics are given for screw press / expeller plants and solvent extraction plants. (4) Average costs of processing soybeans by different methods. (5) Production costs of protein and energy for soybeans, groundnuts, jowar, and maize.

Figures: (1) A semi-log graph (p. 110) shows the increase in area planted to soybeans in each of the countries in table 1. (2) "Agricultural production costs per kilogram

of protein from different crops in Madhya Pradesh, India"–graph from 1970 to 1973. Soybean is by far the least expensive, followed by groundnut, maize, and jowar. (3) "Agricultural production costs per million calories from different crops in Madhya Pradesh, India"–graph from 1970 to 1973. Soybean is the least expensive, followed by groundnut. (4) Average costs of crushing soybeans in India based on the capacity of the crushing machinery. Economical operation requires a capacity of at least 100-200 tons per day. Address: Economist, International Crops Research Inst. for the Semi-Arid Tropics (ICRISAT), Hyderabad 500-016, India.

1332. Whigham, D. Keigh. ed. 1975. Soybean production, protection, and utilization. *INTSOY Series* No. 6. 266 p. March. Proceedings of a Conference for Scientists of Africa, the Middle East, and South Asia. Held 14-17 Oct. 1974 at Addis Ababa, Ethiopia (College of Agric., Univ. of Illinois at Urbana-Champaign). [100+ ref]

• ***Summary:*** Contents: Foreword, by William N. Thompson, Director of INTSOY. List of Participants (directory of 97 people). Introduction (3 papers). Invited papers: Production (8 papers). Protection (4 papers). Utilization (3 papers). Country reports (18 papers). Volunteered papers (2 papers). Individual papers are cited separately. Address: Dep. of Agronomy, Univ. of Illinois, Urbana, IL 61801.

1333. Kozaki, Michio. 1975. Tônan Ajia no hakkô shokuhin [Southeast Asian fermented foods]. In: Nippon Shokuhin Kogyo Gakkai (Japanese Society for Food Science and Technology), 22nd Convention: Special Lectures and Symposium. See p. 12-20. [Jap]
Address: Tokyo Nogyo Daigaku, Sakuraoka 1-1-1, Setagaya-ku, Tokyo, Japan.

1334. Pusponegoro, Puspita. 1975. Makanan hasil proses fermentasi [Fermented foods]. Presented at Lembaga Kimia Nasional LIPI (National Chemistry Institute). Held 26 May 1975 at Bandung. [Ind]*

1335. Goldsborough, Clarence; Akers, Howard. 1975. Mixed prospects for oilseeds in North Africa, South Asia. *Foreign Agriculture.* June 30. p. 6-8. Summarized in Soybean Digest. 1975. Sept. p. 35, as "Mideast Shows Potential for U.S. Soybeans."

• ***Summary:*** "With some assist from the petroleum boom–plus generally expanding incomes and population growth–demand for U.S. oilseeds and their products appears to be on the rise in North Africa. South Asia, however, is another story, with Malaysian palm oil cutting into traditional U.S. soybean oil markets there and economic woes limiting all spending on imports, no matter what the need."

Among North African countries, details are given on imports and use of soybeans and soybean products in Algeria, Morocco, Tunisia, and Egypt. Algeria has yet to buy much soybean products, except for $1 million worth of oil in 1974. Morocco, which produces mainly live oil, is growing a small amount of soybeans, and has one soybean processing facility with an annual capacity of 75,000 metric tons. Tunisia also produces mainly olive oil, but the government purchased an estimated 30,000 tons of crude, degummed soy oil in 1973. Egypt imports mostly cottonseed oil, plus about 28,000 tons/year of soybean meal for use in mixed feeds. Soybean meal imports should expand as poultry production expands. "Egypt appears to be a good market for soy protein–some private U.S. firms are already actively exploring the market. On the South Asian subcontinent, U.S. sales prospects are clouded, by the abundance of Malaysian palm oil at low prices in India and Pakistan and by the dire economic conditions in Bangladesh. The stiff competition from Malaysian palm oil dropped Indian imports of U.S. soybean oil to less than 50 million pounds in the 1973-74 marketing year (beginning Sept. 1 for soybeans and Oct. 1 for soybean products) from 285 million in 1970-71." Address: 1. Foreign Commodity Analysis, Fats and Oils, Foreign Agricultural Service; 2. American Soybean Assoc.

1336. Fung, Wye-poh. 1975. Effect of soya bean milk on the healing of gastric ulcers: A controlled endoscopic study. *Medical J. of Australia* 1(23):717-18. June. [4 ref]

• ***Summary:*** Although the effect on gastric ulcer healing was not significant, soya bean milk was shown to be effective in the relief of peptic ulcer pain. The mean ulcer healing grade was 1.600 in the soya bean milk group as compared with 1.000 in the control group. Address: Dep. of Medicine, Univ. of Singapore.

1337. Razowski, Józef; Yasuda, Tosiro. 1975. On the Laspeyresiini genus *Matsumuraeses* Issiki (Lepidoptera, Tortricidae). *Acta Zoologica Cracoviensia (Krakow, Poland)* 20(2):89-106. July 31. [17* ref. Eng]

• ***Summary:*** The known species of the genus *Matsumuraeses* are reviewed. A key for the identification of the males based on the genitalia is included. One new species is described and redescriptions or notes are given of others. The genus was originally established as monotypic by Issiki in 1957. The host plants are mainly *Papilionaceae*. Only *Matsumuraeses phaseoli* (Matsumura; originally named *Semasia phaseoli* Matsumura in 1900) and *M. falcana* (Walsingham; originally named *Eucelis falcana* Walsingham in 1900) are pests of the soybean.

*M. phaseoli* uses as its host plants: Azuki beans and soybeans *(Glycine max* and *Glycine hispida).* Distribution: Japan (Hokkaido, Honshu, Shikoku), North Korea (Phiongjang-si district), and USSR (Amur district).

*M. falcana* uses *Glycine max* as one of its hosts. Distribution: Japan (Hokkaido, Honshu, Shikoku, Kyushu),

China (Zi-kawy), Taiwan, Nepal.

*M. capax* is a new species, which uses as its host the leaves of *Astragalus membranaceus* Bunge in March and April. Its distribution includes Mongolia. It is not clear in which countries the insects were found growing on soybeans. Address: 1. Inst. of Systematic and Experimental Zoology, Polish Academy of Sciences, Krakow, Slawkowska 17 [Poland]; 2. Entomological Lab., College of Agriculture, Univ. of Osaka Prefecture 7491: Mozuumemachi, Sakaim Osaka, Japan.

1338. Soriano, Mercedes R. 1975. Soy sauce manufacture in the Philippines. Paper read at the Third ASEAN Sub-Committee on Protein. Held 29 July–2 Aug. in Manila, Philippines. *
Address: National Inst. of Science and Nutrition, Manila.

1339. Brown, Lester R. 1975. The politics and responsibility of the North American breadbasket. *Worldwatch Paper* No. 2. 45 p. Oct. No index. 22 cm. [3 ref]
• ***Summary:*** North America has emerged as a major supplier of food to the rest of the world. World grain trade has changed dramatically during the past 40 years. Grains now occupy more than 70% of the world's cropland area. Prior to World War II (in the period 1934-1938), all of the world's geographic areas except Western Europe (which imported 24 million metric tons) were net exporters of grains. Latin America was the world's leading grain exporter (9 million metric tons), followed by North America (5 MMT), and Eastern Europe and the USSR (5 MMT). Asia exported 2 MMT.

However since that time Asia has turned from a small grain exporter to the world's largest grain importer (47 MMT in 1976, led by Japan, China, and India). Other regions with large grain imports are Eastern Europe and the USSR (27 MMT), Western Europe (17 MMT), Africa (10 MMT), and Latin America (3 MMT). In 1976 North America exported 94 MMT of grain, and Australia and New Zealand exported 8 MMT. The main reason for this change is the varying rates of population growth. Areas with high population growth rates have not been able to grow enough food to keep up with population. Many countries in these regions have a population growth rate of 3% or more per year which, if allowed to continue, will lead to a nineteenfold population increase within a century. Japan (with a population equal to nearly half that of North America squeezed into an area smaller than California) is the world's leading food importer, relying on imports to feed 62% of its 110 million people.

Brazil has recently emerged as a soybean exporter. Address: Worldwatch Inst., 1776 Massachusetts Ave., Washington, DC 20036.

1340. Van Rheenen, H.A. 1975. Soybeans in the northern states of Nigeria. In: R.A. Luse and K.O. Rachie, eds. 1975. Proceedings of IITA Collaborators Meeting on Grain Improvement. Ibadan, Nigeria: International Institute of Tropical Agriculture. iii + 179 p. See p. 158-59.
• ***Summary:*** "The main centers of growing soybean in Nigeria are (a) Benue Province in Benue Plateau State, (b) Kwali–Koton Karifi area in Niger Province North Western State and Kabba Province of Kwara States, and (c) Southern Zaria Province of North Central State.

"The soybeans grown are of the indeterminate type, have a growing season of 130-140 days, are vigorous and tall (1.5–1.75 meters), susceptible to bacterial pustule and produce yellowish rather small seeds. The estimated yield of a good farmer's crop is 800-1,000 kg/ha.

"Almost all the seed is exported to Europe and the total export per year has varied over the last 20 years between 5,000 and 20,000 tons.

"Only recently has soybean started to be locally consumed. The Federal Institute for Industrial Research at Oshodi processes soybeans to flour and uses the flour in combination with different ingredients to form products for human consumption like soy-ogi, biscuits, etc. Dr. Theodore Kay of Ahmadu Bello University, Zaria, has successfully tried to popularize soybeans for the production of akara balls, moinmoin and other local foods.

"Research on soy beans is carried out at Samaru, Shika and Mokwa, with trials laid out at different Provincial Stations. Only three research workers study the crop and spend only part of their time on it.

"At Mokwa improvement work on soybeans started about 15 years ago by establishing a germplasm collection, which presently contains about 500 entries... In 1964 a breeding and selection program was initiated, using the cultivars C.N.S. and Malayan as parents." Malayan is the variety most widely grown in Nigeria's areas of soybean production.

Note: Jebba is in western central Nigeria, in the southwest of Northern Nigeria. Address: Agricultural Research Station, Mokwa via Jebba,.

1341. Whigham, D.K. 1975. International soybean variety experiment: First report of results. *INTSOY Series* No. 8. 161 p. Oct. (College of Agric., Univ. of Illinois at Urbana-Champaign). [4 ref]
• ***Summary:*** Contents: Foreword. Introduction. Materials and methods. Results and discussion. Summary. References. Information and summary tables. Agronomic data from 1973 and 1974 trials is given for the following countries and sites: Africa: Egypt (Bahteem), Ethiopia (Awassa), Ghana (Legon), Lesotho (Ralinku), Sierra Leone (Njala), Somalia (Afgoi), Tanzania (Ilonga, Njombe).

Asia: Afghanistan (Kabul), India (Jabalpur, Pantnagar), Indonesia (Bogor, Citayam, Jogjakarta), Malaysia

(Serdany), Pakistan (Mansehra, Swat), Philippines (La Granja, Los Baños), Sri Lanka (Alutharama, Angunukulapalessa, Bandarawela, Gannoruwa, Maha Illuppallama, Paranthan, Ratmalagara), Taiwan (Ping Tung, AVRDC–Shanhua), Thailand (Chiangmai University, Khon Kaen, Lop Buri, Maejo Experiment Station, Suwan Farm), Vietnam (Darlac Province).

Mesoamerica: Belize (Central Farm), Costa Rica (Hacienda Tempisque, Taboga), Mexico (Chiapas, Tampico), Nicaragua (Leon), Puerto Rico (Isabela, Lajas, Mayaguez).

Middle East: Jordan (Deir Alla), Syria (Douma).

South America: Colombia (Palmira), Ecuador (Boliche, Pichilingue, Portoviejo), Peru (La Molina).

Note 1. This is the earliest document seen (June 2007) that clearly refers to the cultivation of soybeans in Afghanistan. This document contains the earliest date seen for the cultivation of soybeans in Afghanistan (23 May 1973). Eight varieties were tested at Kabul by cooperator S.A. Rahman Mohmand. Cutler 71 gave the highest yield, 2,952 kg/ha.

In Belize, twenty varieties were tested at Central Farm by cooperators D. Cole and J. Cal, being planted on 5 Nov. 1973. Improved Pelican gave the highest yield, 1,680 kg/ha.

Note 2. This is the 2nd earliest document seen (Jan. 2001) that clearly refers to the cultivation of soybeans in Nicaragua (25 Jan. 1974). On 25 Jan. 1974, under the direction of Fermin Balerdi, twenty varieties of soybeans were planted at Proyecto Adelante, Leon, Nicaragua. Improved Pelican gave the highest yield, 2511 kg/ha.

Note 3. This is the earliest document seen (Dec. 2007) that clearly refers to the cultivation of soybeans in Pakistan after the country became Pakistan. On 16 May 1973 nineteen varieties were planted at Swat. Lee 68 gave the highest yield, 4,826 kg/ha. On 24 May 1973 sixteen varieties were planted at Mansehra. Jupiter gave the highest yield, 4,911 kg/ha. The cooperator at both locations was S. Badshah.

Note 4. This is the 2nd earliest document seen (Dec. 2007) concerning soybeans in Jordan, or the cultivation of soybeans in Jordan. This document contains the earliest date seen for soybeans in Jordan, or the cultivation of soybeans in Jordan (9 April 1974). Sixteen varieties were tested at Deir Alla by cooperators Nabil Katrhuda and A. Hammoudeh. Semmes gave the highest yield, 3,688 kg/ha.

Note 5. This document contains the 2nd earliest date seen for soybeans in Lesotho, or the cultivation of soybeans in Lesotho (21 Dec. 1973). It describes the first systematic soybean trials in Lesotho. Seventeen varieties were tested at Ralinku, Quthing District. Bragg gave the highest yield, 673 kg/ha.

Note 6. This is the 2nd earliest document seen (Jan. 2001) concerning soybeans in Somalia, or the cultivation of soybeans in Somalia. This document contains the 2nd earliest date seen for soybeans in Somalia, or the cultivation of soybeans in Somalia (1974; no month is given). The earliest document was by Vivenza (1928). Twenty varieties were tested at Afgoi. Bonus gave the highest yield, 1,171 kg/ha.

Note 7. This is the earliest document seen (Dec. 2007) concerning soybeans in Syria, or the cultivation of soybeans in Syria. This document contains the earliest date seen for soybeans in Syria, or the cultivation of soybeans in Syria (25 April 1974). Sixteen varieties were tested at Douma by Syria's Ministry of Agriculture and Agrarian Reform–the cooperator. Cutler 71 gave the highest yield, 1,223 kg/ha.

The source of all these soybeans was INTSOY (at the University of Illinois in the USA) for ISVEX trials.

1342. Pramanik, A. 1975. Soyabean–versatile protein 'stand in' for human diets. *Planter (The) (Kuala Lumpur, Malaysia)* 51(597):548-52. Dec. [9 ref]

• ***Summary:*** Discusses utilization of soyabean as a good substitute for meat, cereals, and cow's milk, in Asia. Address: Factory Manager, Dairy Products (M) Sdn. Bhd., Prai Industrial Complex, Penang, Malaysia.

1343. Shurtleff, William; Aoyagi, Akiko. 1975. Tofu and yuba in China, Taiwan, and Korea (Document part). In: W. Shurtleff and A. Aoyagi. 1975. The Book of Tofu. Hayamashi, Kanagawa-ken, Japan: Autumn Press. 336 p. See p. 250-64.

• ***Summary:*** Contents: Introduction. Three varieties of tofu. Doufu: Known as *tojo* or *tokua* in the Philippines, or as *tahu* in Indonesia. Pressed tofu *(doufu-kan):* Savory tofu *(wu-hsiang kan)*, soy-sauce pressed tofu *(chiang-yu doufu-kan)*, pressed tofu sheets *(pai-yeh*, incl. pressed tofu noodles or "beancurd shreds" *{doufu-ssu, kan-ssu}*, pressed tofu loops *{pai-yeh chieh}*, Buddha's Chicken *{su-chi}* or Buddha's Ham *{suhuo-t'ui}*, salted dry tofu *{doufu-kan})*. Chinese soft kinugoshi *(shui-doufu, sui-doufu, nen-doufu, nan-doufu, shin-kao doufu)*. Warm soymilk curds: Chinese smooth curds *(doufu-nao, dou-nao;* often served for breakfast by street vendors), curds-in-whey *(doufu-hua)*. Deep-fried tofu *(yu-doufu, cha-doufu, doufu-kuo, kuo-lao doufu)*. Frozen tofu *(tung-doufu, ping-doufu)*.

Fermented tofu: *Doufu-ru,* white fermented tofu *(pai doufuru,* incl. 5 different types such as red pepper, sesame oil and red pepper, five-spice, etc.), red fermented tofu *(hung doufuru, nanru, nanyu,* made by adding Chinese red fermented rice *{ang-tsao}* to the brining liquor to give it a deep red color, thick consistency, and distinctive flavor and aroma; soy sauce is generally used in place of rice wine; another variety is rose essence fermented tofu), stinky fermented tofu *(tsao-doufu, ch'ou doufu,* incl. green stinky fermented tofu), chiang-doufu (prepared by pickling firm cubes of tofu for several days in either Chinese-style miso *{chiang}* or soy sauce).

Soymilk *(doufu chiang, dou-chiang, dou-nai, dou-ru):* Widely enjoyed as a spicy hot breakfast soup (p. 204) or a warm, sweetened beverage (p. 207). Sometimes sold bottled by street vendors.

Yuba: Much more popular and much less expensive in China and Taiwan than it is in Japan. Called bean curd "skin" or "sheets" in most Chinese cookbooks, yuba is known in Mandarin as *doufu-p'i* ("tofu skin") or *doufu-i* ("tofu robes"). Remarkable Chinese ingenuity and creativity in giving the semblance of meat. In the display case of attractive restaurants or marketplace yuba shops are perfect replicas of plucked hens, roosters, and ducks, light-brown fish (complete with fins, gills, eyes, and mouth), juicy hams, tripe, liver, rolled meats, red sausage links, deep-fried drumsticks, and a life-sized pig's head–all made from yuba. Most of these imitation meat dishes are prepared by pressing fresh yuba into a hinged (wooden or aluminum) mold, clamping the mold closed, then steaming it until the yuba's shape is fixed. *Su-tsai* restaurants specialize in Buddhist vegetarian cookery. Names of prepared dishes: Buddha's Chicken *(suchi),* Buddha's Fish *(suyu, sushi),* Buddha's Duck *(suya),* Vegetarian Tripe *(taoto)* or Liver *(sukan);* Molded Pig's Head *(tutao),* Molded Ham *(suhuo),* Sausage Links *(enchan),* Buddha's Drumsticks *(sutsai tsui),* Deep-fried Duck *(suya).* A full-page illustration (p. 258) shows these products. Fresh yuba. Dried yuba *(kan doufu-p'i,* incl. sweet yuba and Bamboo yuba *{fuchu}).* Tofu and yuba in Chinese cookery: Mandarin cookery, congee (rice porridge), "red broiled" sauces *(hong-sao),* meatless days, vegetarian restaurants.

The Chinese tofu shop: Description of the process for making tofu. Tofu in Korea. Recipes: Fermented tofu dressings, spreads, dips, and hors d'oeuvre. Fermented tofu in sauces, egg dishes, and with grains.

Illustrations show: (102) A woman cutting doufu at the marketplace. (103) Making pressed tofu using a hand-turned screw press. (104) Pressed tofu noodles. Buddha's chicken. (105) Street vendor selling soymilk curds. (106) Pressing tofu in forming boxes using stone weights. (107) Deep-frying agé triangles in a wok. (108) Threaded thick-agé cubes. (109) Net-like thick agé. (110) A soymilk vendor carrying bottled soymilk using a shoulder pole. (111) Yuba mock meats. (112) Yuba steaming pots. (113) Steam-heated drum can cooker in Chinese tofu shop. Doufu-ru [fermented tofu] cubes on plate, in bottle, in can. Woman selling tofu, seated by the street side.

Note 1. This is the earliest English-language document seen (Feb. 2004) that uses the word "doufu" to refer to Chinese-style tofu. Note 2. This is the earliest English-language document seen (Oct. 2008) that uses the word "tofu skin" to refer to yuba. Address: Lafayette, California.

1344. Siegel, A.; Bhumiratana, A.; Lineback, D.R. 1975. Development, acceptability, and nutritional evaluation of high-protein soy-supplemented rice noodles for Thai children. *Cereal Chemistry* 52(6):801-12. Nov/Dec. [24 ref]

• ***Summary:*** "Dehydrated rice noodles, supplemented with 20 and 30% full-fat soy flour (dry basis), were developed for use in feeding programs at Child Nutrition Centers in Thailand... These soy-rice noodles contain 15.0 and 18.0% protein on a moisture-free basis, respectively; the control contained 7.8% protein... Protein costs of soy-rice noodles were substantially less than those for regular rice noodles." These noodles were not apparently sold commercially. "The soy flour used was Kaset full-fat soy flour, prepared semicommercially by the Institute of Food Research and Product Development (IFRDP), Bangkok, by the procedure described by Bhumiratana and Nondasuta" in 1972. This soy flour contained 40-49% protein. Address: 1&3. Kansas State Univ.; 2. Inst. of Food Research & Product Development, Kasetsart Univ., P.O. Box 4-710, Bangkok, Thailand; Siegel's present address: International Development Research Centre, Box 8500, Ottawa, Canada K1G 3H9.

1345. Balai Penelitian Kimia Semarang. 1975. Perbaikan mutu tempe gembus [Improvement in the quality of okara tempeh]. Semarang: Balai Penelitian Kimia, Departemen Perindustrian (Chemical Research Administration, Ministry of Industries). 29 p. Research report. [Ind]*

1346. Balai Penelitian Kimia Semarang. 1975. Percobaan perbaikan mutu tempe gembus dengan mikroorganisme *trichodrema.* [Experiment on improving the quality of okara tempeh using *Trichoderma* microorganisms]. Semarang: Balai Penelitian Kimia, Departemen Perindustrian (Chemical Research Administration, Ministry of Industries). [Ind]*

• ***Summary:*** Note: Trichoderma is a mold, now also called the "compost fungus" and used in composting (especially in the Philippines) to accelerate the breakdown of the substrate into soil.

1347. Birowo, A.T. 1975. Economic and employment aspects of the cropping system in Indonesia. *Philippine Economic Journal* 14(1&2):272-78. *

1348. Cheam, S.T.; Tan, B.T. 1975. Food consumption in Malaysia. In: Proceedings of a Conference on Malaysian Self-Sufficiency. Faculty of Agriculture, Univ. of Malaya, Kuala Lumpur. *

• ***Summary:*** It is estimated that the local per capita consumption of soybeans averaged 5.3 kg for the years 1941 through 1973.

1349. Kozaki, Michio. 1975. Tônan Ajia no hakkô shokuhin [Southeast Asian fermented foods (Abstract)]. *Proceedings*

*of the 22nd Annual Meeting of the Japanese Society of Food Science & Technology.* p. 29. [Jap]
Address: Tokyo Nôgaku Daigaku.

1350. Kuan, C.Y. 1975. Soybeans as an intercrop in Malaysia. In: Proceedings of Conference on Malaysian Self-sufficiency. Kuala Lumpur. *

1351. Milono, P.; et al. 1975. The improvement of soy sauce manufacturing techniques. Paper presented at the Technical Meeting, ASEAN Sub-Committee on Protein, Manila. *

1352. Somaatmadja, Sadikin; Guhardja, Edi. 1975. Food legumes in Indonesia with soybeans as a priority. Paper presented at Seminar on Grain Legumes. 7 p. Held 8-14 Dec. 1975 at Colombo, Sri Lanka. *

1353. Sundhagul, Malee; Daengsubha, W.; Suyanandana, P. 1975. Thailand's traditional fermented food products: A brief description. *Thai J. of Agricultural Science* 8:205-19. *

• ***Summary:*** Originally: Staff of Microbiology Unit. 1975. Thailand's traditional fermented food products: description. Publ. of Thailand TISTR. 14 p. mimeo. ASRCT. Address: Thailand.

1354. Suriawira, Unus. 1975. Diteksi dan pengukuran bakteri patogen penghasil racun beberapa jenis makanan fermentasi Indonesia dan faktor lingkungan yang mempengaruhinya [Detection and counting of pathogenic bacteria in several Indonesian fermented foods, and the causative environmental factors]. Bandung: Badan Research Institut Teknologi Bandung. 42 p. Research report. [Ind]*
Address: Bandung, Indonesia.

1355. Thodey, A.R.; Seetisarn, M. 1975. Multiple cropping in Northern Thailand. *Philippine Economic Journal* 14(1&2):235-57. *

1356. Yap, T.C.; Lee, L.F. 1975. Performance and path coefficient analysis of soybeans under local conditions. *Malaysian Agricultural Research* 4:97-102. *

1357. Yasumatsu, K.; Hirashima, Y.; Yano, K. 1975. Field surveys on the biological control of insect pests and mites in Southeast Asia: General report. *Mushi* 48(10):95-123. *
• ***Summary:*** Various plants are discussed, including the soybean. Countries include Thailand, Hong Kong, and the Philippines.

1358. Agrix Publishing Corp. 1975. How to make soy sauce, coconut vinegar, tomato catsup, banana catsup, banana flour, cassava flour. Quezon City, Philippines: APC. 7 p. Illust. 23 cm. Agrix How-To Series, No. 18. *

1359. American Women's Association. 1975. The cookbook. Jakarta, Indonesia: American Women's Association. 242 p. 21 cm. *

1360. Bibliography of grain legumes in Malaysia (soybean, groundnut, pigeon pea, four-angled bean, cowpea, and derris). 1975. Kuala Lumpur: Rubber Research Institute of Malaysia (RRIM). *

1361. Ekasari, Indriati; Winarno, F.G.; Jenie, B.S.L. 1975. The effects of starters, drying temperatures and storage on the quality of rehydrated tauco. In: Dept. of Agricultural Product Technology, Faculty of Agricultural Engineering and Product Technology, Bogor Agricultural University. Research on Tauco: Phase One. See p. A-1–A-11. [8 ref]
Address: Bogor, Indonesia.

1362. Eusebio, J.S.; Barba, C.V.; Pena, C.C. 1975. Eat legumes for better nutrition. Quezon City, Philippines: Agrix Publishing Corp. *

1363. Farm, The. 1975. The Farm vegetarian cookbook. Summertown, Tennessee: The Book Publishing Co. 128 p. Illust. Index. 18 cm. Revised edition by L. Hagler. 1978. 223 p.
• ***Summary:*** Expanding on the pioneering "Yay Soybeans!" (1974), this creatively illustrated vegan cookbook contains many extremely innovative and original recipes including: Soybean Stroganoff. Soyburgers. Spaghetti Sauce with TVP. Soysage. Soy fritters. Indonesian fried tempeh. Soymilk. Tofu. Tofu spreads. Soy "yogurt." Soy "cheese." Soy "butter" (made with soy flour). "Cream cheese" (made with soymilk). Soy "mayonnaise." Soy "whipped cream." Soy "coffee." "Soy 'nuts.'" Soy pulp granola. Ice Bean [soy ice cream] (Recipes include: Pineapple "sherbert" and "Vanilla ice bean," each made with soy milk instead of dairy milk). Mellowmeal (breakfast cereal containing soy flour). Soy "yogurt" Danish pastry. Soy bread. Soy pulp cookies. Soy "cheese cake." Blintzes (filled with tofu).

Gluten recipes (p. 54-59) include: Basic gluten (feeds 8 generously). Gluten roast. Gluten burritos. Chili gluten. Oven-fried gluten. Janice's barbeque [barbecue] gluten ribs.

The rear cover states: "We are a large, long-haired spiritual community in Tennessee. We came together through open meetings in San Francisco with Stephen. We have 750 people, including 250 kids, living on 1,750 acres. This cookbook is to help as many people be vegetarians as possible without turning any of them off and making them think its strange or weird and to let people know that it tastes good, is nice, graceful, and it can be a turn-on, that it'd be really neat to eat, and make you look forward to meal-times and make you really happy to eat such good food." The Introduction, by Stephen, begins: "The thing

about our cookbook is we don't want to be faddish or cultish or scare people off. We just honestly want them to know how to make it on vegies, even somebody who doesn't particularly have a moral reason for being a vegetarian, but just wants to eat a little cheaper, or somebody who learns to be a vegetarian to loose weight, 'cause you maintain a really healthy natural weight on vegetables... The main thing is that we're absolute vegetarians. We don't do meat or milk or eggs or cheese or fish or fowl."

"You can increase the world's food supply by being a vegetarian. So its good for everybody else, its good for the individual for health, and its good for the soul and the spirit not to be involved in killing. And I understand that vegetables are alive, but like I've said before, I've been to pig stickings, and I've been to rice boilings, and rice boilings have better vibrations than pig stickings."

Photos show: Facing title page: People planting white potatoes at the edge of a large field in front of the woods. The lady in front is Sylvia Tepper, Robert Tepper's wife. Pages: (1) Little Susannah Frohman eating a rolled up soybean tortilla. (3) Stephen Gaskin. (18) Ruth Thomas, making lunch in the kitchen of the only house on the property when Farm folks first came here. It housed The Farm's clinic, school, bank offices, and receptionist for a number of years until other facilities were built for these purposes. Ruth could make a mean soybean burger (which is pictured). (23) Laurie Sythe making potato soup on the other side of the same kitchen Ruth was pictured in. (35) Poblano chili plants. (60-61) Tempeh sliced to be round to fit on buns, resting on a plate (L) and a tray (R). (64). Uncle Bill (age 82, center, surrounded, from left by: Marilyn Keating, Jeffrey Keating, Ruth Thomas, Patrick Thomas, Uncle Bill, Joel Kachinsky, Roberta Kachinsky, Bruce Moore, Roslyn Moore {holding baby Sam}. All at their home on Schoolhouse Ridge. The house, named "Kissingtree," was originally built for Stephen and family, but he declared it "too fancy" for him, and he passed it on to this group {women were mostly schoolteachers in our school}). (67) Janice Hunter making stir fry at the Tower Road House kitchen. (68) John Hurgeton drinking a glass of soymilk on a construction site somewhere. (71) Sue Ellen, who worked in The Farm's soy dairy, holding a glass of soymilk and relaxing. (89) Sour soymilk Danish pastry. (106) Jars of canned goods stored at the Farm's canning facility. Thanks to Cynthia Holzapfel for providing photo captions.

Illustrations appear on almost every page: On the front cover is a color illustration of a basket full of vegetables on a quilt. Many of the pages have illustrated borders or unique illustrations (line drawings) (flowers, plants, leaves, a pot of steaming food, psychedelic designs, native American motifs, etc.) where there would otherwise be empty space. Pages: (10) A Farm member eating, with one hand, a tortilla wrap filled with cooked whole soybeans. (20) A young woman in a kitchen facing the stove. (28-29) Illustrations of two Farm members making pizza. (65) Uncle Bill in a kitchen stirring a pot. (81) A pitcher labeled "Soy Milk." (83) An old-fashion, hand-turned ice cream machine for making Ice Bean. (88) Sour soymilk Danish pastry. (95) A happy man and a woman eating bagels. The man's finger, pointing up, serves as a bagel holder. Yum! (100) Overhead view of a round table with ten people eating. (105) A vase full of kitchen utensils. (113) A lady holding a cake–a very favorite recipe on The Farm. (120) A lady rolling out dough on a table.

Note 1. This book played an important role in introducing soyfoods (especially tempeh and soy ice cream), as well as a vegan diet, to America.

Note 2. This is the earliest document seen (Oct. 2008) that uses the word "vegies" (one of two documents). It is also the earliest document seen (Oct. 2008) that uses the word "barbeque" or "barbequed" rather than the standard "barbecue." Address: Summertown, Tennessee.

1364. Food and Agricultural Organization of the United Nations. 1975. Soybeans: Area harvested, yield, and production. *FAO Production Yearbook (Rome, Italy)* 29:103. • ***Summary:*** The following nations are listed for the first time as soybean producers in the *FAO Production Yearbook*. F = FAO estimate. India: Harvested 32,000F ha in 1973, 13,000 ha in 1974, and 160,000F in 1965.

Sri Lanka: Harvested 1,000 ha in 1974 and 1,000F in 1975.

New Zealand: Achieved a yield of 3,000 kg/ha in 1975.

Name changes: Laos is changed to Lao P. D. Rep. [People's Democratic Republic]. Vietnam DR and Vietnam Rep. are merged to create Vietnam CR [Communist Republic?].

1365. Guhardja, Edi. 1975. Evaluations of some hybrid plant materials of possible use in a recurrent selection program for protein in soybean seeds. PhD thesis, University of Illinois at Urbana-Champaign. 111 p. Page 1998 in volume 36/05-B of Dissertation Abstracts International. *
Address: Univ. of Illinois at Urbana-Champaign.

1366. International Rice Research Institute. 1975. Annual report for 1974. Los Banos, Laguna, Philippines. Soybeans: p. 332, 334-37, 339-41. *
Address: Los Baños, Laguna, Philippines.

1367. Irawati, Zubaidah; Winarno, F.G.; Rahman, Ansori. 1975. The effects of mold starters, fermentation containers and storage time on the quality of tauco. In: Dept. of Agricultural Product Technology, Faculty of Agricultural Engineering and Product Technology, Bogor Agricultural

University. Research on Tauco: Phase One. See p. C-1–C-10. [6 ref]
• ***Summary:*** Tauco is Indonesian-style miso. Address: Bogor, Indonesia.

1368. Muljokusumo, E. Sudigdo. 1975. Tempe dan oncom. Cetakan ke 3 [Tempeh and onchom. Revised ed.]. Bandung: Penerbit Tarate. 40 p. Kita Membuat Sendiri (2) (methode science). Author's name now written as Mulyokusumo. 40 p. [Ind]
• ***Summary:*** Illustrated booklet for use in secondary school science classes. Also discusses *benguk* [velvet bean tempeh] and *dage*. Address: Indonesia.

1369. Noor, Muhammad; Wahab, Abdul. 1975. Proses pembuatan tempe [Tempeh production]. Thesis, Biology Dep., ITB, Bandung, Indonesia. Contains numerous photographs. [Ind]*
Address: ITB, Bandung, Indonesia.

1370. Nurhajati, Siti; Winarno, F.G.; Sri Laksmi, B. 1975. Studies of the affect of *Rhizopus oligosporus* and *R. oryzae*, and fermentation time on the quality of tauco. In: Dept. of Agricultural Product Technology, Faculty of Agricultural Engineering and Product Technology, Bogor Agricultural University. Research on Tauco: Phase One. 35 p. See p. C-1–C-12. [11 ref]
• ***Summary:*** Tauco is Indonesian-style miso. Address: Bogor, Indonesia.

1371. Roig y Mesa, Juan Tomas. 1975. Diccionario botánico de nombres vulgares Cubanos [Botanical dictionary of Cuban vernacular names]. Havana, Cuba: Editorial Pueblo y Educación. Illust. 20 cm. [Spa]*
• ***Summary:*** The soybean (Soya) was introduced to Cuba in 1904 by the EEA *(Estación Experimental Agronómica de Santiago de Las Vegas,* currently INIFAT, the Experimental Agronomical Station) from the USA, but it was possibly already found in the Isla de la Juventud, used by the Japanese to prepare a kind of cheese called 'tofu.' *(dau phu* in Vietnamese).

Note 1. This document contains the earliest date seen for soybeans in Cuba (1904), or the cultivation of soybeans in Cuba (1904 or 1904; one of three documents). The source of these soybeans was the USA.

Note 2. Although these soybeans were introduced in 1904, they may not have been cultivated until 1905 (see Cruz 1906).

Note 3. The author was born in 1877. The 1st edition was published in 1928 (3 vols, 48 plates).

1372. Selected annotated bibliography on the nodulation and nitrogen fixation of soybean (Glycine max (L.) Merr.). 1975. Kuala Lumpur: RRIM (Rubber Research Inst. of Malaysia). *

1373. Shuib, Zaidah. 1975. Insiden kehadiran bakteri patogen penghasil racun pada proses pembuatan oncom dan tempe, dan faktor-faktor yang mempengaruhinya [Factors affecting the incidence of bacterial pathogens during onchom and tempeh processing]. Thesis (Skripsi), Bagian Biologi Institut Teknologi Bandung, Bandung, Indonesia. 48 p. PBITB. [Ind]*
Address: Bandung, Indonesia.

1374. Solomon, Charmaine. 1975. South East Asian cookbook. Sydney, Auckland, London, New York: Books for Pleasure (Div. of Paul Hamlyn Pty. Ltd.). 120 p. Illust. Index. 23 cm.
• ***Summary:*** Contains little on soy.

1375. Sudargo, Lestari D. 1975. Penelitian waktu pembusukan pada tempe kedelai dan tempe gembus [Research on putrefaction time of soy tempeh and okara tempeh]. Thesis (Skripsi), Akademi Gizi, Jakarta. 33 p. [Ind]*
Address: Jakarta, Indonesia.

1376. Sudarmadji, Slamet. 1975. Certain chemical and nutritional aspects of soybean tempe. PhD thesis, Dep. of Food Science, Michigan State University. ix + 151 leaves. Page 4371 in volume 36/09-B of Dissertation Abstracts International. Illust. 29 cm.
• ***Summary:*** Discusses: Changes in fatty acid content and profile of tempeh during fermentation. Total free fatty acids produced by tempeh during 100 hours of fermentation (The most rapid production occurs during the first 28 hours). Total bacterial count in tempeh during fermentation (This increases most rapidly during the first 18 hours). The temperature of tempeh at ambient temperatures of 25ºC and 32ºC. (At 32ºC the temperature in the tempeh rises rapidly from the 15th hour until the 27th hour, reaching a peak of about 43.5ºC). Rats fed fried soy tempeh gained weight more slowly than rats fed cooked and fried unfermented whole soybeans.

Note: Slamet Sudarmadji was born in 1941. Address: Michigan State Univ.

1377. Sulistioningsih, -; Winarno, F.G.; Jenie, B.S.L.; Muchtadi, Deddy. 1975. The effects of soybean varieties and different mold species mixtures for fermentation on the quality of tauco during storage. In: Dept. of Agricultural Product Technology, Faculty of Agricultural Engineering and Product Technology, Bogor Agricultural University. Research on Tauco: Phase One. See p. B-1 to B-12. [12 ref]
• ***Summary:*** Tauco is Indonesian-style miso. Address: Bogor, Indonesia.

1378. Swastomo, Wasidi; Winarno, F.G.; Muchtadi, D. 1975. Studies of the affect of soybean variety, soaking time and brine concentration on the quality of tauco. In: Dept. of Agricultural Product Technology, Faculty of Agricultural Engineering and Product Technology, Bogor Agricultural University. Research on Tauco: Phase One. 35 p. See p. A-1 to A-12. [11 ref]

• ***Summary:*** Tauco is Indonesian-style miso. Address: Bogor, Indonesia.

1379. Tenne, F.D.; Mengistu, A.; Sinclair, J.B. 1975. Occurrence and identification of *Bacillus subtilis* associated with soybean seeds from six geographical countries. *Proceedings of the American Phytopathological Society* 2:91 (Abst. NC-45).

• ***Summary:*** The six countries are China, Ethiopia, Pakistan, Puerto Rico, Thailand, and USA. *Bacillus subtilis* appears to be an omnipresent seed-borne bacterium on soybeans; it can cause seed decay under conditions of high moisture and temperature. Address: All: Univ. of Illinois, Urbana, IL 61801.

1380. U.S. Department of Agriculture. 1975. The annual report on activities carried out under Public Law 480, 83d Congress, as amended, during the period July 1, 1973 through June 30, 1974. Washington, DC: U.S. Government Printing Office. See table 17.

• ***Summary:*** Table 17 is titled "Title II, Public Law 480–total commodities shipped by program sponsor, fiscal year 1974." The main program sponsors and distributing agencies, listed alphabetically, are AJJDC (American-Jewish Joint Distribution Committee), CARE, CRS (Catholic Relief Service), CWS (Church World Service), LWR (Lutheran World Relief), SAWS (Seventh-day Adventist World Service), UNICEF, UNRWA (United Nations Relief and Works Agency), and WRC (World Relief Commission). All of these are Private Voluntary Organizations (PVO/PVOs), registered with USAID. The following foods containing soy protein were distributed: CSM (corn soya mix), CSB (corn soya blend), WSB (wheat soya blend), and small amounts of soya flour. The vegetable oil which was shipped to many countries was soybean oil; it is not recorded here.

Foods containing soy protein were distributed to the following countries or areas:

Africa: Botswana, Burundi, Cameroon, Central African Republic, Chad, Congo–Belgian, Dahomey, Ethiopia, Gabon, Gambia, Ghana, Ivory Coast, Kenya, Lesotho, Liberia, Malagasy, Mali, Mauritania, Morocco, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, Somali Republic, Sudan, Swaziland, Tanzania, Togo, Rhodesia, Upper Volta, Zaire, Zambia.

Near East–South Asia: Bangladesh, British Solomon Islands, Egypt, Gaza, India (incl. soy flour), Gaza, Jordan–East, Jordan–West Bank, Nepal, Pakistan, Sri Lanka, Turkey, Yemen, Palestine Refugee Program.

East Asia: Cambodia, Indonesia, Korea, Laos, Malaysia, Philippines, Singapore, Vietnam.

Latin America: Antigua, Bolivia, Brazil, British Honduras, Chile, Colombia, Costa Rica, Dominica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Paraguay, Peru, St. Kitts, St. Lucia, St. Vincent, Uruguay. Address: Washington, DC. Phone: 703-875-4901 (1991).

1381. Zainudin, Djendjen; Winarno, F.G.; Rachman, A. 1975. Studies of the affect of different mold species and fermentation times on tauco production. In: Dept. of Agricultural Product Technology, Faculty of Agricultural Engineering and Product Technology, Bogor Agricultural University. Research on Tauco: Phase One. 35 p. See p. B-1–B-11. [7 ref]

• ***Summary:*** Tauco is Indonesian-style miso. Address: Bogor, Indonesia.

1382. Applied Scientific Research Corporation of Thailand (ASRCT). 1975? Chocolate soy beverage (Leaflet). Bangkok, Thailand. Undated.
Address: ASRCT, 196 Phahonyothin Rd., Bank Khen, Bangkok 9, Thailand.

1383. Giovanna, Jasper Di. 1975? My recollections of I.D. ["Ike"] and early history of Illinois Soy Products Co. (Continued). Illinois? 22 p. Undated. Unpublished typescript.

• ***Summary:*** Continued: At Joe's suggestion, Ike entered the Illinois Soy Products Co. into membership with the National Soybean Processors Association. He even served on some Association committees. The secretary or president of NSPA at the time was Edward J. Dies, an author of agricultural or Wall Street subjects. He wrote several books about soybeans.

In about 1937 Ike had some meetings with a representative of a German company that designed and built solvent extraction plants for soybeans. At that time most of the industry capacity was of the expeller type (or hydraulic in the southern U.S.). A number of larger companies, including ADM in Decatur, were looking at solvent extraction plants. Eventually, after serious consideration, Ike decided against such a plant, apparently for three reasons: (1) He wanted to move to a better climate; (2) Extraction plants required considerable water and sewage usage, neither of which were easily obtainable at the plant site; (3) These plants were very expensive.

Ruth Sinaiko's maiden name was Grebler. Her parents moved from Wisconsin to Springfield to be near Ruth and

Ike and for new business opportunities. This made everyone happy. Ike and Ruth adopted a baby girl. "They named her Jean and gave her all their love."

As time passed, the acreage planted to soybeans in the U.S., including Illinois, increased. The country began to come out of the Depression. Irving Rosen, a brother-in-law of Ike's, together with Joe and Alex Sinaiko, bought the soybean plant at Quincy. Max Albert, another brother-in-law, also with Joe Sinaiko's help, bought property at Galesburg, Illinois and made plans for a soybean processing plant.

These plants became successful and this made Ike happy. There were good relations between the various families and many get-togethers. Frequently Ike would take Jasper to these get-togethers. "They all treated me very affectionately. Joe and Ike would advise me of the virtues of working hard and of being honest and of keeping good morals and character. This impressed me very much and had much to do with how I handled myself."

"During this time, along with the rapid expansion of the livestock and poultry feeding there was a big jump in volume of pet food business, especially the dog food business. There was a growing acceptance of dry dog food which was relatively new in pet feeding. Soybean products were widely used in the manufacture or formulation of 'dry' dog food. Ike got the idea to make a Soya Pea-Sized Cake for use in Dog Food. This product was obtained by a screening process of the Soybean Cake after it left the Cake Crusher in our process. The Pea-Sized Cake was accepted and became a permanent part of the business of the Illinois Soy Products Company."

Ike also made a mixture of molasses with soybean cake for feeding cattle. Then he ordered and installed a "pellet machine" and made "Soybean Meal Pellets" for about a year. But neither of the two products was successful. Note: This is the earliest English-language document seen (July 2006) that contains the term "Soybean Meal Pellets" (regardless of capitalization).

Discusses Hitler's 1938 rise to power in Germany, his oppression of Jews, and the family of Eric Nadel of Hamburg. Eric and his wife came to Springfield and Ike hired him to work in the office. He also later helped Otto Langfelder.

Joe and Ike decided to start a soybean plant in Decatur, Illinois, because of the favorable freight rates and "milling in transit" privileges. Also large amounts of soybeans were grown in the surrounding area. They purchased the vacant Hight Elevator, an old concrete elevator situated on the I.C. railroad in an industrial area, and started Decatur Soy Products Co. It began production at harvest time in 1939. ADM's new solvent extraction plant was not ready until shortly afterwards.

When Germany invaded Poland and Britain [sic], and World War II began, the commodity markets exploded. The war helped the soybean industry to grow, and most processors thrived. Decatur Soy Products was a financial success its first year.

During the 1930s, the U.S. was a net importer of fats and oils. Most of the imports came from Southeast Asia. After the Japanese bombed Pearl Harbor, these imports stopped. The U.S. government took emergency action to increase our supply of oils and fats by a big increase in the planting of soybeans and other oilseeds. Their program included control of the soybean processing industry by the U.S. Commodity Credit Corporation (CCC). After many meetings, a plan was developed which put all soybean processors under contract with CCC. This contract fixed the profit margins of the processors, and controlled the prices processors could pay for soybeans or charge for products. Ike played a role in these negotiations and his views were respected. The profit margin was good and processors, with few exceptions, prospered. Through these meetings and related NSPA meetings Ike became well acquainted with the leaders of the Industry as well as the CCC and he attended many of the meetings where decisions were made. A few of these people were Soybean Johnson of Purina, Gene Funk of Funk Brothers Seed Company, Ed. Sheiter of A. E. Staley Mfg. Company, Dwayne Andreas of Honeymead Products, Ralph Goldseth of the Glidden Company, Clive Marshall of Allied Mills, Hank Lloyd of U.S. CCC, Ed Dies of the N.S.P.A. Mr. Shellabarger of The Shellabarger Soybean Processing Company."

The War created a major expansion in the livestock and poultry industries, and also in the usage of fats and oils, not only in the U.S. but in countries allied with us. Therefore soybean acreage grew rapidly and processing capacity grew with it. Yes despite this expanded capacity, demand for products was greater than supply. Because of the mushrooming demand for feeds, the availability of formula feeds was limited by the feed company's ability to buy proteins. Soybeans had become the single largest U.S. source of protein for the feed makers. Some processing firms began to hold back on selling proteins to the trade so they could increase their production of feeds, and some even used this advantage to enter the formula feed business. The feed firms that found their protein supplies completely or partially cut off were desperate to obtain supplies. Most of the processors, including Illinois Soy Products Co. and Decatur Soy Products Co. started allocation systems based on the previous year's usage. New customers could only be given an allocation as the processor's production expanded.

The leading U.S. grain company and exporter of grains, the Cargill Co., had recently entered the formula feed business. Since Cargill was not a soybean processor and found it difficult to buy enough soybean meal, Cargill decided to buy a going soybean processing business. Joe and Ike often visited and spoke with Julius Hendel of Cargill as well as some others prominent in Cargill's

managing team, and Cargill's desire for a soybean plant was conveyed to Ike or Joe. After some preliminary talks, a deal was made for Cargill's purchase of the Illinois Soy Products Company. [in early 1944] The price paid was generous and afforded Ike and the other stockholders a very good capital gain. Cargill agreed to keep Eric Nadel and the other personnel on to help run their new acquisition.

"Following the sale of Illinois Soy Products Company, Ike made plans for moving his family and home to Los Angeles, California.

"Ike did not intend to retire. He scouted around in California for a business to buy or get into. There was an expeller-type soybean plant in Norwalk, California that was owned by The Glidden Company and which was closed-down. It had not operated for a while. Ike and Joe decided they could make a go of this business and they formed The Liberty Vegetable Oil Company, following purchase of the closed plant

"In the beginning Ike processed mostly soybeans and flax at The Liberty Vegetable Oil Company, but as time when along he learned to crush profitably such oil bearing seeds as safflower, copra, and off-grade walnuts ant other nuts which were in good supply in Southern California. Later, he put in a small scale refinery and produced refined oils for the cosmetic trade... This business was a success for Ike from the first year, though it took a good deal of doing on Ike's part."

1384. USDA Foreign Agricultural Service. 1976. Palm oil, historical perspective and future prospects. Washington, DC. 44 p. Jan. Unpublished manuscript.
• ***Summary:*** The sharp gain in U.S. monthly imports of palm oil began in Aug. 1974. West Malaysia is a major exporter. Yet palm oil prices in the USA at about 16 cents a pound are not currently competitive with soybean oil prices at internal points. Address: Washington, DC.

1385. Bourne, M.C.; Escueta, E.E.; Banzon, J. 1976. Effect of sodium alkalis and salts on pH and flavor of soymilk. *J. of Food Science* 41(1):62-66. Jan/Feb. [12 ref]
Address: 1. Cornell Univ., Geneva, New York; 2-3. Univ. of the Philippines, Laguna, Philippines.

1386. Ho, Coy Choke; Koh, Chong Lek. 1976. Microbiology of soybean-based fermented food in South-East Asia. Paper presented at the Third INTSOY Regional Soybean Conference. 7 p. Held 23-27 Feb. 1976 at Chiang Mai, Thailand. Unpublished manuscript. [17 ref]
• ***Summary:*** The relatively well-studied soy-based fermented foods in South-east Asia are tempe, sufu (soy cheese), ontjom tahu [okara tempeh], tau chiow ([tauco, taucho], soybean paste), soy sauce, and thua-nao (natto). These are shown in Table 1, with the microorganisms responsible for fermentation, substrates, uses, and principal references given for each. "It can be noted that only a very limited range of genera of fungi are involved in these fermentations, namely *Rhizopus, Aspergillus, Neurospora, Actinomucor* and *Saccharomyces.* Furthermore, within a genus only a very limited number of species are actually utilized, for example *Aspergillus sojae* in soy sauce fermentation, and *Neurospora intermedia* in ontjom tahu fermentation.

"Regarding ontjom tahu fermentation, the fungus used was formerly erroneously listed as *Neurospora sitophila* (Dwidjoseputro, 1961)."

The authors then use analyses of conidia color and crossing experiments based on meiotic sterility to show that the cultures on okara tempeh (ontjom tahu) belong to a single species, *Neurospora intermedia.*

Note: This is the earliest English-language document seen (March 2009) that uses the word "tau chiow" to refer to Indonesian-style miso. Address: Dep. of Genetics and Cellular Biology, Univ. of Malaya, Kuala Lampur, Malaysia.

1387. Kozaki, Michio. 1976. Fermented foods and related microorganisms in Southeast Asia. *Proceedings of the Japanese Association of Mycotoxicology* No. 2. p. 1-9. March 20. [16 ref]
• ***Summary:*** Table 1, "Main fermented foods using molds, yeasts or bacteria in Southeast Asia," contains four columns: Name of fermented food, raw materials, main related microorganisms, and remarks (incl. names in other countries). Fermented foods listed include amazake (tapé / tapeh in Indonesia, with Rhizopus instead of Aspergillus oryzae), tempeh, sufu, ontjom, natto (soy bean fermented with *Bacillus subtilis* var. *natto;* Teranatto is same as original miso, Taosi in Philippines).

Table 2, "Main fermented foods using molds plus bacteria, molds plus yeasts, yeasts plus bacteria and molds, or yeasts plus bacteria in Southeast Asia," contains the same four columns. Fermented foods listed include soy sauce *(Aspergillus oryzae, Saccharomyces rouxii, Pediococcus halophylus;* called Jan in Korea and Thua nao [sic] in Thailand), Miso (same 3 microorganisms as in soy sauce). Address: Tokyo Univ. of Agriculture, Dep. of Agricultural Chemistry, 1-1, Suragaoka, Setagaya-ku, Tokyo.

1388. *Foreign Agriculture.* 1976. Outlook better for soybeans in three Far East markets. March 22. p. 2-4.
• ***Summary:*** The improved forecast is for Japan, Taiwan, and South Korea. Once virtually free of competition for the important Japanese soybean market, the U.S. must now reckon with Brazil as a competitor, while facing Malaysian palm oil in the vegetable oil market. Brazil's soybean exports to Japan last year, for instance, probably totaled only about 60,000 tons, compared with the 2.8 million tons of U.S. beans. The cost of shipping Brazilian beans to Japan

in 1975 averaged $5-$10 per ton more than from the U.S. This difference reflected the longer distances from Brazilian ports, plus Brazil's use of smaller ships. The 10-day-longer shipping time from Brazil is especially important in Japan, where timeliness of cargo is a key market factor.

There is only one major oilseed crusher and meal supplier in Korea. The Government production plan calls for self-sufficiency in soybeans and the country has launched a strong drive in this direction. Current Korean production of soybeans totals about 311,000 tons. The low-oil variety of bean produced in Korea is best suited for food use (e.g. miso).

Taiwan is the largest per capita consumer of soybeans in the Far East, with a per capita soybean oil consumption of about 11 pounds in 1975 (out of 13 pounds for all vegetable oils).

1389. Boucher, Suzanne. 1976. Tempe makers in Yogyakarta. *Indonesia Circle* 9:10-11. March.
• ***Summary:*** Discusses tempeh in the context of family life in Yogyakarta, Java, Indonesia. During the author's stay in Yogyakarta last summer she was introduced to a family of tempe makers. She describes the process of making tempeh. In some cases, after the soybeans are dried but before they are inoculated, they are mixed with coconut gratings *(ampas kelapa)* to make *tempe tidak murni.* During this mixing, there must be no trace of coconut oil on the tempeh maker's hands. During menstruation, women are not allowed to make tempeh.

1390. Graham, Larry. 1976. Palm oil threat grows. *Soybean Digest.* March. p. 8-9.
• ***Summary:*** "Federal officials are using phrases such as 'markets are awash with floods of palm oil'..."

1391. Tee Ai Ben. 1976. A survey into local soya bean products. Penang: Universiti Sains Malaysia. March. * Address: Malaysia.

1392. Longacre, Doris Janzen. 1976. More-with-less cookbook. Scottsdale, Pennsylvania: Herald Press. 328 p. April. Illust. Index. 22 cm. Introduction by Mary Emma Showalter Eby. Spiral bound. [30* footnotes]
• ***Summary:*** Commissioned by the Mennonite Central Committee. On the cover: "Suggestions by Mennonites on how to eat better and consume less of the world's limited resources." However, this is not a vegetarian cookbook. Contents: Introduction. Part I: More with less. 1. Less with more: World shortages, North America: Five times as much, overspending money, overeating calories, overeating protein, overeating sugar, overcomplicating our lives. 2. Change–An act of faith: Does it really help anyone if I cut back?, it seemed inadequate, we liked it better the second time. 3. Building a simpler diet: The protein question, what is complete protein?, amino acid teamwork, no-meat, low-meat, and which meat, increasing protein content in foods.

II. Sharing the recipes. Soy-related recipes (all use whole soybeans unless otherwise stated): Nameless soybeans (p. 47). Soybean granola (with roasted soybeans, p. 91). Section of soybean recipes (p. 96-98, 109-15): Savory baked soybeans. Soybean loaf. Soybean hamburger casserole (with ground beef). Soybean casserole. Fresh soybean-cheese casserole (with "fresh green soybeans"). Soybean pie. Refried soybeans. Soybean soufflé. Sweet and sour soybeans. Marinated soybeans. Soybean sandwich spread. Basic soybean spread or dip. Soybean curd sauté (with bean curd [tofu]). Gather up the fragments. Soy, cheese and meat loaf (with "vegetable-protein meat extender, p. 166). Basic burger mix (p. 166). Quick soybean soup (p. 211). Soybean salad (p. 259). Roasted soybeans (3 recipes, p. 305).

Soy is also mentioned elsewhere: Soybeans contain complete protein (p. 28). Protein complementarity: In Indonesia fermented soybean cakes go with a rice meal. Chinese and Japanese use bean curd [tofu] and bean sprouts with rice (p. 29) Use soybeans or soy flour to increase protein content of foods (p. 31). Table showing protein and calorie content of some common foods (low fat soy flour, dry soybeans, immature cooked soybeans, mature cooked soybeans, p. 34). Table showing comparative costs of protein sources (dry soybeans {the least expensive of all!}, textured vegetable protein meat extender, soybean breakfast sausage, soy flour, p. 37). Soybeans and soy flour (p. 45). Cook large amounts of soybeans and freeze them to save time (p. 48). Soybeans contain fewer calories per gram of protein than common white beans (p. 49). When making granola, add soy flour, soy grits, roasted soybeans, or soaked soybeans (p. 88). Address: Akron, Pennsylvania.

1393. Saono, S.; Brotonegoro, S.; Abdulkadir, S.; Basuki, T.; Jutono, -; Badjra, I.G.P. 1976. Microbiological studies of tempe, kecap, and taoco. I. Quantitative estimation and isolation of microorganisms from some products from West Java. In: ASEAN Project on Soybean and Protein Rich Foods, Progress Report on Research Activities, Jan-May, 1976. Appendix 7. *
• ***Summary:*** Note: This is the earliest English-language document seen (March 2009) that uses the word "taoco" to refer to Indonesian-style miso.

1394. Lachmann, Alfred. 1976. The AID program to utilize LEC's in LDC's. *LEC Report* No. 1. p. 13-17. D.E. Wilson, ed. Low-Cost Extrusion Cookers: International Workshop Proceedings. (Fort Collins, CO: Dep. of Agric. and Chemical Engineering, Colorado State Univ.).
• ***Summary:*** An excellent early history. "As early as 1971 a search for low-cost extrusion equipment began. One of the extruders selected for further study was the Brady Crop

Cooker Model No. 206, manufactured by Koehring Farm Division...

"Later, in 1973, another low-cost extruder was located which produced flour from full-fat soybeans for use in feed formulations. It was the Insta-Pro extruder, Model 500, manufactured by Triple 'F' Inc. Note: This is the earliest document seen (July 2006) that mentions the "Insta-Pro" extruder.

"As a consequence, experimental work was started to test the capabilities of low-cost extruders for the manufacture of human foods. Samples of experimentally extruded soy flours were tested by Northern Regional Laboratories and ADM for their physical and chemical characteristics and for the destruction of anti-physiological factors. Kansas State University evaluated the soy flours for their suitability as protein fortifiers in the manufacture of bread and found them to be suitable for this purpose...

"The first testing of a low-cost extrusion cooker outside of the United States took place in India in 1973. In Calcutta at the United Flour Mills, a CARE-purchased Brady Crop Cooker was installed and a test program was started to look into production of foods for Asian CARE-sponsored feeding programs.

"The first AID/USDA-sponsored testing program was initiated in Guatemala. In Guatemala the machine to be tested was loaned to CARE by USDA. CARE in turn selected as its testing organization the Institute of Nutrition of Central America and Panama (INCAP)...

"In 1974 it became clear that specific problems encountered in utilizing low-cost extrusion cookers required solutions, and that a systematic testing program to evaluate and analyze capabilities of low-cost extrusion equipment should be started. A research contract was signed between Colorado State University and the USDA. The University's Agricultural Engineering Department was given the task of determining the operational characteristics and capability of cooker-extruders for the production of human foods...

"A year later, USDA signed a research agreement with CSU extending its role in studying low-cost extrusion cookers. In this agreement the Food Science and Nutrition Department and the Agricultural Engineering Department became involved in a new project. The general objectives of this project were to assist selected developing countries in their efforts to supplement or replace foods from international donor agencies with commodities produced locally, and to utilize food technology in related areas to improve diets of their local population...

"Another testing program was initiated at EAIRO in Nairobi, Kenya, where white maize, a special local millet, rice and soybeans were cooked successfully. During the testing program the cooker was utilized to produce enough material of a corn-soy blend to initiate a study on the acceptability of this product as a commercial weaning food in Tanzania.

"A third machine will soon be installed at the Philippine Women's University...

"In Sri Lanka a cooker has been installed by CARE with auxiliary equipment provided through CSU which performs as a production unit. It is utilized for the cooking of dehulled sorghum to which a small quantity of soybeans has been added...

"In Costa Rica an electrically powered extrusion unit, furnished by CARE, is located at the Pronutre plant and has been used to demonstrate processing of whole soybeans and corn-soy blends.

"In Indonesia, again with CARE's initiative, the performance of extrusion cookers will be studied at the Institut Pertanian Bogor (IPB)." Address: Nutrition and Agribusiness Group, USDA/ERS.

1395. Pearson, Richard. 1976. Early civilization in China: Book review of *The Cradle of the East,* by Ping-ti Ho. *Science* 193(4251):395-96. July 30.

• ***Summary:*** The purpose of this book is "to ascertain whether the major cultural elements which eventually coalesced in Shang civilization were of indigenous [Chinese] origins." The book is "an attempt to show that from the Yang Shao Neolithic through to the Chou there was a continuous series of creative innovations in North China that gave rise to and fostered Chinese civilization." Yang Shao culture began before 5000 B.C. in what is today southern Shensi, Shansi, and northwestern Honan provinces. The soil was loess and the main crop was millet. Ho believes that the Yang Shao developed the world's earliest writing system, consisting of word signs on pottery. Rice was domesticated in central China by 4000 B.C. Wheat and barley were introduced from the West in the second or late third millennium B.C. Bronze technology developed about 1600 B.C. Ho concludes that the major elements of Chinese civilization are all derived from the Yang Shao nuclear area; they reached other parts of China by a centrifugal process.

But the reviewer (like a number of specialists in Southeast Asian archaeology) is critical of this claim and the model of "cradles" and diffusion on which it is based. He believes, based on archaeological evidence, that cultivation of food crops may have been earlier in South China and Southeast Asia than in North China–because of favorable early post-Pleistocene conditions. Address: Dep. of Anthropology, Univ. of British Columbia, Vancouver, BC, Canada.

1396. Kozaki, Michio. 1976. Tônan Ajia no miso to shôyu [Southeast Asia's miso and shoyu]. *Miso no Kagaku to Gijutsu (Miso Science and Technology)* No. 271. p. 1-7. Sept. [Jap]

1397. Shurtleff, William; Aoyagi, Akiko. 1976. The book of miso. Hayama-shi, Kanagawa-ken, Japan, Soquel, California, and Brookline, Massachusetts: Autumn Press. 256 p. Sept. Illust. by Akiko Aoyagi. Index. 28 cm. Revised ed. 1981. New York, NY: Ballantine Books, 620 p. [60 ref]
• ***Summary:*** Contents: What is miso? Preface. Acknowledgments. Part I. Miso: Savory, High Protein Seasoning. 1. Soybeans, protein and the world food crisis. 2. Miso as a food. 3. The miracle of fermentation. 4. The varieties of miso: Regular Miso: Rice miso (red / aka, light-yellow / shinshu, mellow red / amakuchi akamiso, mellow beige / amakuchi tanshoku, mellow white / shiro koji, sweet red / edo or edo ama-miso, sweet white / Kyoto shiro miso), barley miso (karakuchi mugi, mellow barley / amakuchi mugi), soybean miso / mamé miso (miso-dama, Hatcho miso, soybean miso / mame miso, tamari miso). Special Miso: Finger lickin' miso / Namemiso (Kinzanji miso, moromi miso, hishio, namémiso, natto miso, goto miso), sweet simmered miso / nerimiso. Modern Miso: Akadashi miso, dehydrated or freeze-dried miso, low-salt / high-protein miso.

Part II. Cooking with Miso (400 recipes). 5. Getting started. 6. Recipes from East and West: Miso toppings, miso in dips & hors d'oeuvres, miso in spreads & sandwiches, miso dressings with salads, miso in soups & stews, miso in sauces, miso with grains, beans & tofu, miso in baked dishes, miso sautéed & simmered with vegetables, miso in grilled dishes, miso in deep-fried dishes, miso & eggs, miso in desserts, miso pickles, koji cookery.

Part III. The Preparation of Miso. 7. Making miso at home and in communities. 8. Japanese farmhouse miso (incl. miso-dama). 9. The traditional miso shop. 10. The modern miso factory. Appendixes: A. A brief history of chiang, miso, and shoyu: Introduction, Chinese chiang, early Japan, the Nara Period (710 A.D. to 784 A.D.), the Heian Period (794 A.D. to 1160 A.D.), the Kamakura Period (1185 A.D. to 1333 A.D.), the Muromachi Period (1336 A.D. to 1568 A.D.), tamari–the forerunner of shoyu (Priest Kakushin returns to Japan from China, where he learned how to make Kinzanji miso, settles at Kokoku-ji temple near town of Yuasa, discovers tamari), miso during the Edo Period (1603 A.D. to 1867 A.D.), the development of shoyu the Meiji and Pre-war Periods (1867 A.D. to 1941 A.D.), modern times, transmission to the West.

B. The varieties of Chinese chiang, Korean jang and Indonesian Tao-tjo. C. The chemistry and microbiology of miso fermentation: Introduction, koji starter molds, making koji starter, making koji–the first fermentation, cooking the soybeans, preparing the miso–the second fermentation, the finished miso. D. People and institutions connected with miso: In Japan–Miso research scholars and institutes, exporters of natural miso and koji to the West, traditional or semi-traditional shops making natural miso, Japan's ten largest miso factories (gives the production in tons/year for several companies), other well-known miso makers. Makers of koji starter and koji, Japanese restaurants specializing in miso cuisine. North America–Miso research scholars and institutes, commercial miso makers, companies importing Japanese miso, koji, or koji starter, individuals interested in miso. Europe (Belgium, England, France, Germany, Holland, Italy, Portugal) and Latin America (Brazil, Costa Rica, Mexico, Venezuela). E. Miso additives. F. Miso with seafoods, chicken, and meat. G. Table of equivalents. H. So you want to study miso in Japan? Bibliography. Glossary. About the authors (autobiographical).

Note 1. This is the earliest English-language book seen (July 2000) that has the word "miso" in the title. It is also the first book in the Western world written entirely on the subject of miso.

Note 2. This is the earliest document seen (July 2000) that mentions "Hatcho miso" (spelled that way–which is now the correct romanization). Hatcho is a Japanese place name meaning (approximately) "Eighth Street."

Note 3. This is the earliest document seen (Sept. 2002) that contains industry and market statistics on individual miso companies.

Note 4. This is the earliest document seen (March 2009) that gives illustrated details about commercial miso production.

Note 5. An advertisement on the inside rear cover of the paperback edition of this book announced that the authors were preparing *The Book of Sea Vegetables*. That book was half researched and written but never published because of concern with pollutants in sea vegetables, and increased interest in soyfoods. Address: 790 Los Palos Dr., Lafayette, California 94549.

1398. Shurtleff, William; Aoyagi, Akiko. 1976. Tofu & Miso America Tour: 29 Sept. 1976 to 3 Feb. 1977 [Itinerary with two maps]. Lafayette, California: New-Age Foods Study Center. Unpublished manuscript.
• ***Summary:*** On 13 Sept. 1976 the authors bought a large, white 1975 Dodge Tradesman 300 van (used, with 40,000 miles on it). On one side Akiko painted in large, bold letters "Tofu and Miso America Tour 1976-77." Their *Book of Tofu* had been published in December 1975 and *Book of Miso* on 23 Sept. 1976. On Sept. 29 they packed the van full to the ceiling with their books on tofu and miso, plus Larry Needleman's tofu kits–and departed.

This trip had four main purposes: (1) To introduce tofu and miso to America; (2) To introduce people to the many benefits of a meatless/vegetarian diet; (3) To encourage people to start soyfoods companies, especially tofu shops; and (4) To promote the authors' newly-published *Book of Tofu* and *Book of Miso*.

This itinerary includes the name and address of 64 people and organizations visited. Many of these were pioneers in the soyfoods and natural foods movements:

Sept. 29–David and Kathleen Sandler, Robert Dolgin, Don Wilson, Farm Food Co. (San Rafael, California). Oct. 1–Petaluma, California. Oct. 2–Josephine County Food Center, Grants Pass, Oregon. Oct. 3. Heliotrope Natural Foods (Salem, OR). Oct. 4–West Bank Cafe (Corvallis, OR). Oct. 5. Visit Linda Shurtleff (McMinville, OR). Visit *Rain Magazine* (Portland, Oregon). They do an interview which is published in their Nov. 1976 issue. Oct. 6. Blake Rankin and Janus Natural Foods (Seattle, Washington). Oct. 7. Janus. Oct. 8–Luke Lukoskie and Sylvia Nogaki of Island Spring (Vashon, Washington). Oct. 10–Jack Grady, a macrobiotic (Spokane, WA). Oct. 13–Univ. of Minnesota. Oct. 14–Georgie Yiannias of Wedge Food Co-op and Ananda Marga (Minneapolis, Minnesota). Our largest class with 300 people. Oct. 15–Barbara ("Bobbie") Reinhardt Shurtleff dies of colon cancer at Alta Bates Hospital, Berkeley, CA. Oct. 15. Famine Food Co-op (Winona, Minnesota). Oct. 16–Bonnie Maroney of The Wisconsin Farm (Ettrick, WI). Oct. 19–Visit George Strayer and Larry Krueger of the American Soybean Assoc. (Hudson, Iowa). Visit David and Ann Tucker (Iowa City, Iowa). Oct. 20. Outpost Natural Foods (Milwaukee, WI). Visit Bountiful Bean Co-op. Oct. 21. Visit Dr. Danji Fukushima and Kikkoman Foods (Walworth, Wisconsin). Oct. 22–Visit Drs. Hesseltine, Wang, Wolf, Mustakas, Cowan at Northern Regional Research Center (Peoria, Illinois). Oct. 23–Morning class on commercial production for Les Karplus and 5 people at Vegetarian Incorporated (Urbana, Illinois). Oct. 23-24. Side trip to visit ADM and Staley (Decatur, IL). Oct. 24–Les and Debbie Karplus of Vegetarian Inc. (Urbana, IL). Oct. 25–Visit Dr. L.S. Wei of the Univ. of Illinois Dept. of Food Science (Urbana, Illinois). Evening program for Karplus in Urbana. Oct. 26. Purdue University (Indiana). Oct. 27–Chris Steele (Lansing, Michigan). Oct. 28–Mike Potter and Louis Howie of Eden Foods (4601 Platt Rd., Ann Arbor, Michigan). Oct. 29–Calico Market (Erie, Pennsylvania). Oct. 30–Visit Greg Weaver and Jay Thompson of Rochester Zen Center (Rochester, New York; Later Northern Soy). Visit Genesee Co-op. Oct. 31–Alternative Health Education Center (Rochester).

Nov. 1–Visit Arnold Karmody at Empty Cloud (Canandaigua, New York). Meet Dr. Keith Steinkraus (Geneva, New York). Nov. 2–Visit with Dr. Steinkraus at New York Agric. Exp. Station (Geneva, NY). Lunch together with his wife, Maxine. Nov. 3–Tom MacDonald at Hannibal, New York. Nov. 4–Ira and Kathy Leviton of Corncreek Bakery (South Deerfield, Massachusetts). Visit Laughing Grasshopper tofu shop just before it begins operation. Nov. 5–Fritz Hewitt of Common Ground Restaurant (Brattleboro, Vermont). Visit Tom Timmins of Llama, Toucan & Crow (Brattleboro). Nov. 6. Shep Erhard (Franklin, Maine). Nov. 7–Ann S. Johnson at Univ. of Maine (Orono, ME). Nov. 8–Visit Marine Colloids (Rockland, Maine). Nov. 10–Drive to Boston, stay with Nahum & Beverly Stiskin (Brookline). Nov. 13–Tofu & Miso program in Boston. Visit Erewhon Natural Foods (33 Farnsworth St., Boston, Massachusetts), Martha Trundy, Jeffrey & Gretchen Broadbent. Nov. 14–Visit to shops in Boston's Chinatown. Michio and Aveline Kushi give a big party in our honor at their home at 62 Buckminster Rd., Brookline, then take us out to dinner at the Seventh Inn. Nov. 15–Tofu-making class at a home in Boston. Nov. 17–Visit offices of *East West Journal*. Sherman Goldman conducts long interview, later published in Jan. 1977 issue. Misomaking class at home of Ken Burns. Nov. 18–Visit Joel Wollner in Cape Cod. Nov. 19–Radio show then program for Joel. Nov. 20–Peter Smith at Quaker group in Pennsylvania. Nov. 22–Visit Woods Hole, Massachusetts to study sea vegetables. Evening program at New Bedford, MA. Nov. 23–Stay with Seung Sahn, Sa Nim at Providence, Rhode Island Zen Center. Meditate and show students how to make tofu. Evening at Insight Meditation Center, Barre, MA, a Vipassana center in a former Catholic seminary, co-founded in 1976 by Jack Kornfield, Joseph Goldstein and 3 others. We have dinner, meditate with the sangha, and hear Jack talk about Vipassana. Nov. 24 Sit morning zazen with master and students at Providence zendo. Nov. 25–Thanksgiving. Akiko and I stay alone in a house near Hartford, Connecticut and taste a good tofu pumpkin pie. I read about seaweeds. We take a long walk in the countryside. Nov. 26–Program for Erewhon Natural Foods in Hartford (stay with Maria Orefice, owner of Garden of Eating restaurant in Hartford). Article in *The Hartford Courant* (Dec. 1). Nov. 27–Long River Food Coop in Connecticut. Nov. 28–Stay with Susan and Kirk Gershuny of Snowflower (Tivoli, New York). They plan to make soy ice cream soon. Nov. 29–Drive in Deep snow to the New York Farm in Franklin, New York. Stay in a big house they built. Nov. 30–Carl Bethage of the East West Center in Gardiner, New York. Also did a radio program.

1976 Dec. 1–Visit Frances Moore Lappé at her upstairs office in Hudson-on-Hastings, New York. Then visit her large home on the hillside. Dec. 1-5–We missed a program for Annemarie Colbin in New York City (partly because we feared our van would be burglarized on the street) so we stayed Dec. 1-5 at the luxurious home of Leo S. Nikora (Niki; Bobbie's friend). I work on writing *The Book of Kudzu*. Dec. 6-7. Program for 40 people (Hosts: Nancy N. Bailey and Robert Rodale) at Rodale Press (Emmaus, Pennsylvania); I am surprised they serve white sugar on their dining tables. Dec. 8–Tim Snyder of Ecology Co-op in Philadelphia. Dec. 9–Stay at home of Sylvia Anderson in Pleasantville, New Jersey and do a program upstairs in a modern university. Study magnificent photos of Native Americans by Edward S. Curtis. Dec. 10–Visit Jay and Freya Dinshah of the North American Vegetarian Society (Malaga, New Jersey); their poor vegan child has bowed legs. Dec. 12–Cindy Blouse in Dallastown, Pennsylvania.

Dec. 13–Visit Laurelbrook Foods, a natural foods distributor in Forest Hill, Maryland. We meet Rod and Margie Coates. Dec. 14–Big program hosted by Ella May Stoneburner and Seventh-day Adventists near Washington, DC. Dec. 15–Michael Rosoff (who ran the East West Center in Washington, DC) planned to host a class in a DC church. After we witness a robbery, we are afraid to leave our van on the street. So we do a scaled-down program in the home of Murray and Pam Snyder, which was the East West Center in Baltimore, Maryland. Visit Laurelbrook Foods Warehouse #2 in Durham / Chapel Hill. Dec. 16–Roanoke Food Co-op in Copper Hill, Virginia. Dec. 17-18–John Shuttleworth and Jim Morgans of *Mother Earth News* (Hendersonville, North Carolina). They do a long interview and take photos. Program at night. Note: An audio tape of Bill's talk at this program is filed with Soyfoods Center documents for 1976. Dec. 19–Chandler Barrett in Atlanta, Georgia.

Note 1. This is the earliest document seen (April 2001) concerning the work of Ira Leviton or Tom Timmins with soy. One evening, before Shurtleff was scheduled to speak at Leviton's Corncreek Bakery, Leviton drove Shurtleff to see the Laughing Grasshopper Tofu Shop which was under construction on the second story of an old wooden building in the nearby town of Millers Falls, Massachusetts. Much of the equipment was made out of wood–including wooden curding vats and a wooden cider press. The company opened in Jan. 1977.

Note 2. This is the earliest document seen (April 2006) concerning Llama, Toucan & Crow in Brattleboro, Vermont.

Note 3. This is the earliest document seen (May 2006) concerning the forerunners of United Natural Foods, Inc. (INFI)–in the form of Llama, Toucan & Crow. Address: 790 Los Palos Manor, Lafayette, California 94549. Phone: 283-3161.

1399. Shurtleff, William; Aoyagi, Akiko. 1976. Tofu & Miso America Tour: 29 Sept. 1976 to 3 Feb. 1977. Continued from Jan. 1977. [Itinerary with two maps]. Lafayette, California: New-Age Foods Study Center. Unpublished manuscript.

• ***Summary:*** Continued: 1976 Dec. 21. Arrive at The Farm in Summertown, Tennessee. Meet Margaret Nofziger and Stephen Gaskin. Stay until 2 Jan. 1977. We stayed most of the time at "Hoot Owl Hollow," a large community owner-built home with many families; our host was Edward Sierra. During the next few weeks we stayed in a parked mobile home (owned by the Sandlers) in a lovely valley about 1 hour drive away. I worked on *The Book of Kudzu* final draft. Heavy confrontation with Farm folks–as I am about to start a program–about how they didn't like my way. Write a 4-page pamphlet titled "What is Tempeh?" jointly with Cynthia Bates. 1976 Dec. 31–This is our first year with significant income ($27,390, mostly from Autumn Press royalties) but no profit. During 1976 thirty articles and book reviews about our work with tofu and miso were published in magazines and newspapers in the USA and Japan.

1977 Jan. 2–Our Tofu & Miso America Tour continues. Jan. 3–Stay in a suburban home with Lynn Delacruz in Meridan, Mississippi. Jan. 4–Program for Atlantis Distributors in New Orleans. That night we stay in a trailer home with John Gabriel and his wife in Houma, Louisiana. They are from The Farm and make commercial tempeh in their trailer. Jan. 6–Jim Baker (Dallas, Texas). After the program I meet Dr. Ralph Sand who is studying tofu and soy cheeses at Anderson Clayton. We also visit with my cousin, Bob Shurtleff, near Dallas. Jan. 7–Jane Binante in Denton, Texas. Jan. 9–Jim Hemminger of Gregg St. Tofu Co. (started by Thom Leonard) in Fayetteville, Arkansas. His partner is Mary Weingartner. We sleep on the floor of a small house in Fayetteville and the next morning see Jim make tofu in a bathtub. Jan. 10–East Wind in Tecumseh, Missouri. Jan. 12–Stay with Robert Nissenbaum (a fine, humble fellow) in St. Louis, Missouri. I finish typewritten manuscript of "What is Tempeh?" Jan. 13–Program at a restaurant, The Sunshine Inn (St. Louis). Sponsored by The Ethical Society. Stephen Uprichard, Dale Deraps, and Robert Nissenbaum are there.

Jan. 15–Meet David and Danette Briscoe (Kansas City, Missouri; they soon start publishing *Soycraft,* a small periodical on soyfoods), dinner with Thom Leonard at his home in Lawrence, Kansas (we have miso soup with miso that Thom made, then do a big program sponsored by the Mercantile Community Co-op in downtown Lawrence at either the Lawrence Library or Community Center–in a big downstairs room. I tape the lecture. Unbeknownst to me, Ken Bader, CEO-to-be of the American Soybean Assoc., is in attendance). Jan. 16–Visit Bob Amelay of the Omaha Food Co-ops in Omaha, Nebraska. Jan. 17–Drive across Nebraska to Denver. Jan. 18-19–Dave Bolduc and Christie Shurtleff in Boulder, Colorado. The first night we do a big tofu program in the historic Boulder Theater. That afternoon we have an audience with the Karmapa–a high Tibetan spiritual leader, who has diabetes; we give him an inscribed hardcover copy of *The Book of Tofu.* Akiko recalls cooking tofu burgers for him. That evening in a large, packed hall, we witness his Holiness conduct the Black Crown Ceremony. Jan. 20. Jimmy Carter is inaugurated as president. Jan. 24–Program for The Colorado Farm in Hotchkiss, Colorado–way out in the boondocks. Jan. 25–Stay with Andrea Chin in Taos, New Mexico. Visit Lama Foundation high above Taos in the snow (Steve Durkee, teacher). They have many small meditation cubicles around the hillside and have just finished a nice adobe meditation hall. Near Durango, Colorado, we visit Ed Tripp, who looks lonely, sad and desolate, farming a little patch of organically grown wheat and living alone in a bare shack on coffee and cigarettes. Jan. 26. We stay somewhere in New Mexico. Jan.

27–Program at the First Unitarian Church in Albuquerque (79 p.m.) hosted by Michele E. Martin of Jemez Bodhi Mandala Zen Center, Jemez Springs, New Mexico. Sit meditation in their cold Rinzai zendo then soak in the hot springs outside in the snow. Their teacher, Sasaki roshi, is not there. Jan. 28–Susan Berry in Silver City is supposed to host a program. We cannot find her house. At one point along in here we do a program in or near Utah in a remote church up on a little bluff. Dinner before at Frosty Hot Dog place. Jan. 29–Long drive across Arizona to San Diego. Jan. 30–Big program in San Diego for 350 people at the Ocean Beach Community School hosted by David and Barbara Salat, publishers of *Well Being* magazine. Afterwards we stayed overnight on their houseboat in San Diego Bay. Magical. Akiko had a bad cough and was very tired.

In Los Angeles we spend a day (in late January or early February 1977) with Lewis Headrick and Jimmy Silver visiting three small tempeh shops: Bali Foods (in Baldwin Park, run by Mr. Henoch Khoe), Country Store Health Foods (in Sun Valley; Joan Harriman), and Toko Baru (in West Covina; Randy Kohler). One evening we had dinner with Mr. Yamauchi and perhaps Al Jacobson. I gave a presentation on tofu. Afterwards, in the parking lot, Mr. Yamauchi gave me an envelope containing several hundred dollars in bills–his way of saying thank you for the work we were doing on behalf of tofu. Feb. 1. Drive to northern California, then have dinner at the home of Herman and Cornellia Aihara (Oroville, CA). Feb. 2. Last program of the tour for Harold Lockhard of the Sacramento Natural Foods Co-op (Sacramento, California; Program is in a modern college building).

On 3 Feb. 1977 arrive home in Lafayette, California.

On this 4-month tour the Shurtleffs, trying to do for soyfoods what Johnny Appleseed did for apples, presented 70 public programs attended by about 3,646 people, did many media interviews and appearances, and travelled 15,000 miles. They had a gross income of $18,020 from honoraria and sales of their books (Book of Tofu, Book of Miso), tofu kits, pamphlets, and nigari. Total trip expenses were about $5,361 plus about $7,200 for books from the publisher, leaving a net income of about $5,459. It was a huge, challenging, and exhausting Odyssey that bore abundant fruit in the founding of a new tofu shop almost everywhere they spoke.

1977 Feb. 9–Meeting in Lafayette (790 Los Palos Dr.) with Robert Dolgin and David Sandler (from the Farm and Farm Foods in San Rafael) and Larry Needleman leads to the establishment of Bean Machines, Inc. (BMI). The Farm places a firm order for a Japan tofu system.

1977 Feb. 12–Bill and Akiko leave America and fly to Japan. Air fare paid by Hydrometals. Address: 790 Los Palos Manor, Lafayette, California 94549. Phone: 283-3161.

1400. Shurtleff, William; Aoyagi, Akiko. 1976. Tamari (Document part). In: William Shurtleff and Akiko Aoyagi. 1976. The Book of Miso. Hayama-shi, Kanagawa-ken, Japan, Soquel, California, and Brookline, Massachusetts: Autumn Press. 256 p. See p. 50, 219-21. Sept. Illust. by Akiko Aoyagi. Revised ed. 1981. New York, NY: Ballantine Books, 620 p. [60 ref]

• ***Summary:*** In Chapter 5, "Getting started," in the section on "Basic ingredients," is a subsection titled "Tamari" which states (p. 50): "A close relative of shoyu, tamari is prepared from a koji which contains only soybeans and no wheat; it has a distinctive, slightly strong flavor and aroma, a dark brown color, and a fairly thick consistency. Produced either as a byproduct of tamari miso (p. 44) or as a food in its own right, it is now rarely used in its natural form, being generally made into *sashimi-damari* by mixing it with miso-damari (see below), *mizuamé,* cane sugar, caramel, and often preservatives. Although not widely used in Japan, it remains fairly popular in Kyoto and central Japan, where it is used as a seasoning for *sashimi* (raw fish). In ancient times tamari was widely used in its natural form and highly prized as a fine seasoning, having much the same flavor as a best-grade Chinese soy sauce. Today, an increasing amount is made synthetically.

*"**Miso-damari**–*also called *uwahiki–*is the tamari-like liquid that accumulates in *any* variety of miso during fermentation. Thicker and richer than tamari, it is gathered only in very small quantities and is not sold commercially. A delicious by-product of most homemade miso (it rises to the surface in summer and settles in winter), it may be used like shoyu and is especially delicious with hors d'oeuvres.

In "Appendix A: A brief history of chiang, miso and shoyu," is a section (p. 219-21) titled "Tamari: The forerunner of shoyu." Address: 790 Los Palos Dr., Lafayette, California 94549.

1401. Shurtleff, William; Aoyagi, Akiko. 1976. Appendix B: Varieties of Chinese chiang, Korean Jang, and Indonesian Tao-tjo [Tauco] (Document part). In: William Shurtleff and Akiko Aoyagi. 1976. The Book of Miso. Hayama-shi, Kanagawa-ken, Japan, Soquel, California, and Brookline, Massachusetts: Autumn Press. 256 p. See p. 277-331. Sept. Illust. by Akiko Aoyagi. Revised ed. 1981. New York, NY: Ballantine Books, 620 p.

• ***Summary:*** Contents: Introduction. Note: Of the romanized Chinese names given in curly brackets below, the first is in the Wade-Giles transliteration; the second is in the more modern pinyin transliteration.

Chinese chiang: Introduction, Red or regular chiang (chunky chiang, hot chunky chiang, Szechwan red-pepper chiang, Hamanatto chiang, Cantonese red chiang, great chiang, yellow-red chiang), black chiang (sweet wheat-flour chiang, black chiang), assorted chiangs (introduction, red-pepper chiang, Canton sweet simmered chiang, dried

chiang, other varieties (none of which contain soybeans or grain koji; sesame chiang, peanut chiang, umeboshi chiang, shrimp chiang, corbicula chiang, tangy chiang, semi-fermented chiang)), chiang sauces (bean sauce, hoisin sauce *{hai-hsien chiang, haixiang jiang}*, oyster sauce, barbecue sauce, other chiang sauces, none of which contain soybeans or grain koji; shrimp sauce, Chinese Worcestershire sauce, Chinese ketchup). Note 1. The Chinese (Wade-Giles) names and characters for each of these sauces are given on page 230.

Korean jang: Introduction, Korean soybean jang *(doen jang),* Korean red-pepper jang *(kochu jang),* Mild red-pepper jang *(mat jang),* Chinese sweet black jang *(cha jang* or *chungkuk jang),* Japanese red jang *(wei jang* or *ilbon jang).*

Note 2. This is the earliest English-language document seen (March 2009) that uses the word "kochu jang" (or "kochu-jang") to refer to Korean-style red pepper and soybean paste (miso).

Indonesian tao-tjo: Summary.

Note 3. This is the earliest English-language document seen (March 2009) that uses the term "chungkuk jang" to refer to a fermented Korean soyfood or seasoning. Actually, the term refers to a type of Korean natto, and therefore does not belong in a book about miso. Address: 790 Los Palos Dr., Lafayette, California 94549.

1402. Shurtleff, William; Aoyagi, Akiko. 1976. The book of miso (Illustrations–line drawings). Hayama-shi, Kanagawa-ken, Japan, Soquel, California, and Brookline, Massachusetts: Autumn Press. 256 p. Sept. Illust. by Akiko Aoyagi. Index. 28 cm. Revised ed. 1981. New York, NY: Ballantine Books, 620 p. [60 ref]

• ***Summary:*** Continued: Illustrations (line drawings, both numbered and unnumbered) show: The two Japanese characters for miso. Three men "Putting Hatcho miso to bed" by piling nearly round river stones on top of a huge vat; the pyramid shape makes the pile earthquake proof. A child holding a sheaf of grain. A round *zaru* (woven split bamboo tray) with a circle of salt in the middle. A square wooden measure (isshô-baku) filled with soybeans. The top of rice and barley plants showing grains and leaves. A wooden vat or red miso tied with rice-straw ropes. A miso makers standing large wooden vats of two different sizes, with braided bamboo hoops. A well stocked miso shop in Japan (at Kichijoji train station, Tokyo). A woman standing behind two deep earthenware crocks filled with miso; ball so miso are in a basket. A sunken open-hearth fireplace *(irori)* in a traditional Japanese farmhouse with a pot hanging over the coals on a hook *(jizai kagi)* and tofu dengaku being grilled around the coals, their skewers stuck into the ash. Nine wooden kegs of different kinds of miso piled up on 3 levels. A field of soybeans planted in rows. A hand holding soybeans pods still attached to the stem. A soybean pod split open to show the beans. (1) Bar chart of protein from different sources vs. protein returned. (2) Diagram of energy flow through two different food chains, one with a steer in the middle, the other with direct consumption of soy and grains. (3) Development aid from affluent nations as a percentage of GNP (1960-1971). Stylized soybean plant growing out of a stylized Planet Earth. Miso gift pack, with poly bags of rice, barley, and Hatcho miso. A Japanese pipe *kiseru.* (6) Graph of intestinal cancer vs. meat consumption among females in selected countries; the more meat consumed, the more cancer. Miso aging (from *Miso Daigaku).* (7) The varieties of miso and their characteristics (full-page table). (8) The percentage of salt in different miso varieties. (9a) Map of Japan show where the different types of miso originate. (9b) Map of Japan showing geographical miso preferences. A head of rice. (10) Famous sub-varieties of salty rice miso. Two heads of barley. Table about two types of barley miso. Two sets of soybean leaves with pods. Table about three types of soybean miso. The Japanese characters for Hatcho Miso. (11) A wooden sign in a Hatcho miso office: "Supplier to the Imperial Household." (12) Two cross-section views of a tamari miso vat. A small pottery crock of sweet simmered miso *(Nerimiso).* Packages of different types of modern miso: Peanut miso, akadashi miso, low-salt, high protein miso, Instant miso soup with dried frozen tofu, leeks, wakame. (14) Different types of miso packaging, both traditional and modern. A sample miso label. (13) Varieties of miso available in the West, plus characteristics of each. Squeezing a bean of miso out of the cut corner of a plastic bag. Three different shoyu containers. Six different types of tofu on a cutting board. (15) Oriental kitchen tools (utensils; full page). A small crock of salt with a wooden spoon in it. Suribachi and modern sesame seed grinder. Tofu preparatory techniques. Broiling tofu with chopsticks on a broiling screen. Four forms of kombu. Two stylized crossed sheaves of rice. A traditional farmhouse kamado (raised earthenware cooking area). Pottery crock. Black and white sesame seeds and plant. Yuzu. Sprig of kinome. Head of garlic. Two burdock roots. Two leeks *(negi).* Making broiled miso. Hoba miso. Kaiyaki miso. Yubeshi miso. Wakame plant. A bowl of miso soup. A woman drinking hot miso soup next to a vending machine. Vegetables cut for miso soup *(mi* or *gu).* Table of the most popular ingredients in miso soup. How to make miso sup at home (4 views). Miso-koshi (woven bamboo strainer). Mad monks grinding miso. (19) Full-page table of miso soup throughout the four seasons. Shiso / beefsteak leaves. Kabocha. Daikon. Irori and jizai kagi (sunken farmhouse fireplace and overhead hanging hook). Woman serving miso by a sunken / open hearth fireplace. Woman kneeling, grinding miso with a pestle *(suri kogi)* in a *suribachi* (serrated earthenware mortar / mixing bowl). (20) Rice patties with nori *(o-musubi, o-nigiri).* Bamboo noodle tongs. Homemade

noodles in a pot. (21) Broiled mochi wrapped with nori. (22) Steamed tofu. A Chinese cleaver, with its tip stuck into a chopping block. Cultivated shiitake mushrooms growing on a log. Kabocha. Daikon. (23) Miso oden. Doténabé [Dotenabe]. Konnyaku twists. Dengaku Hoshi. Tofu dengaku (2 pieces, skewered; 3 pieces skewered in a box). Japanese eggplant *(nasu)* scored and Shigiyaki. Deep-frying with a wok. Lotus root stuffed with miso. (24) Deep-fried sandwiches. (25) Gashouse eggs. (26) Layered omelets. Japanese bamboo steamer. Kashiwa mochi. Selling miso pickles. Two pickling containers. (27) Salt-pressing. Air-drying daikon and turnips *(kabu).* Miso pickles with tea and chopsticks. Amazaké at the Nakamura-ro restaurant. How top make miso at home: Utensils, ingredients, and process (7 figures). (29) Miso fermentation crocks. Corona hand-mill. Soft mat koji. (30) Proportions by weight of basic ingredients for various homemade misos; full-page table. (32) Utensils for homemade koji and koji starter. (33) Miso flow chart. (34) Composition of nutrients in 100 gm of basic miso ingredients. (35) Process for homemade rice koji (9 figures). (36) Graph of changes in koji temperatures. Woman leaning over miso vat.

Japanese farmhouse miso: Traditional country farmhouses (2 views). Raised farmhouse kitchen hearth, caldrons and earthenware dais *(kamado).* (38) Farmhouse floor plan. A kura (family treasury and storehouse). Two bamboo colanders. Pounding miso at Suwanose. Making miso in a traditional farmhouse (9 figures). Farmhouse soybean miso made with *miso-dama* (miso balls) (5 figures).

The traditional miso shop: (39) A 17th century workplace (2 figures). (40) Tsujita shop floor plan. Koji trays. (41) Insulated fermentation box. (42) The small tools (full-page). (43) Shop with 2 cauldrons. (44) Steamer and cauldron. (45) A fermentation vat. (46) Shop floor at vat's rim. Preparing traditional rice miso (31 figures). Making koji using natural mold spores. Stacked koji trays. Making miso in a semi-traditional shop (5 figures). Hatcho miso; company and vats (2 views).

The modern factory (2 figures).

A brief history of chiang, miso, and shoyu (incl. evolution of Chinese characters). Hideyoshi Toyotomi and a robber on the bridge (Hatcho miso history). Making miso-damari. Inside a Kikkoman shoyu factory around 1900. Traditional shoyu seller.

Chinese chiang in earthenware jars in a courtyard. Korean jang; selling it and making at home. (48) The interaction of basic miso components during fermentation. (49) Temperature control curves for four quick misos. Edo period shoyu production. Cutting tofu for Dengaku and Busy making dengaku, both from the book *Tofu Hyaku Chin.* Cartoon of a man pouring himself sake, thinking of miso soup. Ebisu with fishing rod and big fish under left arm. Tamari shoyu pouring out of spiggot at base of miso vat. Traditional Japanese kitchen utensils. Sunken fireplace *(irori)* with huge carved wooden overhead hook hanging from braided rice straw rope. Photo (in Nerima-ku, Tokyo) and brief biograpahy of William Shurtleff and Akiko Aoyagi. Address: 790 Los Palos Dr., Lafayette, California 94549.

1403. Bourne, M.C.; Clemente, M.G.; Banzon, J. 1976. Survey of suitability of thirty cultivars of soybeans for soymilk manufacture. *J. of Food Science* 41(5):1204-08. Sept/Oct. [29 ref]
Address: 1. Cornell Univ., Geneva, New York; 2-3. Univ. of the Philippines, Laguna, Philippines.

1404. Gunawan, Cecelia. 1976. Percobaan membuat inokulum untuk tempe dan oncom [Experiments on the preparation of inocula for tempeh and onchom]. Paper presented at Lembaga Kimia Nasional–LIPI. 24 p. Held 11 Oct. 1976 at Bandung, Indonesia. [Ind]*

1405. Abu Kassim, b. Abu Bakar. 1976. Soybeans in Malaysia. *INTSOY Series* No. 10. p. 243-44. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** Contents: Introduction. Current status. Domestic markets and utilization. Prospects for production. Conclusion.

"Because little information on soybeans is available from East Malaysia, this report is confined to West Malaysia. Soybeans appear to have been introduced into peninsular or West Malaysia about 50 years ago [1926]. The crop, which has been grown among young rubber plants or as a sole crop in rotation with other annual crops, is planted primarily on small farms. Last year, however, there was a move by a few enterprising organizations to try large-scale, commercial plantings.

"Soybean products are consumed in various forms by both humans and livestock. The domestic demand greatly exceeds the local supply, which is therefore dependent upon importation...

"Although soybeans can be grown throughout the country, a large percentage of the crop is raised in the east coast states of Kelantan, Pahang, and Trengganu of peninsular Malaysia... Peninsular Malaysia imports whole soybeans, as well as the flour, oil, and cake of the soybean. Until 1973 about 200,000 gallons of soy sauce were also imported, but in 1974 about 15,000 gallons were exported... Soybeans are used mainly to make beanmilk, curd, sprouts, and other food products for human consumption... It has been estimated that the local consumption of soybeans per capita per year averaged 5.3 kg for the years 1971 to 1973."
Address: Field Crops Branch, MARDI (Malaysian Agricultural R&D Inst.), Serdang, Selangor, Malaysia.

1406. Ballon, Federico B. 1976. Soybean production and utilization in the Philippines. *INTSOY Series* No. 10. p. 245-47. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** Contents: Introduction. Production: Varieties, inoculant, fertilizers, water management, harvesting and storage. Crop protection: Weed control, diseases and pests. Marketing. Utilization. Extension.

"Soybeans are an important commodity in the Philippines. In 1974 the country imported about 60,012 metric tons of soybean meal from the United States and other countries at a cost of over US$16 million. This quantity was still far below the estimated requirement of 104,884 metric tons. The total registered production in 1975 was only 6,552 metric tons, although the estimated need was 115,152 tons. Domestic production constitutes only about 5.68 percent of the total requirement of the country."

Inoculant: "The Bureau of Soils of the Department of Agriculture is responsible for the low-cost production and distribution of inoculants to the farmers."

"In the Philippines about 20 percent of the soybean supply is used for human food and about 80 percent for animal feed...

"Through the National Food and Agricultural Council (NFAC), a national coordinating agency, the government has launched a bold, grain production program known locally as 'Masaganang Maisan.' The objective of the program is to produce an adequate grain supply for domestic consumption and possibly for export." Address: Vegetable and Legume Crops Section, Bureau of Plant Industry, Manila, Philippines.

1407. Bernard, R.L.; Hittle, C.N. 1976. United States national soybean germ plasm collections. *INTSOY Series* No. 10. p. 182-85. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** A full-page table (p. 183) gives the following information on soybean germ plasm collections worldwide: Country and curator, address, number of accessions, nature and origin of accessions. There are major collections in the following places: Toulouse, France (500 accessions). Amravati, Haharashtra (1,800), and Pantnagar, Uttar Pradesh (4,000), India. Bogor, Indonesia (400). Hiratsuka, Kanagawa prefecture (2,928), and Iwate University, Morioka (200 Glycine species), Japan. IITA, Ibadan, Nigeria (2,000). Harbin, and Kirin Province, China. Pretoria, South Africa (600). Suweon (300 Glycine species), and Cheong Kyang, Seoul (1,300), Korea. Algot Holmberg and Soner AB, Norrkoping, Sweden (1,200). AVRDC, Tainan (9,000), and Taichung (2,800), Taiwan. Urbana, Illinois (4,100), and Stoneville, Mississippi (1,700), USA. Leningrad, USSR (2,500).

There are additional collections in Australia, Bulgaria, Hungary, Philippines, [Southern] Rhodesia (Salisbury [Harare]), and Romania.

Table 1. Divisions of USDA soybean germ plasm collections (Urbana, Stoneville, Total). Table 2. Maturity grouping of the USDA soybean germ plasm collection, 1976 (In the northern region [maturity group 00 to IV] there are 237 named varieties, 51 FC [Forage Crop] strains, 2,999 P.I. [Plant Introduction] strains, and 3,287 total. In the southern region [maturity group V to IX] there are 101 named varieties, 39 FC [Forage Crop] strains, 1,514 P.I. strains, and 1,654 total).

Table 3. History of soybean introductions into the United States. The earliest period given is 1898-1907; the great surge in soybean introductions was in 1929-32 during the Dorsett-Morse expedition to East Asia; A total of 11,594 strains have been introduced. Table 4. Maturity grouping and origin of accessions through 1976 in USDA wild soybean (Glycine soja Sieb. and Zucc.) germ plasm collection (there are 361 accessions; Country of origin: Japan 180, Korea 134. China and Taiwan 32. USSR 15). Table 5. Species distribution of USDA perennial Glycine collection, 1976 (8 species *[G. canescens, G. clandestina, G. falcata, G. latrobeana, G. tabacina, G. tomentella, G. wightii]* and 161 accessions from Australia, India, Africa, Taiwan, Japan, Philippines, Ethiopia).

Note: The assignment of FC numbers began in about 1911 and was discontinued in 1957. Address: USDA.

1408. Bhumiratana, Amara. 1976. Small-scale processing of soybeans for food in Thailand. *INTSOY Series* No. 10. p. 143-46. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** Contents: Introduction. Fermented soybeans. Soymilk. Yuba. Yoghert [Soy yogurt, inoculated with *Lactobacillus bulgaricus* and *L. acidophilus* and incubated at 37ºC for 16-20 hours]. Chinese soya bean dessert (Taow Huey). Tofu (white or yellow). Sufu. Soybean snack (protein crisp; deep-fried sufu). Tempeh. Thai dessert. Kanom ping kaset. Baby food. Kaset noodle. Kaset protein. Note: There is a flowchart and photo of each product.

"The Institute of Food Research and Product Development, Kasetsart University, initiated several soybean utilization pilot projects five or six years ago. Using soybeans alone or combined with other ingredients, we have developed a range of products, such as baby foods, kaset protein, and snacks. Tests indicate that these foods are highly acceptable, being both palatable and nutritious. Some of these products are soon to be manufactured commercially by small-scale industries. This paper is a description of the soy food processing methods developed by the Institute." Address: Inst. of Food Research and Product Development, Kasetsart Univ., Bangkok, Thailand.

1409. Bromfield, K.R.; Yang, Charles Y. 1976. Soybean rust: Summary of available knowledge. *INTSOY Series* No. 10. p. 161-64. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign).

• ***Summary:*** Contents: Introduction. Geographical and seasonal appearance. Breeding for rust resistance. Additional rust control measures. Biology and life cycle. International working group.

Geographical appearance: Soybean rust was first recorded, observed or collected on soybeans in various countries as follows: 1934–Australia: First collected, but serious proportions were not recorded until 1970-71.

1960s early–Since then in Taiwan it has been a serious economic soybean disease. 1966–First reported in Thailand.

1970–Pantnagar, India: First observed. It was severe in 1974 but absent in 1975.

1970–In the Philippines, rust first became especially serious this year, but was known before that time.

In Indonesia, about 80% of the soybean crop is grown on the island of Java. "Soybean rust occurs throughout Java, but it is thought to be more common and more severe in western Java, the region of the island that has the greatest number of rainy days and the highest total rainfall. Soybean rust is considered the most serious soybean disease in Indonesia. Observed yield reductions have ranged up to 81%."

Rust has not yet been reported on soybeans in the United States, nor elsewhere in the Western Hemisphere. Address: 1. USDA ARS, Plant Disease Research Lab., P.O. Box 1209, Frederick, Maryland 21701.

1410. Ferrier, L.K.; Cheosakul, Ubolsri; Ebine, H.; Kopp, E.; Winarno, F.G. 1976. Small scale soybean processing: What is needed? *INTSOY Series* No. 10. p. 207-210. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign).

• ***Summary:*** The Introduction by L.K. Ferrier states: "In recent years food scientists have become increasingly concerned about the nutritional status of people in the developing nations of the world... Participants in this symposium believe that the development of small-scale processing equipment for use in the home, village, or small industry is crucial."

The first section of this discussion deals with the practical problems in developing a small-scale soybean food industry in Thailand.

"Kopp: Dry-roasted soybeans have met with considerable success in Ethiopia."

"Winarno: In 1976 Indonesia launched an ambitious program called the National Campaign for Nutrition Improvement of the Nation, whose purpose is to combat protein and calorie malnutrition. Four organizations are involved: (a) the Nutrition Intervention Program, (b) the Food Technology Development Center, (c) the Nutrition Research and Development Center, and (d) the Nutrition Education and Training Program." Address: 1. Dep. of Food Science & INTSOY, Univ. of Illinois, Urbana.

1411. Goodman, Robert M. ed. 1976. Expanding the use of soybeans. *INTSOY Series* No. 10. xv + 261 p. Proceedings of a Conference for Asia and Oceania. Held Feb. 1976 in Chiang Mai, Thailand (College of Agric., Univ. of Illinois at Urbana-Champaign). [100+ ref]

• ***Summary:*** Content: Introduction. Opening addresses. General sessions: Production, protection, utilization and economics.

Symposia: Soybean rust. Biology and control of major insect pests of Asian soybeans. Breeding tropical soybeans. Small scale soybean processing: What is needed? Extension research to the village farmer.

Country reports: Current status of soybean production and research in–Australia, Bangladesh, India, Indonesia, Iran, Japan, Korea, Malaysia, Philippines, Kingdom of Saudi Arabia, Sri Lanka, Thailand.

Closing address, by R.W. Howell. List of contributed papers. Abbreviations and units of measure. Address: Dep. of Plant Pathology and INTSOY, Univ. of Illinois, Urbana, IL.

1412. *INTSOY Series.* 1976. Conference delegates. No. 10. p. xii-xv. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign).

• ***Summary:*** The following number of participants came from the following countries: Australia (3). Bangladesh (4). Hong Kong (1). India (4). Indonesia (20). Iran (6). Iraq (1). Japan (6). Malaysia (12). Pakistan (1). Philippines (9). Puerto Rico (4). Saudi Arabia (3). Singapore (2). South Korea (3). Sri Lanka (5). Switzerland (1). Taiwan (8). Thailand (120). United Kingdom (2). USA (17).

Ten patrons of the conference are also listed.

1413. Kellogg, Earl D.; Williams, Sheldon W. 1976. Viable alternatives for processing soybeans in a variety of situations. *INTSOY Series* No. 10. p. 148-153. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign). [9 ref]

• ***Summary:*** Contents: Introduction. Viable alternatives for processing soybeans: Home and village processing alternatives (incl. small-scale extrusion cookers that cost $45,000), larger scale processing alternatives. Economic efficiency and choice of technique. Conclusion. Discussion. Address: 1. Multiple Cropping Project, Faculty of Agriculture, Chiang Mai Univ., Chiang Mai, Thailand; 2. Dep. of Agricultural Economics, Univ. of Illinois, Urbana, IL.

1414. Moody, Keith. 1976. Weed control in Asian soybeans. *INTSOY Series* No. 10. p. 69-73. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign). [21 ref]
• ***Summary:*** Contents: Introduction. Weed control methods: Chemical, biological, crop competition (variety, planting density), land preparation, manual and mechanical weeding, mulching. Conclusions. Discussion. Address: International Rice Research Inst., Los Baños, Laguna, Philippines.

1415. Rejesus, Romeo S. 1976. Insect pest diversity and succession in Asian soybeans. *INTSOY Series* No. 10. p. 97-103. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign). [18 ref]
• ***Summary:*** Lists a large number of insect pests. Contents: Introduction. Pest diversity: Insects and other arthropods in Philippine soybeans, insect diversity in other Asian countries. Pest succession: Wet season, dry season. Developmental approach. Appendix I is a partial list of soybean insect pests in the following Asian countries: Indonesia, India, Solomon Islands (Stapley 1972; 2 species), Micronesia (Gressitt 1954, 14 species on soybeans), and Thailand (Napompeth 1975, 13 species).

Note: Gressitt (1954) did NOT mention soybeans in Micronesia. Address: Dep. of Entomology, College of Agriculture, Univ. of the Philippines at Los Baños, College, Laguna, Philippines.

1416. Sanbuichi, Takashi; Watanabe, Iwao. 1976. Soybean production in Japan. *INTSOY Series* No. 10. p. 237-38. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** "Each year Japan produces approximately 120,000 metric tons of soybeans on 90,000 hectares. About 30 percent of this yield is raised on the northern island of Hokkaido, where large-scale farming is practiced. Especially in the northeastern part of Hokkaido, soybeans are a very important crop... Throughout the country the average soybean yield is about 1.4 metric tons per hectare, but during the past four years production in the Tokachi District of Hokkaido has risen to between 1.8 and 2.0 metric tons per hectare...

"In Japan soybeans are used principally as a source of edible oil and protein foods, such as miso (bean paste), shoyu (soy sauce), tofu (soybean curd), and natto (fermented soybeans). The soybeans produced in Japan usually have large seeds, a high protein content, and are of a quality suitable for producing high quality soy products...

"In general, early varieties are cultivated in the high latitudes and late varieties in the low latitudes, but on the southern island of Kyushu early varieties are occasionally used. Known as summer soybeans, they are sown in the spring and harvested in the summer. Late varieties, which are called autumn soybeans, are sown in summer and harvested in the autumn...

"Results show that large-seeded varieties produce high yields. Soybeans grown in the northern parts of Japan usually have larger seeds than those raised in southern areas. It is believed that the marked difference between day and night temperatures and the favorable soil moisture content during the early stages of plant growth account for the large size of soybean seeds grown in the north. The author observed a serious decrease in seed size when Japanese varieties were introduced into Thailand...

"Soybeans are raised in several types of areas in Japan. Traditionally they have been planted beside the footpaths in paddy rice fields. Intercropping with wheat is another old cultural practice, although both practices are seldom used today. Because of the over-production of rice in Japan, the government has recently recommended that soybeans be cultivated in rice fields." Address: 1. Tokachi Agric. Exp. Station, Memuro, Kasai-gun, Hokkaido; 2. National Inst. of Agricultural Science, Nishigahara, Kita-Ku, Tokyo. Both: Japan.

1417. Sarikapbuti, Yookti; Lumpaopong, B.; Riley, J.J.; Kung, P.; Golden, W.G.; et al. 1976. Extension of research to the village farmer. Extension workers in agricultural development. *INTSOY Series* No. 10. p. 211-16. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** The initial presentation addresses the following questions: "What can be done to make the importance of extension work more visible to the public and to students? What can be done to improve the relationship between extension workers and research personnel?" There are then contributions by panel members and the audience who discuss extension and training in Thailand, the Philippines (IRRI), Sri Lanka, China, and Malaysia. Address: 1. Agricultural Extension Dep., Ministry of Agriculture and Cooperatives, Bangkok, Thailand.

1418. Somaatmadja, Sadikin; Guhardja, Edi. 1976. Current status of soybean research and utilization in Indonesia. *INTSOY Series* No. 10. p. 232-35. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign). [1 ref]
• ***Summary:*** Contents: Introduction. Production: Hectarage and yield. Production techniques: Systems of cultivation, inoculation, harvesting and processing for storage, storage. Factors affecting soybean production in Indonesia: Seed viability and seed supply, pests, diseases, cultural practices, varieties. Consumption and utilization. Marketing. Extension: Training, method used to increase soybean production (expansion of hectarage, intensification, varieties).

"At present soybeans occupy fifth place among the other food crops, after rice, cassava, maize, and sweet potatoes. Research on soybeans is conducted at the Central Research Institute for Agriculture (CRIA) at Bogor and its substations, including Sukamandi and Ujung Pandang; at several universities, such as the Institut Pertanian Bogor, Universitas Gadjah Mada, Jogyakarta, and Brawijaya Malang; and at other research institutes, including Badan Tenaga Atom Nasional, Jakarta, and Lembaga Biologi Nasional, Bogor.

"From 1970 to 1973 the annual harvested hectarage of soybeans averaged 703,878 hectares with a production of 517,199 metric tons and an average yield of 7.34 quintals [1 quintal = 100 kg] per hectare. Approximately 80 to 85 percent of the total soybean hectarage in Indonesia is in Java-Madura...

"Per capita consumption of soybeans in Indonesia reflects the distribution of the crop. In Java the per capita consumption each year is about 5.04 kg; in Sumatra, Kalimantan, Sulawesi, and Maluku/Irian Jaya between 0.10 and 1.04 kg; and in Bali about 3.43 kg.

"Soybeans are not consumed directly, but are processed into a large number of products. Tempeh (fermented soybeans), tahu (soybean curd), tauge (soybean sprouts), kecap (soy sauce), tauco (fermented mixture [Indonesian miso]), and oncom (made from residues of soymilk and tahu) are consumed as side dishes with rice. Roasted beans, tahu chips, and boiled seeds are eaten as snacks, and boiled young pods are prepared as a green vegetable. Soymilk is consumed as a beverage." Address: 1. Sukamandi Research Station, Central Research Inst. for Agriculture, Sukamandi; 2. Bogor Agricultural Univ., Bogor. Both: Indonesia.

1419. Tongdee, Amnuay. 1976. Soybean production in Thailand. *INTSOY Series* No. 10. p. 253-54. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** Contents: Introduction. Production and production areas. Cultivation. Varieties, fertilizers, and inoculation. Disease and insect pests. Utilization.

"Soybeans, one of Thailand's most important crops, have been grown here traditionally, although there is no evidence of when they were first introduced. After having been brought to this country, probably by migrating Chinese, soybeans became part of the Thai diet. They are processed into a variety of foods, including tou-hu tou-cheaw, and soy sauce. Freshly cooked pods [green vegetable soybeans], called tou-rae, are prepared for immediate consumption." Address: Mae-Jo Agric. Exp. Station, Chiang Mai, Thailand.

1420. Vajragupta, Chalermsri. 1976. Small-scale equipment for oil extraction. *INTSOY Series* No. 10. p. 122-25. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** Contents: Introduction. Pretreatment process: Raw materials, cooker, flake roller, expeller. Solvent extraction process. Refining process: Degumming and neutralization, water washing treatment, bleaching treatment, deodorizing treatment.

"An oil-seed laboratory, including an oil-seed pilot plant, was established in 1972 as a part of the Thai-Japanese Soybean Project." Address: Agricultural Chemistry Div., Dep. of Agriculture, Bangken, Bangkok, Thailand.

1421. Winarno, F.G.; Karyadi, Darwin. 1976. Nutrition and processing of soybeans. *INTSOY Series* No. 10. p. 137-42. R.M. Goodman, ed. Expanding the Use of Soybeans (College of Agric., Univ. of Illinois at Urbana-Champaign). [21 ref]
• ***Summary:*** Contents: Introduction. Nutritional status. Soybeans as source of good-quality protein: Chemical composition, nutritive value, other components. Storage of soybeans. Processing and its effects on nutritive value: Effects of heating on nutritive value, effects of heating on flavor, soybean varieties and processing methods. High protein food mixtures: Saridele, Tempeh-fish-rice, soya-rice baby food, soybean residue-fish-rice (with okara), other food mixtures. Conclusion. Discussion.

"In 1952 the Institute of Nutrition started a study of soybean milk. As a result of the study, a factory was set up in Jogyakarta in 1957 with the assistance of FAO and UNICEF. The product, which was called Saridele, was made from soybeans, peanuts, and sesame seeds, and was fortified with minerals and vitamins. The nutrient composition of Saridele compared with that of cow's milk is shown in Table 6. The production of Saridele was discontinued after 1966 because of the irregular supply of soybeans and marketing problems." Address: 1. Agricultural Engineering and Product Technology, Bogor Agricultural Univ., Fate Meta, Jl. Gu Gede; 2. Nutrition Research and Development Centre. Both: Bogor, Indonesia.

1422. Bookwalter, G.N. 1976. Trip report on lectures and demonstrations at Meals for Millions (MFM) Foundation, 1800 Olympic Boulevard, Santa Monica, California 90406, on November 1-4, 1976. Peoria, Illinois. 3 p. Dec. 6. Typed, without signature. [1 ref]
• ***Summary:*** This is a report for the ED [Engineering and Development Laboratory] files. Contents: Personnel contacted: Mark Sterner, Hank Sterner, and Gideon Zeidler. Student participants in training program (name and country of 7 students from India, Costa Rica, Chile, Malaysia, Nigeria, Korea, Turkey). Preparation of instantized corn meal. Preparation of mixed weaning food. Taste panel. Texturized soy protein research. Equipment development.

Bookwalter concludes: "My general impression of both the MFM and student participants was extremely high. MFM has a highly productive research program with a small staff. The student participants were all intelligent and well educated. I've never seen so much friendliness, enthusiasm, discussion, and dedication, both within MFM personnel and the student participants. I left with the feeling that a great deal of good would come from this." Address: USDA ARS Northern Regional Research Center, Peoria, Illinois 61604.

1423. Saono, S.; Brotonegoro, S.; Abdulkadir, S.; Basuki, T.; Jutono, -; Badjra, I.G.P. 1976. Microbiological studies of tempe, kecap, and taoco. I. The microbial content and its amylolytic, proteolytic, and lipolytic activities. Progress Report Subproject III.b. ASEAN Project for Soybean and Low-Cost High Protein Foods. Jan-Dec. 1976. Unpublished manuscript. *

1424. Whigham, D.K. 1976. International soybean variety experiment: Second report of results. *INTSOY Series* No. 11. vi + 223 p. Dec. (College of Agric., Univ. of Illinois at Urbana-Champaign).

• ***Summary:*** Contents: Foreword. Introduction. Materials and methods. Results and discussion. Summary. Information and summary tables. Agronomic data from 1974 trials is given for the following countries and sites: Africa: Angola (Nova Lisboa), Cameroon (Wum), Egypt (Bahteem, Seds), Ethiopia (Awassa, Bako, Debre Zeit, Jimma), Ghana (Kwadaso, Legon), Ivory Coast (Abidjan, Dekokaka, N'Dakro), Nigeria (Kadawa), Rhodesia (Salisbury), Sierra Leone (Njala), Swaziland (Malkerns), Zambia (Kitwe).

Asia: Afghanistan (Baghlan), India (Pantnagar), Indonesia (Muneng), Malaysia (Serdany), Nepal (Khumaltar), Pakistan (Parachinar, Sarai Naurang, Swat, Tandojam, Tarnab), Philippines (La Carlota, Los Baños), Sri Lanka (Alutharama, Angunukulapalessa, Bandirippuwa, Gannoruwa, Kilinochchi, Maha Illuppallama, Maskeliya, Puttalam, Ratmalagara, Thirunelvely), Taiwan (Shanhua, S. Shanmugasundaram [AVRDC]), Thailand (Chiang Mai, Khon Kaen, Maejo).

Europe: Spain (Madrid).

Mesoamerica: Costa Rica (Las Juntas, Taboga), Dominican Republic (Santiago), El Salvador (Santa Cruz Porrillo), Mexico (Apatzingan, Uxmal), Panama (Tocumen), Puerto Rico (Isabela, Lajas, Mayaguez), Trinidad and Tobago (Port of Spain).

Middle East: Iran (Karaj), Israel (Bet Dagan), Jordan (Wadi Dhuleil), Lebanon (Beqa'a), Saudi Arabia (Riyadh, Wadi Jizan).

South America: Bolivia (Abapo-Izozog, Palometillas, Santa Cruz, Villa Montes), Colombia (Ibague, Motilonia), Ecuador (Boliche, Pichilingue, Portoviejo), Guyana (Ebini, Mon Repos), Venezuela (Maracay).

Note: This is the second earliest document seen (Dec. 2007) that clearly refers to the cultivation of soybeans in Lebanon, and the first that refers to variety trials. This document contains the earliest clear date seen for the cultivation of soybeans in Lebanon (26 April 1974). Seven varieties were tested at Beqa'a by cooperator S. Abu-Shakra. Bonus gave the highest yield, 771 kg/ha.

This document contains an early date for cultural trials of soybeans in Panama (5 Sept. 1974). On 5 Sept. 1974, under the direction of Juan Jose Franco P., fifteen varieties of soybeans were planted at Tocumen. Bonus gave the highest yield, 3,678 kg/ha.

This document also contains the second earliest date seen for soybeans in Swaziland, or the cultivation of soybeans in Swaziland (25 Nov. 1974). Fifteen varieties were tested at Malkerns. Bragg gave the highest yield, 3,126 kg/ha.

The source of all these soybeans was INTSOY (at the University of Illinois, USA) for ISVEX trials. Address: College of Agriculture, Univ. of Illinois, Urbana-Champaign.

1425. Jones, Antoinette M. 1976. Aspects of economic, social and administrative conditions in Central and East Java in the first quarter of the tenth century A.D. PhD thesis, University of London. See p. 41, 90-91.

• ***Summary:*** Page 41 gives a list of inscriptions from the period 901-929 A.D. from Central and East Java. The Watukura A (Watu Kura) inscription is dated A.D. 902. The place it was found is unknown. It is a copperplate, now in a private collection in Copenhagen, Denmark. A transcription with translation can be found in Van Naerssen (1941 [reprint]) *Oud Javaansche Oorkonden in Deensche en Duitsche verzamelingen [Ancient Javanese Documents in Danish and German Collections]* (p. 82-105).

In the section on foods, page 90 states: "There is no mention of the soya bean (Glycine max. Merr.) or of *tempe* but the bean must have been known and cultivated as we find mention of *tahu* [tofu] eaten at a feast in the Watukura A inscription. This name certainly points to Chinese influence* and the process of making *tahu,* beancurd cakes shaped into squares and made from soya beans and still widely eaten in Java today, may have been learned from the Chinese, either resident or visiting. In any case the *tahu* itself must have been made in Java; it could hardly have been imported as it does not carry" [i.e., is perishable].

Footnote: *"In Chinese this word is made up of two characters, Mandarin *tou*–peas, beans, pulse, and Mandarin *fu*–rotten, corrupt, putrid. For the two characters together the Chinese dictionaries give 'bean curd' (Carstairs Douglas, p. 156). The Hokkien (Amoy tâu hû) is the nearest to the Indonesian tahu and it is likely that the O.J. [Old Javanese] from the Hokkien or a similar southern dialect (possibly Hainanese, cf. Wilkinson). The Indonesian word

for soya bean is *kedelai* (from Tamil, Wilkinson), but I have not found any mention of this word in O.J. inscriptions from this period." Address: England.

1426. Lim, C.L. 1976. The manufacture of soy sauce in West Malaysia. In: Symposium on soy sauce. Malaysian Inst. of Food Technology, Hotel Jaya Puri, P.J., Selangor, Malaysia. *

1427. Muljokusumo, E. Sudigdo. 1976. Témpé dan oncom benguk gage: Kita membuat seri 2 [Tempeh and onchom in the form of dage: Series 2]. Bandung, Indonesia: Penerbit Tarate. [Ind]*

1428. Sastroamidjojo, M.S.A. 1976. Proses pertempean sebagai sesuatu jalan untuk mengatasi crisis protein [Tempeh processing as a solution to the protein crisis]. Yogyakarta: Fakultas Pertanian Universitas Gadjah Mada. 4 p. Unpublished manuscript. [Ind]*
Address: Yogyakarta, Indonesia.

1429. SEARCA. 1976. Uniform tests of selected varieties of high protein crops in seven locations in Southeast Asia: Terminal report, 1970-76. College, Laguna, Philippines: Southeast Asian Regional Center for Graduate Study and Research in Agriculture. *

1430. Steinkraus, Keith H. 1976. Soybean milk processing and technology. *Applied Nutrition (Calcutta)* 4(2):49-62. Lecture delivered to the Indian Dietetic Association. [31 ref]
• ***Summary:*** Contents: Abstract. Introduction. Historical aspects of soybean milk processing and technology. Commercial success among soybean milks: Soyalac (made by Dr. Harry Miller and Loma Linda Food Co.), Infant formulas (incl. Sobee and Pro-Sobee [Mead Johnson], Mull-Soy [Borden], Isomil [Ross]), Saridele (in Indonesia), soft drink approach (Vitasoy made by Hong Kong Soya Bean Products Co. Ltd.; Vegemilk, Beanvit, and Vitabean made by Yeo Hiap Seng; Vitamilk made by Green Spot (Thailand) Ltd.; Philsoy in the Philippines), Taiwan Farmer's Cooperative soybean milks. Advances in soybean milk technology: Defatted soy process, residue (pulp) recovered from soybean milk manufacture, soybean milks simulating cow's milk, flavor problems, nutritional problems. Address: Dep. of Microbiology and Food Science, Cornell Univ.

1431. Sudjana, Rusman. 1976. Pembuatan tempe kedelai bebas minyak dengan alat ekstraktor buatan sendiri [Preparation of fat-free tempeh using a homemade extractor]. Bandung: Lembaga Kimia Nasional–LIPI. 9 p. Unpublished manuscript. [Ind]*
Address: Bandung, Indonesia.

1432. Suharni, Th. Tri; Sidemen, I.G. Badjra; Sutariningsih, Edang. 1976. Peranan beberapa bakteri dalam pembentukan growth factor pada fermentasi tempe [The role of several bacteria in growth factor formation during tempeh fermentation]. Yogyakarta: Fakultas Biologi Universitas Gadjah Mada. 16 p. Research report. [Ind]*
Address: Yogyakarta, Indonesia.

1433. Taira, Harue; Taira, Hirokadzu; Kaizuma, Norihiko; Fukui, J.; Matsumoto, S. 1976. [Varietal differences of seed weight, protein and sulfur-containing amino acid content of soybean seeds]. *Nippon Sakumotsu Gakkai Kiji (Proceedings of the Crop Science Society of Japan)* 45(3):381-93. [35+ ref. Jap; eng]
• ***Summary:*** These studies sought to determine the effect of varietal differences on seed weight (dry weight), protein content (moisture free basis), and sulfur-containing amino acid content in the protein (N x 6.25; methionine, cystine, and methionine + cystine) of 1,110 samples of soybean seeds grown in 1970 at Kariwano, Akita, Japan.

For all the samples, the weight of 100 seeds ranged from 2.6 gm to 47.0 gm, with a mean value of 20.4 gm, and a coefficient of variation of 35.59%.

The protein content ranged from 29.81% to 53.29%, with a mean value of 39.82% and a coefficient of variation of 7.71%.

The methionine content ranged from 0.78% to 1.34%, with a mean value of 1.03% and a coefficient of variation of 7.71%.

The cystine content ranged from 0.85% to 2.36%, with a mean value of 1.40% and a coefficient of variation of 17.14%.

The total sulfur-containing amino acids (methionine + cystine) content ranged from 1.66% to 3.52%, with a mean value of 2.43% and a coefficient of variation of 11.93%.

Concerning the mean value of each group classified by place of origin of the variety, the weight of 100 seeds was smallest in Southeast Asia (10.0 gm) and largest in Tohoku [northeastern provinces], Japan (24.2 gm).

Protein content was lowest in Europe (35.98%) and highest in Southeast Asia (43.35%).

Methionine content was lowest in the Chugoku [southwestern] region of Japan (0.93%) and highest in Southeast Asia (1.14%). Cystine content was lowest in Hokkaido [Japan's northernmost main island] (1.32%) and highest in Europe (2.02%). The content of total sulfur-containing amino acids was lowest in Chugoku (2.30%) and highest in Europe (3.13%). Address: 1-2. National Food Research Inst., Ministry of Agric. & Forestry, Koto-ku, Tokyo; 3-4. Faculty of Agric., Iwate Univ., Morioka; 5. Tohoku National Agric. Exp. Station, Kariwano, Akita. All: Japan.

1434. Tanuwidjaja, Lindayati. 1976. Pembuatan tempe dan makanan sejenisnya dari tepung kedelai [Preparation of tempeh and other foods from soy flour]. Bandung: Lembaga Kimia Nasional LIPI. 15 p. Research report. [Ind]*
• ***Summary:*** Discusses soy flour tempeh. Address: National Inst. of Chemistry, Bandung, Indonesia.

1435. West, R.E. 1976. Problems involved in growing soybeans in the tropics. In: Proceedings of the Symposium on Soil Microbiology and Plant Nutrition. Kuala Lumpur. *

1436. Ballon, F.B.; Resma, P. 1976. Grain legumes in the Philippines. In: M.A. Rifai, ed. 1976. ASEAN Grain Legumes. Bogor, Indonesia: Central Research Institute of Agriculture. 225 p. See p. 17-21.
• ***Summary:*** During the past years, production of leguminous grains has been confined mainly to leguminous vegetables intended for domestic consumption. Most of the soybeans and soybean meal used in the Philippines have been imported. Address: 1. Bureau of Plant Industry, Manila, Philippines.

1437. Boon, Ong Chong. 1976. A comparison of sago flour versus tapioca root meal with varying proportions of fish meal and soybean meal for growing/finishing pigs. *Malaysian Agricultural Journal* 50(4):427-34. [14 ref] Address: Dep. of Agriculture, Sarawak.

1438. Cunard, A.C. 1976. Grain legumes in Malaysia. In: M.A. Rifai, ed. 1976. ASEAN Grain Legumes. Bogor, Indonesia: Central Research Institute of Agriculture. v + 225 p. See p. 9-15. [6 ref]
• ***Summary:*** Soybeans are used for the preparation of soy products such as bean curd, sprouts and sauces. In 1971 Malaysia imported 20,699 tons of soybeans, 3,155 tons of soybean flour, 673 tons of soybean oil, and 21,744 tons of oil cake of soybeans [soybean meal]. The peanut is much more widely grown in Malaysia than the soybean; 83% of the soybeans grown in Malaysia are grown in the state of Pahang. Address: MARDI, Kuala Lumpur, Malaysia.

1439. Food and Agricultural Organization of the United Nations. 1976. Soybeans: Area harvested, yield, and production. *FAO Production Yearbook (Rome, Italy)* 30:123.
• ***Summary:*** The following nations are listed for the first time as soybean producers in the *FAO Production Yearbook.* El Salvador: Achieved yields of 1,500 kg/ha in 1974, 1,800 kg/ha in 1975, and 2,400 kg/ha in 1976. Note: However no production or area figures are given for soybeans in any of these 3 years.

Name Changes: Cambodia is changed to Kampuchea DM. Lao P D Rep is changed to Lao. Mal W Malays is changed to Mal Peninsul. Vietnam CR is changed to Viet Nam.

1440. Hakim, Rusli. 1976. Grain legumes in Indonesia. In: M.A. Rifai, ed. 1976. ASEAN Grain Legumes. Bogor, Indonesia: Central Research Institute of Agriculture. 225 p. See p. 1-7. [3 ref]
• ***Summary:*** Grain legumes have long been grown in Indonesia; traditional uses include bean curd [tofu], tempe [tempeh], oncom [onchom], soysauce, soypaste, and roasted nuts.

Tables show: (1) A ten year average of production, acreage, and yield of soybeans in Indonesia, 1961-1971–by province. The provinces with the highest average production are: East Java (Jawa Timur) 249,651. Central Java (Jawa Tengah) 75,775. West Nusa Tenggara (Nusa Tenggara Barat) 26,659. West Java (Jawa Barat) 18,319. Yogyakarta 11,952.

(3) Per capita consumption of soybeans in Indonesia 1970 (kg per capita per year). West Nusa Tenggara (Nusa Tenggara Barat) 14.14. East Java (Jawa Timur) 5.04. Central Java (Jawa Tengah) 5.04. West Java (Jawa Barat) 5.04. Yogyakarta 5.04. Jakarta 5.04. Bali 3.43. Address: Central Research Inst. for Agriculture, Bogor, Indonesia.

1441. Hermana, -. 1976. Saving the protein waste from processing of legumes in Indonesia. In: M.A. Rifai, ed. 1976. ASEAN Grain Legumes. Bogor, Indonesia: Central Research Institute of Agriculture. 225 p. See p. 195-200. [11 ref]
• ***Summary:*** Contents: Introduction. The protein waste: Peanut soybean, mungbean. Utilization of the waste.

Tables show: (1) Food legumes available in Indonesia. The three columns are: Latin name, English name, and Indonesian name. Shows 22 food legumes available in Indonesia, from Ochse (1931) and Aykroyd (1969).

(2) Food legumes usually processed. Discusses hunkwe, made by extracting the starch from the mung bean or kacang ijo *(Vigna radiata,* now *Phaseolus aureus)* with water.

(3) Indonesian fermented foods made from waste products. Include dage (made from oncom), oncom (made from peanut presscake or okara), tempe bongkrek (made from coconut presscake), tempe gembus (okara tempeh), tempe mata kedele (made from the hypocotyl of the soybean).

(4) Nutritive composition of kecap (per cent): Both peanut kecap and soybean kecap. Address: Nutrition Research Inst., Bogor, Indonesia.

1442. International Rice Research Institute. 1976. Annual report for 1975. Los Banos, Laguna, Philippines. Soybeans: p. 370, 373, 385, 390. *
Address: Los Baños, Laguna, Philippines.

1443. Jackobs, J.A. 1976. INTSOY, an international programme for soybean improvement. In: M.A. Rifai, ed. 1976. ASEAN Grain Legumes. Bogor, Indonesia: Central Research Institute of Agriculture. 225 p. See p. 129-30.
• ***Summary:*** "Intsoy, an international programme for soybean improvement, was proposed to develop efficient methods of soybean production and the development of improved varieties. It is also concerned with the potential markets and utilization of the crop.

"The headquarters of the project are at the University of Illinois and the University of Puerto Rico. It is financed at present through a contract with U.S.A.I.D."

"The concept of an international soybean programme arose out of the experience of the University of Illinois in collaborating in the All-India Soybean Improvement Scheme. Illinois staff worked with Indian colleagues at two main centres, Jabalpur and Pantnagar." Address: MUCIA Advisor, Univ. of Gadjah Mada, Yogyakarta, Indonesia.

1444. Khumaidi, M. 1976. Role of soybeans in patterns of Indonesian diets. MSc thesis. 57 p. *

1445. Lie, Goan-Hong; Oey, Kam-Nio; Prawiranegara, D.D.; Herlinda, J.; Sihombing, G.; Jus'at, I. 1976. Nutritive value of various legumes used in the Indonesian diet. In: M.A. Rifai, ed. 1976. ASEAN Grain Legumes. Bogor, Indonesia: Central Research Institute of Agriculture. 225 p. See p. 183-93.
• ***Summary:*** This general overview discusses soybeans *(Kacang kedelai),* tempeh, soy milk, "tahu or soycurd" [tofu], kecap, taoco [Indonesian-style miso], soy milk, residue of soy milk or tahu [okara] which may be fermented and sold as oncom. The average nutritional composition of the first 6 products is given. Address: Nutrition Research Inst., Jakarta, Indonesia.

1446. Na Lampang, Arwooth. 1976. Grain legumes in Thailand. In: M.A. Rifai, ed. 1976. ASEAN Grain Legumes. Bogor, Indonesia: Central Research Institute of Agriculture. 225 p. See p. 23-27.
• ***Summary:*** In Thailand, legumes are cultivated for many purposes but the main one is for food. Statistics show that the three main legume crops grown in Thailand are mungbean *(Vigna radiata* and *Vigna mungo),* peanut, and soybean.

The majority of these legumes in Thailand are produced in the North, the Central Plain, and the Northeast region of the kingdom which range in latitude from 13 to 30 degrees North. Thailand's climate is divided into two distinct seasons: (1) The wet season, in which the monsoon or rainy season starts in May and continues until October or November "This is the critical period for Thai farmers since their crop cultivation depends primarily on natural rainfall." (2) The dry season takes place during the rest of the year and crops can only be cultivated in areas where adequate water is available.

Since legumes tend to have short growing seasons, they can be grown up to three times a year–if sufficient water is available. Generally the periods May to June, July to August, and January to February are legume planting periods.

Table 1 gives statistics for mungbean, peanut, and soybean in Thailand for 1961-1970. For each crop each year is given: Acreage (1,000 ha), production (1,000 metric tons = tonnes), value ($ million) and exports ($ million). Soybean is the smallest of the three in acreage, production, and value. During this decade, acreage grew from 24,000 ha to 59,000 ha. Production grew from 24,200 tonnes to 50,400 metric tons. Value grew from $3.1 million to $5.9 million.

"Demand for soybean grains has increased rapidly due to the expansion of domestic feed and oil extracting industries and new markets in neighboring countries. Consequently, the Thai government decided to include a soybean acceleration programme in the Third Five Year Plan (1972-1976) and a goal of 300,000 tons of soybean grain for 1976 was set... national production of soybean grains increased from 67,800 tons in 1971 to 104,000 tons in 1972 and to 140,000 tons in 1973. It is expected that further increases in production will continue." Address: Oil Crop Project, Dep. of Agriculture, Bangkok, Thailand.

1447. Owen, Sri. 1976. Indonesian food and cookery. London: Prospect Books, and Jakarta: Indira Reprints. 255 p. Rev. ed. 1980. [20 ref]

1448. Prawiranegara, Dradjat D.; Lie, Goan Hong. 1976. Production and consumption of legumes in Indonesia. In: M.A. Rifai, ed. 1976. ASEAN Grain Legumes. Bogor, Indonesia: Central Research Institute of Agriculture. 225 p. See p. 175-82. [6 ref]
• ***Summary:*** Tables show: (2) Production of the main foodstuffs in Indonesia, 1968-1971. In 1979, in descending order of production (in thousand tons) they are: Rice 12,168. Cassava 10,476. Corn 2,825. Sweet potato 2,175. Seafish 807. Soybean 488. Inland fish 421. Peanut 281.

(3) Per capital production of peanut, soybean and fish in Indonesia, 1968-1971 (in gm per capita per day). In 1970, when Indonesia's population was 120.7 million the figures were: Peanut 7. Soybean 12. Fish 30. Calculated as grams of protein per capita per day the figures in 1970 were: Peanut 1.8. Soybean 4.2. Fish 3.0. Address: Nutrition Research Inst., Jakarta, Indonesia.

1449. Quebral, Florendo C.; Cagampang, I.C.; Herrera, W.A.T.; Mendoza, E.R.; Mondragon, R.L.; Payumo, E.M.; Ragus, L.N. 1976. The Philippines recommends for soybean

1976. Los Banos, Laguna, Philippines: PCARR. vi + 68 p. Illust. 24 cm. Reissued in 1978. [50 ref]

• ***Summary:*** Contents. Foreword. Acknowledgment. Introduction. 1. Nutritive value. 2. Utilization. 3. Cost and return analysis of soybean production. 4. Marketing. 5. Cultural management: Selection of varieties, adaptation (soil and climate requirements), land preparation, inoculation, planting, water management, fertilization, crop protection. 6. Post-harvest handling: Threshing, drying, storage. 7. Soybeans in multiple cropping. 8. Seed production. 9. References. Appendices: A. Standardization of soybean. B. Multifarious uses and preparation of soybean and by-products. C. Climate in the Philippines. D. Available inoculants and their distributors. E. Symptoms and first aids for pesticide poisoning. F. Addresses of manufacturers and distributors of pesticides. G. Glossary. Appendix tables. Tables. Figures.

A summary of soybean area, production, and yield in the Philippines, 1959-1975 follows: The number of hectares used for planting soybeans went from 1,690 ha. in 1959 up to 2,200 ha. in 1962, and then decreased annually until it was only 1,240 ha. in 1973. However, a record high of 2,780 ha. was reached in 1974, followed by 2,018 ha. in 1975. Production of soybeans was low in 1959-60, only 571.8 and 981.3 tons, respectively. By 1962, however, production had increased to 2,066.9 tons, but decreased steadily over the years until 1974. In 1974, a maximum of 2,214.0 tons was produced. The corresponding annual yields (tons/ha.) reflect the sharp rise of soybean production in 1961-62 and the ensuing decline of the industry throughout the rest of the 1960s and early 1970s, until 1974, when production soared to new heights. Address: PCARR (Philippine Council for Agriculture and Resources Research), Los Baños, Laguna, Philippines.

1450. Rifai, Mien A. ed. 1976. ASEAN grain legumes. Papers presented at the First ASEAN Workshop on Grain Legumes, held at Kopo (Cisarua), Bogor, Indonesia, 15-20 Jan. 1974. Bogor, Indonesia: Central Research Institute of Agriculture. v + 225 p. Illust. 24 cm.

• ***Summary:*** The workshop was sponsored by the Dept. of Agriculture, Republic of Indonesia. Pages 224-25 contain a directory of observers and participants.

Note: ASEAN (Association of Southeast Asian Nations) was established in Aug. 1967 by 5 nations to promote political and economic cooperation among the non-communist states of the region. The 6 members in 1988 were Brunei, Indonesia, Malaysia, Philippines, Singapore, and Thailand. Address: National Biological Inst., Bogor, Indonesia.

1451. Schultz, John M.; Mason, William P. 1976. Soybeans: Brazil as a competitive force. MBA thesis, Harvard Business School. vii+ 151 leaves. 28 cm. [49 ref]

• ***Summary:*** This is the best report seen to date on the soybean industry in Brazil. Contents: Preface. Indexes of tables and figures. Introduction. 1. World food demand. 2. Fats, oil & meals. 3. Brazilian production. 4. Comparative cost of production. 5. Development of agricultural inputs and infrastructure. 6. Brazilian commercialization of soybeans and its products. 7. Government's role in the Brazilian soybean system. 8. Brazilian soybean supply-demand model. Summary & Conclusions. Appendices: Conversion rates, Glossary of Brazilian organizations. Bibliography.

Tables: (1) Change in world population growth. (2) World population, 2000: Less developed regions, developed regions, total–for high, medium, and low projections. (3) Where population is growing fastest (percentage growth from 1950 to 1970): Latin America 75% (doubling time 22 years), Africa 59%, Asia 52% (DT 24 years), Oceania 46%, North America 37%, Russia 35%, Europe 18%. (4) Percent of world population by regions: In 1973 developing world has 75% of total, developed world has 25%. In 2000 those figures are expected to change to 80% and 20%. (5) Per capita demand for related commodity groups by areas worldwide (kg per year): (6) Net demand for fats and oils by region: 1970, 1985, 2000. (7) Index of world net food demand by commodity: 1970, 1985, and 2000. (8) Index numbers of total and per caput food production. (9) Joint product derivation for 8 oilseeds (average percentage weight of oil and meal; soybean is 80 to 18). (10) World production of fats & oils, market shares for edible vegetable oil, palm oils, industrial oils, animal fats, marine oils (1965, 1970, 1975). (11) Gross fats & oil exports, for 13 oils and fats, annually from 1971/72 to 1974/75, with projections to 1980/81 at which time–#1 Palm oil 3.1 million metric tons (mmt). #2. Soybean oil 1.02 mmt. Sunflower oil 1.00 mmt. Butter 0.75 mmt. (12) World production of fats & oils, for 14 oils and fats. (13) Exports of fats & oils (vegetable & animal), Malaysia and Brazil. (14) U.S.A. food oils and fats domestic use, 1960, 1974, & 1985 projections. In 1960 the diet was 58% vegetable fats and 42% animal fats. In 1985 the projected diet was 90% vegetable fats and 10% animal fats. (15) Soybean yields for selected regions (1971-75): World average, USA, Brazil, China. (16) World cropland area by commodity, 1970. All cereals have 73.5% of the total, vs. 10.8% for oilseeds and 6.3% for pulses and nuts. (17) World soybean production (1970/71 to 1975/76): USA, Brazil, China, Others. "The U.S. embargo in 1973 gave Brazilian exports a boost as importing countries placed greater emphasis on double sourcing." (18) Cottonseed oil production and export for U.S. and world, 1970-1975. (19) Sunflower seed oil production, 1970-1975. (20) Palm oil: Production and exports in major producer-exporter countries and the world annual 1965-75 with projections for 1976, 1980 and 1985. Countries are West Malaysia, Sabah (a Malaysian state located on the northeast tip of the island

of Borneo), Indonesia, Ivory Coast, Zaire. (21) Value of four oil crops per hectare for selected countries. Crops: Oil palms, soybeans, sunflower, peanuts. Countries: West Malaysia, USA, USSR, Nigeria. Oil palms have by far the greatest oil yield and value per hectare. (22) Palm oil: Production in specified countries (Western hemisphere 3.5%, Africa 39.1%, Asia 57.4%): Forecast for 1975 and percentages. (23) Palm oil–local consumption vs. exports (1974): For West Malaysia (exports 96% of production), East Malaysia (92%), Indonesia (92%), Ivory Coast (60%), Zaire, Western Hemisphere. (24) Palm kernel oil–production and exports 1971-75. (25) Coconut oil: Production & export. (26) Lard production & export: Selected years. (27) Lard rendered per hog: USA. Yield of lard per hog in USA decreased from 13 kg in 1963 to 6.7 kg in 1974–as demand for lard decreased. (28) World meal production and gross exports by commodity: Selected years 1955, 1967, 1974. Soybean meal is always the leader by far, with cottonseed meal 2nd. (29) Present and projected world consumption of animal products: Poultry, pork, and beef. Poultry and hogs are the main consumers of soybean meal. Cattle consume mostly pasture and grass–as nature designed. (30) Protein meal: World production exports, share of market by commodity, 1955, 1970/71, 1974/75. Soybean meal is by far the leader, followed by cottonseed meal. A U.S. moratorium on soybean exports in 1973 and 1975 enabled Brazil to enter major markets as a source of dependable supply. (31) Soybean meal and seed, production and exports (U.S., Brazil, and world) (meal equivalents). (32) Peruvian fishmeal, production and exports. (33) Peruvian fishmeal exports, soybean equivalents. (34) Brazilian production by states. (35) Changes in acreage planted. (36) Land area of Rio Grande do Sol. (37) Parana production by regions. (38) Cultivated land in Sao Paulo. (39) Land area of central-west states. (40) Weighted average comparison of costs of production. (41) Comparison of fertilizer and lime costs (Brazil and the U.S.). (42) Comparison of machinery cost. (43) Brazilian labor rates. (44) Comparison of regional costs of production. (45) Seed soybean variety usage by state. (46) Fertilizer demand. (47) National fertilizer program. (48) Chemical demand. (49) Land costs by state. (50) 1974 storage capacity by states. (51) Comparison of transportation systems. (52) Capacities at main ports. (53) Comparison of average export profits. (54) 1975 crushing capacity by state. (55) Major crushing firms. (56) Exports. (57) Major importers of Brazilian soybeans and soybean products. (58) Exporter percentages of soybeans. (59) Brazilian ICM tax rates, Jan. 1, 1976. (60) Historical supply-demand relationships. (61) Projection of supply-demand relationships.

Figures: (1) World population growth (in millions) 1900-2000. (2) Soybeans and their products. (3) Relationship between beans and end products. (4) European Community: Apparent consumption of fats and oils, 1965-1975. (5) Oilseeds. (6) Price comparison, coconut, palm, and soybean oil, average monthly cash prices. (7) Per capita consumption of poultry meat. (8) Peruvian anchovy catch, 1960-1975. (9) Map of Brazil. (10) Comparison of average prices for wheat and soybeans at the farm level. (11) Comparison of wheat-soybean acreage. (12) Index changes of soybean production, acreage, and yields. (13) Map of Rio Grande do Sul. (14) Map of Parana. (15) Map of Sao Paulo. (16) Map of Santa Catarina. (17) Map of Central-west states. (18) Comparison of rainfall during growing season. (19) Industry structure. (20) Map of climatic conditions. (21) Map of soil conditions. (22) Brazilian railroad systems. (23) Export corridors program. (24) Comparison of Brazilians–U.S. prices at he farm. (25) Map of crushing facilities. (26) Per capita Brazilian vegetable oil demand. (27) Per capita Brazilian meat consumption. (28) Brazil's major agricultural exports. (29) Comparison of market share in exports of soybeans. (30) Schematic supply-demand relationships. (31) 1976 planting estimates (Based on wheat & soybean prices). Address: Harvard Business School, Cambridge, Massachusetts.

1452. Shepard, Sigrid M. 1976. The Thursday night feast and good plain meals cookbook: Natural foods of the Eastern Hemisphere: China, Japan, Indonesia, India, the Middle East. Spokane, Washington: New Age Printing. vii + 442 p. Illust. by Margaret V. Putman. Index. 28 cm.
• ***Summary:*** This is a natural foods cookbook (not vegetarian), with strong influence from East Asia. The author's great aunt was a missionary in China. Pages 5-7 describe how to make a "bean curd box" for making tofu, and then how to make tofu at home. Among the many soy-related recipes are about 55 for tofu, 7 for miso, 2 for whole soybeans, and many for soy sauce. Pages 431-34 contain a directory of natural foods provisioners and Oriental foods provisioners.

1453. Solomon, Charmaine. 1976. The complete Asian cookbook. New York, NY: Summit Books. 511 p. Illust. Color plates. Index. 29 cm.
• ***Summary:*** This artistic cookbook is loaded with full-page color plates plus a good glossary. Soy-related recipes include: Bean curd omelettes (Tahu telur, from Indonesia, p. 188). Fried bean curd with peanuts (Tahu goreng kacang, from Indonesia, p. 204). Fried bean curd with soy sauce (Tahu goreng kecap, from Indonesia, p. 204). Fried fish with salted soya beans [miso] (Ikan goreng tauceo, from Malaysia, p. 224). Bean curd in salted soya bean paste [tofu in miso] (Taukwa tauceo, from Malaysia, p. 233). Bean curd and bean sprouts [probably mung bean sprouts] (Taukwa dan taugeh, from Malaysia, p. 233). Stuffed soy bean cake [with fried tofu] (Tauhu sod sai, from Thailand, p. 316). Glutinous rice and soybean sauce (Nuoc leo, from Vietnam, p. 341). Soup with bean curd (Canh dau hu, from Vietnam,

p. 342). Misu tomato sauce (with red misu = red miso, from the Philippines, p. 351). Bean curd in barbecue sauce (Chu hau jeung mun dau fu, from China, p. 414). Bean curd with crab sauce (Hai yook par dau fu, from China, p. 414). Ginger soy sauce (See yau ghung jeung), Chilli soy sauce (See yau laht jiu jeung), Black bean sherry sauce (Dau see sheung jing jeung, with canned salted black beans = soy nuggets), Black bean garlic sauce (Suen tau dau see, with soy nuggets) (from China, p. 431). Sesame seed sauce (Cho kanjang, from Korea, p. 451, with "4 tablespoons light soy sauce"). Dumpling soup (Mandoo, from Korea, p. 453, with "1 square fresh bean curd" and "2 tablespoons light soy sauce"). Soup of soybean sprouts (Kong namul kuk, from Korea, p. 453, with 500 gm soy bean sprouts and 1 tablespoon soy sauce). Rice with fried bean curd (Kitsune domburi, from Japan, p. 460). Steamed egg custard with tofu (Kuya mushi, from Japan, p. 471). Bean paste soup (Miso shiru, from Japan, p. 477). Sushi in fried bean curd (Inari-Zushi, from Japan, p. 480).

Soy-related glossary entries (p. 485-502) include: Aburage. Akamiso. Black beans, salted (Chinese: dow see = salted black beans). Bean curd (Chinese: dow foo; incl. yellow bean curd, dried bean curd, red bean curd). Chinese bean sauce (ground = *mor sze jeung* or chunky = *min sze jeung* similar to Malaysian *taucheo* or *tauceo).* Dow foo pok (Chinese-style fried bean curd). Miso. Mushroom soy (Soy sauce flavored with mushrooms during the last stage of processing). Soy sauce (light or dark, shoyu, kecap manis). Yellow beans, salted (=salted yellow beans). Yellow bean paste.

Interesting glossary entries (p. 485-502): Aburage, bean curd (fresh, yellow, dried, red), black beans, salted (Chinese: *dow see;* made from soy beans, heavily salted and sold in cans and jars), Chinese bean sauce (ground or chunky, like Malaysian taucheo or tauceo), fish sauce (Vietnamese: *nuoc mam.* Burmese: *ngan-pya-ye.* Thai: *nam pla.* Tagalog: *patis).* Miso. Mushroom soy (Soy sauce flavored with mushrooms during the last stage of processing). Red misu (See miso). sesame seed (Hindi: *till.* Sinhalese: *thala.* Malay: *bijan.* Chinese: *chih mah.* Japanese: *goma.* Indonesian: *wijen).* Sesame oil ("The sesame oil used in Chinese cooking is extracted from toasted sesame seeds..."). Sesame paste ("Sesame seeds, when ground, yield a thick paste similar to peanut butter. Stores specialising in Middle Eastern foods sell a sesame paste known as *tahini,* but this is made from raw sesame seeds, is white and slightly bitter, and cannot be substituted for the Chinese version–which is made from toasted sesame seeds, and is brown and nutty"). Wakame. Wasabi or wasabe. Yellow beans, salted (Very similar to canned salted black beans, but lighter in color). Yellow bean paste (It is not really yellow, but brown. Sold in cans).

Note 1. This is the earliest English-language document seen (Feb. 2004) that uses the word "dau fu" (or "dau-fu") to refer to Chinese-style tofu.

Note 2. This is the earliest English-language document seen (March 2009) that uses the word "tauceo" to refer to Indonesian-style miso.

1454. Somaatmadja, Sadikin. 1976. Production and varietal improvement of soybean, peanut and mungbean in Indonesia. In: M.A. Rifai, ed. 1976. ASEAN Grain Legumes. Bogor, Indonesia: Central Research Institute of Agriculture. 225 p. See p. 111-23.

• ***Summary:*** "Systematic breeding of soybean in Indonesia started in 1918, when the Research Institute at Bogor introduced two varieties, namely Otan and Botan from Taiwan. Prior to this year the Institute had already been conducting a comparative study of yield among existing local varieties." After the introduction of Otan and Botan, however, it was proved that the local varieties were inferior. Otan and Botan were also very important because five of today's eight recommended varieties have been directly or indirectly derived from them.

The Central Research Institute for Agriculture has regional experimental farms under its administration. Nevertheless, until 1960 breeding work was undertaken mainly at the main station at Bogor.

No. 16 (Otan) is black in color. One thousand seeds weigh 70 grams. The plant matures in 70-90 days.

No. 27 is obtained by pure line selection from no. 16. It has the same seed color and weight but it matures in 100-110 days.

No. 29 is obtained by pure line selection from no. 17 (Botan). It has the same seed color, weight and days to maturity as no. 27.

Similar details are given for the other recommended varieties. Address: Central Research Inst. for Agriculture, Sukamandi Branch, Sukamandi, Indonesia.

1455. U.S. Department of Agriculture. 1976. The annual report on activities carried out under Public Law 480, 83d Congress, as amended, during the period July 1, 1974 through June 30, 1975. Washington, DC: U.S. Government Printing Office. See table 17.

• ***Summary:*** Table 17 is titled "Title II, Public Law 480–total commodities shipped by program sponsor, fiscal year 1975." The main program sponsors and distributing agencies, listed alphabetically, are AJJDC (American-Jewish Joint Distribution Committee), CARE, CRS (Catholic Relief Service), CWS (Church World Service), LWR (Lutheran World Relief), SAWS (Seventh-day Adventist World Service), UNICEF, UNRWA (United Nations Relief and Works Agency), and WRC (World Relief Commission). All of these are Private Voluntary Organizations (PVO/PVOs), registered with USAID. The following foods containing soy protein were distributed: Soy fortified sorghum grits (SFSG), CSM (Corn soya mix),

WSB (wheat soya blend), and small amounts of soya flour. The vegetable oil which was shipped to many countries was soybean oil; it is not recorded here.

Foods containing soy protein were distributed to the following countries or areas: British Solomon Islands, India, Indonesia, Khmer Republic [Cambodia], Korea, Laos, Nepal, Philippines, Singapore, Sri Lanka, Vietnam.

Afghanistan, Egypt, Gaza, Jordan–East Bank, Jordan–West Bank, Morocco, Tunisia, Yemen.

Benin, Botswana, Burundi, Cameroon, Cape Verde, Central African Republic, Ethiopia, Gambia, Ghana, Guinea, Ivory Coast, Kenya, Lesotho, Liberia, Malagasy Republic, Mali, Mauritania, Mauritius, Niger, Nigeria, Rwanda, Senegal, Seychelles, Sierra Leone, Somalia Republic, Sudan, Tanzania, Togo, Upper Volta, Zaire.

Belize, Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Jamaica, Nicaragua, Panama, Peru. Address: Washington, DC. Phone: 703-875-4901 (1991).

1456. Wang, H.L.; Mustakas, G.C.; Wolf, W.J.; Wang, L.C.; Hesseltine, C.W.; Bagley, E.B. 1976. An inventory of information on the utilization of unprocessed and simply processed soybeans as human food. Peoria, Illinois: USDA Northern Regional Research Center, Interdepartmental Report. AID AG/TAB-225-12-76. 197 p. AID contract report. Undated. No index. 27 cm. Spiral bound. [65 ref]

• ***Summary:*** Contents: Introduction. Home and village traditional soybean foods by country. 1. Soybean food uses and production in Asia. Soaking dry soybeans. In China: Tou chiang (soybean milk; preparation, ways of serving), tou fu (soybean curd; yen-lu is the Chinese name for nigari), tou fu nao (soft curd), tou fu kan (dry / firm bean curd), chien chang (pressed tofu sheets), yu tou fu (fried tou fu), tung tou fu (frozen tou fu), tou fu pi (protein-lipid film; yuba), huang tou ya (yellow bean sprout or soybean sprout), mao tou (hairy bean, green soybean, or immature soybean), dry soybeans (roasting and frying, stewing and boiling), roasted soybean flour. Fermented soybean foods. Production and consumption of soybeans (China and Taiwan).

Japan: Tofu (soybean curd), kinugoshi tofu, processed tofu products (aburage or age, nama-age and ganmo), kori tofu (dried-frozen tofu), yaki tofu (grill tofu), yuba (protein-lipid film), soybean milk, gô (ground soybean mash), daizu no moyashi (soybean sprouts), edamame (green vegetable soybeans), whole soybeans, kinako. Fermented soybean foods: Production and consumption.

Korea: Tubu (soybean curd), soybean sprouts, whole soybeans (green soybeans, parched or roasted soybeans, boiled soybeans), soybean flour, soysauce, bean paste [Korean soybean miso], natto, production and consumption of soybeans.

Indonesia: Tahu or tahoo (soybean curd), bubuk kedele (soybean powder), tempe kedele, tempe gembus [the name in Central and East Java for okara tempeh], oncom tahu [the name in West Java for okara onchom], other soybean products (soybean sprouts, green soybeans, roasted and boiled soybeans, kecap or soysauce, tauco or bean paste [miso]), food mixtures (Saridele, Tempe-fish-rice or TFR, Soy-rice baby food, soybean residue [okara]-fish-rice), production and consumption of soybeans.

Thailand. Philippines: Soybean sprouts, soybean coffee, soybean cake (made from equal amounts of soybean flour and wheat flour), soybean milk, tou fu and processed tou fu products, production and consumption. Burma. India. Malaysia. Nepal. Singapore. Sri Lanka (Ceylon). Vietnam. West Asia [Middle East; Iran and Turkey]. References–Soybean food uses in Asia.

2. Soybean food uses and production in Africa. Ethiopia: Injera, wots and allichas, kitta, dabbo, dabokolo, porridge. Kenya. Morocco. Nigeria: Whole soybeans, soybean paste, corn-soy mixtures (soy-ogi). Tanzania. Uganda. Production. References–Soybean food uses in Africa.

3. Soybean food uses and production in Europe [both Eastern and Western]. 4. Soybean food uses and production in Latin America. Argentina. Bolivia. Brazil. Chile. Colombia. Ecuador. Guyana. Paraguay. Peru. Uruguay. Venezuela (fried arepas with textured soy). Mexico: New village process, commercial developments of soy-based food products, Gilford Harrison, Ruth Orellana, Seguras Social. Honduras. Costa Rica. Panama. Dominican Republic. Jamaica. Haiti. Trinidad. References–Soybean food uses in Latin America.

5. Soybean food uses and production in North America. United States: Oriental populations, vegetarian communes, The Farm in Tennessee. Canada. References–Soybean food uses in North America. 6. Soybean food uses in Oceania. Australia. New Zealand. 7. Summary of soybean food uses. Traditional soybean foods: Soybean milk, soybean curd and processed soybean curd products, protein-lipid film, soybean sprout, tempe (tempeh), green soybeans, boiled soybeans, roasted soybeans, soybean flour, soysauce, fermented soybean paste, fermented whole soybeans [Toushih, hamanatto], natto, fermented soybean curd. Experimental soybean foods: Whole soybean foods, soybean paste, soy flour, soy beverage. Production and consumption.

8. Recent simple soybean processes, other than traditional. Simple village process for processing whole soybeans: Equipment, process, sanitation requirements, quality of product, evaluation of product in formulas and procedures for family and institutional use in developing countries. NRRC village process. Foods from whole soybeans developed at the University of Illinois (drum dried

flakes, canned and homecooked soybeans, soy beverages and beverage products, spreads, snacks).

Ways of cooking and serving soybeans in the American diet. 9. Industrial processes. Industrial production and selling prices of edible soybean protein products. 10. Barriers to acceptability and utilization of soybeans in food and research recommendations: Availability. Cultural and social factors. Texture. Flavor. Nutrition and food safety. Technology development. Technology transfer. Research recommendations [concerning each of the above barriers].

Concerning Morocco: Cereal-soy blends have been used extensively in Morocco; in fiscal year 1974 some 14.7 million lb were shipped to Morocco. Mmbaga (1975) reported that soy flour is being used in making porridge, with 1 part soy flour to 3 parts maize / corn flour.

Tables show: (1) Soybean production and imports in Taiwan, 1962-1975 (tonnes = metric tons, p. 33). Production rose from a 53,000 tonnes in 1962 to a peak of 75,200 tonnes in 1967, then fell to 61,900 tonnes in 1975. Imports skyrocketed from 62,400 tonnes in 1962 to a record 827,300 tonnes in 1975. (2) Consumption of soybean foods in Taiwan, 1964-1974 (kg/capita/year, p. 34). Total soybean foods not including tofu rose from 1.08 kg in 1964 to a peak of 2.61 kg in 1972 then fell to 1.99 kg in 1974. Consumption of tofu (80% water) rose from 18.75 kg in 1964 to a peak of 33.89 kg in 1972, then fell to 32.04 kg in 1974. (3) Supply and disposition of soybeans in Japan, 1971-1974 (p. 49). Total supply is beginning stocks, plus domestic production, and imports. Total disposition is crushing, plus traditional foods and feed. In 1974 imports accounted for 87.5% of the supply, and crushing accounted for 71.0% of the disposition. (4) Whole soybeans used in the production of traditional foods in Japan, 1970-74 (tonnes / metric tons, p. 50). Tofu and others rose from 508,000 in 1970 to 539,000 in 1974. Miso rose from 177,000 in 1970 to 192,000 in 1974. Shoyu rose from 13,000 in 1970 to 14,000 in 1974. (5) Defatted soybean meal used in the production of traditional foods in Japan, 1970-74 (tonnes / metric tons, p. 51). Shoyu rose from 163,000 in 1970 to 176,000 in 1974. Tofu and others was constant at 130,000 from 1971 to 1973. Miso decreased from 4,000 in 1970 to 2,000 in 1974. (6) Production of traditional soybean foods in Japan, 1970-74 (tonnes / metric tons, p. 52). Tofu and others rose from 1,867,800 in 1970 to 2,264,900 in 1973. Shoyu rose from 1,334,1000 in 1970 to 1,455,800 in 1974. Miso rose from 552,200 in 1970 to 587,200 in 1974. (7) Production and food use of beans [various types] and consumption of some soybean products in Korea, 1964-1967 (p. 56-57). In 1967 consumption (in tonnes / metric tons) was: Bean curd 290,000. Bean sprouts 270,000. Bean sauce 69,700. Bean paste 27,700. Total: 11.6 kg per capita per year. (8) Soybean production in Indonesia, 1960-1974 (p. 65). It rose from 442,862 tons in 1960 to 550,000 tons in 1974. (9) Consumption of soybeans in various parts of Indonesia in 1970 (p. 66). (10) Production of soybean foods in the province of Central Java, 1968-1972 (tons, p. 67). Kecap rose from 914,695 in 1968 to 1,524,000 in 1972. Tahu decreased from 18,570 in 1978 to 17,000 in 1972. Tempe rose from 506 in 1968 to 39,000 in 1972. (11) Area planted to soybeans and total soybean production in Thailand, 1964-1974 (p. 70). Area rose from 213,000 rais (6.25 rais = 1 ha) in 1964 to 1,016,000 rais in 1974. Production (in metric tons) rose from 31,300 in 1964 to 252,400 in 1974. (12) Utilization of soybeans by soybean-consuming countries, 1964-66 (based on FAO 1971 Food Balance Sheets, 1964-66 average, p. 150). The countries leading in per capita consumption (kg/person/ year) are: China (PRC) 6.7. Japan 5.1. Korea(s) 5.0. Singapore 4.3. Indonesia 2.8. Malaysia 2.6. Taiwan (ROC) 1.1. (13) Amounts of cereal-soy blends distributed under Title II, Public Law 480 in fiscal year 1974 (p. 152-155). (14) U.S. exports of full-fat soy flour, 1974-75 (p. 156).

Note: This is the earliest English-language document seen (Feb. 2004) that uses the word "tubu" to refer to Korean-style tofu. Address: Northern Regional Research Center, Agricultural Research Service, Department of Agriculture, Peoria, Illinois 61604.

1457. Winarno, F.G.; Hardjo, S.; Rumawas, F. 1976. The present status of soybean in Indonesia. Bogor, Indonesia: FATEMETA, Bogor Agriculture University. xxiii + 128 p. 29 cm. [7 ref]

• ***Summary:*** The best and most comprehensive survey up to this time on the subject, it was done as part of the 1974 Industrial Census of the Central Bureau of Statistics. Full of valuable statistics and tables. Contents. Preface. Summary. List of tables. List of figures. I. Introduction. II. Objectives and survey methods: A. Objectives. B. Survey methods. III. Cultivation, product handling and protection: A. Botany of the soybean. B. Varieties. C. Growth requirements. D. Agronomy of soybean. E. Crop Management. F. Harvesting and product handling.

IV. Production: A. Harvested acreage, production and average soybean yield in Indonesia. B. Center production areas. C. Harvested acreage of soybean versus other food crops. D. Factors affecting soybean production. V. Farm management and soybean marketing in Indonesia: A. Farm management. B. Marketing of soybean.

VI. Soybean utilization (p. 52): A. Soybean products: Introduction, yuba, sere (from Bali: cooked whole soybeans, mixed with onions, hot pepper, turmeric, salt, and coconut presscake; molded into patties, sun dried, then deep fried), soybean milk, tofu (coagulated with *biang* or *sioko* {calcium sulphate}), soybean sprouts *(tauge),* soybean powder (soybeans that have been cooked, dried, dehulled, and pounded), soybean mixtures, kecap (Indonesian soy sauce), oncom (fermented soybean product, red or black), tauco (Indonesian-style miso), tempe. B. Soybean

utilization: Utilization by farmer (in each of 6 provinces and total), utilization by processor (tempe, tofu, kecap, miscellaneous), census conducted by Central Bureau of Statistics, conversion factor for soybean products. C. Consumption of soybean and its processed products (by province). D. Other components. Appendixes.

Tables in body of text: (1) Brief description of recommended soybean varieties. (2-3). Insecticides used against Agromyza and *Phaedonia inclusa.* (4) Soybean harvest seasons in Indonesia (major harvest months, by province). (5-8) Harvested acreage, production, and average soybean yield during 1950-73, 1960-74, and in Java-Madura (1967-71, 1972, 1973, and 1974). (9) Soybean acreage in Java-Madura. (10) Major production areas in Java-Madura, and average 5-year yield, 1965-69. (11) Harvested acreage of soybeans vs. other crops in Java-Madura, 1971-72. (12) Production cost and value per hectare of soybeans. (13) Major trading and harvest months. (14-15) Percentage of farmer's share and marketing cost of the trade price in various provinces. (16) Percentage of farmer's share of the trade price. (17) Soybean utilization by farmers, 1975-76. (18-21) Production/consumption of tempeh, tofu, kecap, tauco, tauge, yuba, and sere.

(22-29) Raw material utilized by small-scale processors and by soybean home industries in Java and Jakarta. (30-31) Value of raw material and end products of small-scale industries over 3- and 12-month periods. (32) Conversion factor of soybean products to raw material. (33-36) Average daily consumption per capita of soybean and its process products at villages in Lampung, Yogyakarta, East and West Java, and in 4 other provinces. Address: FATEMETA, Bogor Agricultural Univ., Indonesia.

1458. Winarno, F.G.; Hardjo, S.; Rumawas, F. 1976. Kecap (Indonesian-style soy sauce) (Document part). Bogor, Indonesia: In: Winarno, F.G.; et al. 1976. The present status of soybean in Indonesia. FATEMETA, Bogor Agriculture University. xxiii + 128 p. 29 cm. [7 ref]

• ***Summary:*** The description of kecap (p. 58-59) states: Boil soybeans until tender. Drain and spread over round, shallow woven bamboo trays. Place these in a kecap fermentation room. Leave for 5-7 days until the soybeans are well covered with and bound together by a mycelium of *Aspergillus* and/or *Rhizopus* molds. Then dry the trays and soybean koji in the sun. Break up the soybean koji, place it is salt brine in deep earthenware jars, and place the jars in the sun to ferment for one week or up to one year.

When the mash is ready, boil it, adding clean water if necessary. Remove the liquid using a sieve; this is the first extraction, which is the best quality. Repeat this process 3 to 5 times, adding a brine solution the same salt concentration as the original mash. Each extraction, which will be lower in quality that the one before it, is kept separate to provide different qualities of end product.

As the final step for each different extraction, bring it to a boil and add some ingredients such as palm sugar [jaggery], caramel, or coconut sugar. Other ingredients such as fish extract or bouillon are also occasionally added. Filter the liquid through a piece of cheese cloth, bottle and store.

Page 67: Most kecap is made in small scale enterprises, employing on average 10-11 laborers and working 23.7 days/month. The average kecap maker uses 13,390 kg of soybeans annually to produce kecap with a value of 6.3 million rupiahs. A table (p. 68) gives details by province.

Page 80: Kecap is a very minor soy product in Indonesia. Only 0.2% of all soybeans used to make foods in Indonesia are used to make kecap. The largest percentage of soybeans are used to make tempeh (66%), tofu (33%), and tauco (0.3%).

Pages 93-94: Ingredients required to make kecap include palm sugar, cane sugar, molasses, salt, wheat flour, cassava flour and spices. Palm sugar is the most important sweetener. "Depending on the concentrations of sugar and salt, there are two types of kecap available in the market, sweet and salty kecap." Wheat flour and cassava flour serve as thickening agents, but they are not used by all kecap makers. No information is given on the types or amounts or of spices and herbs used in making kecap. Address: FATEMETA, Bogor Agricultural Univ., Indonesia.

1459. Associated Press (AP). 1977. Food poisoning takes 69 lives. *Daily Colonist (Victoria, BC, Canada).* Jan. 9. p. 28, col. 5.

• ***Summary:*** "Sixty-nine persons died and 265 others in East Java were in hospital for food poisoning after eating tempe, a local dish made from soy beans, the daily newspaper *Kompas* reports."

Note: The tempeh that killed these people was probably tempe bongkrek, made from shredded coconut presscake rather than from soybeans. There are no known reports of soybean tempeh being toxic, but many reports of coconut presscake being toxic.

1460. **Product Name:** Tempeh.

**Manufacturer's Name:** Country Store Health Foods.

**Manufacturer's Address:** 8720 Sunland Blvd., Sun Valley, CA 91352. Phone: 213-768-6373.

**Date of Introduction:** 1977. January.

**New Product–Documentation:** Shurtleff and Aoyagi visited this small tempeh shop in Jan. 1977. They met Joan Harriman and included the company in a list of tempeh shops in North America in the 1977 edition of "What is Tempeh?"

Shurtleff & Aoyagi. The Book of Tempeh. 1979 (July). p. 148. Owner: Joan Harriman or Buddy Tjandrawibawa; a natural foods store.

Letter from Joan Harriman, R.D. 1979. Nov. 1. She orders 68 copies of *The Book of Tempeh.* She plans to do a

booth on tempeh. Address is the same as shown above.

Soyfoods Center Computerized Mailing List. 1981. Jan. 22. Owner: Joan Harriman.

1461. Goldman, Sherman. 1977. Charles Atlas versus the Bodhisattva: An interview with Bill Shurtleff and Akiko Aoyagi. *East West Journal.* Jan. p. 32-35.

• ***Summary:*** An in-depth discussion of the work of Shurtleff and Aoyagi with tofu, miso, and tempeh in the USA, Japan, and Indonesia. Photos show: Shurtleff speaking into a microphone. Akiko Aoyagi smiling. Shurtleff and Aoyagi standing next to their white 1975 Dodge Van on the side of which is written: "New-Age Foods Study Center–Tofu & Miso America Tour, 1976-77."

1462. Shurtleff, William; Aoyagi, Akiko. 1977. What is tempeh? Lafayette, California: New-Age Foods Study Center. 14 p. Unpublished manuscript. Jan. Published as a 4-page tan leaflet later in 1977 with the addition of 4 Los Angeles tempeh shops. Revised, published edition, Oct. 1980. Also reprinted by many tempeh shops under their logo. Unpublished manuscript.

• ***Summary:*** Contents: Introduction. A rich source of nutrients. Tempeh in Indonesia. A brief history of tempeh. Making tempeh at home: Homemade soy tempeh (using 2½ cups soybeans), homemade okara- or coconut press-cake tempeh, homemade grain- or grain & soy tempeh. Storing & preserving tempeh. Favorite tempeh recipes: Deep-fried tempeh. Pan-fried tempeh. Tempeh chips. Tempeh, lettuce & tomato sandwich. Tempeh burger, and 11 others. Soybeans and the world food crisis. Making tempeh starter at home. Making tempeh in a community or commercial shop. People & institutions connected with tempeh: Research scholars and institutes in North America, tempeh shops in America (7), individuals interested in tempeh in America (4), research scholars and institutes in Indonesia and Japan (5). Address: 790 Los Palos Dr., Lafayette, California 94549.

1463. Claiborne, Craig. 1977. Nuts go into great Oriental dishes: Peanuts in the kitchen. *Chicago Tribune.* Feb. 24. p. E28.

• ***Summary:*** Nuts, especially the peanut, do not play nearly as important role in serious American cooking as they do in the cuisines of other countries. By contrast, Indonesian chefs do marvelous things with peanuts–mostly in sauces and soups.

A recipe is given for Indonesian chicken satay, which includes "1 tablespoon ketjap manis (a sweet soy sauce), see note." The dipping sauce for this recipe includes "3 tablespoons ketjap manis."

The note (at end of article) states: "Many of the ingredients for Indonesian dishes are available in Oriental markets." Indonesian foods can be ordered by mail from Mrs. De Wildt, R.R. 3, Box 333, Bangor, Pennsylvania 18013.

1464. Leroux, Charles. 1977. Pouring over the virtues of catsup, the sauce everybody loves to hit. *Chicago Tribune.* Feb. 24. p. A1.

• ***Summary:*** The *Oxford English Dictionary* says that the word *kechap* comes from Malay; the Dutch spelled it ketjap.

Some say that catsup originated in China, where it is called *koe-chiap* or *ke-tsiap.*

*Food in History,* by Reay Tannahill says the word "ketchup" comes from the Siamese kachiap.

The sauce we know today as ketchup or catsup–made mainly from tomatoes–is very different from the Oriental sauces mentioned above. They were often made from pickled fish, salt, and oil. American colonists in Virginia had a "walnut catsup" that they used on baked sturgeon.

There is a reference in *Barnaby Rudge* (1840-1841), by Charles Dickens, about putting ketchup on lamb chops (p. 44, lines 3-4).

1465. Arbianto, Purwo. 1977. Arah-arah baru dalam proses pembuatan tempe [New directions on the tempeh making process]. Presented at Lokakarya Bahan Pangan Berprotein Tinggi (Conference on High Protein Food). Held 22-24 Feb. 1977 at Bandung. [Ind]*

1466. Lembaga Kimia Nasional–LIPI (National Chemistry Institution). 1977. Dasar-dasar proses pembuatan tempe [Elements of tempeh processing]. Presented at Lokakarya Manajemen Perusahaan Tempe (Seminar on Management of Tempeh Manufacturing). Held 31 Jan. to 5 Feb. 1977 at Lembaga Kimia Nasional LIPI, Bandung, Indonesia. [Ind]*

1467. MacNaughton, Nancy; Castro, Roberto. 1977. Procesamiento de soya en Honduras [Soybean processing in Honduras]. Tegucigalpa, Honduras: Secretaria de Recursos Naturales, Dirección de Planificación Sectorial, Departamento de Proyectos. iii + 69 leaves. Feb. Illust. 28 cm. [37 ref. Spa]

• ***Summary:*** Contents: Summary and conclusions. 1. Introduction. 2. Antecedents: Work conducted (in the rest of the world {USA, Dr. Harry Miller in Shanghai}, China, Philippines, Rhodesia, Sierra Leone, Mauritania, Ethiopia, Ruanda, Nigeria, Nepal, Sri Lanka, Brazil, Bolivia & Maisoy, Paraguay, Chile, Ecuador {Meals for Millions}), in Mexico and Central America ({INCAP in Panama, Dr. Steven Youngberg, Guatemala, Belize, Costa Rica, Nicaragua}, in Honduras), the role of soya in human nutrition. 3. The project: Objectives, goals, development of the study (processing of soymilk {in the home, at the level of an organized group, at the semi-industrial level}, processing of other derivatives of soya / soyfoods {Queso de soya / tofu, harina de soya / soy flour, Brady Crop

Cooker}, investments required {in the home, at the level of an organized group, at the semi-industrial level}). 4. Conclusions and recommendations: Conclusions. Recommendations. Bibliographic references (leaves 63-65). Appendix: Nutritional aspects of soya.

Figures show: (1) Flow diagram, with equipment, for the production of Vital soymilk. (2-3) Flow chart for the processing of full-fat soy flour by a simple village process. (4) Flow chart for the processing of full-fat soy flour to make soymilk. (5) Flow chart: Traditional process for the production of soymilk. (6) Flow chart: Process for the production of soymilk on the level of organized groups of farmers; INTSOY process. (7) Construction of a sock filter (INTSOY). (8) Flow chart: Process for the production of soymilk using the Unidad Portatil miller. (9) Flow chart: Process for the production of soymilk [with coco] used in the soymilk factory of Stephen Youngberg, in Peña Blanca, Honduras. Note: Dr. Youngberg is a Seventh-day Adventist. (10) Three flow diagrams: Process for the production of whole soy flour in the home–simple, toasted, and blanched. (11) Koehring Brady 206 Crop Cooker; 2-page brochure insert. (12) Koehring Brady Extruder Cooker; 2-page brochure insert.

Tables show: (1) Equipment needed for processing defatted soy flour; capacity 136 kg (300 lbs.) of soy flour in 8 hours of operation. (2) Characteristics and nutritional composition of soy beverage after filtration. (3) Initial investment in equipment used in making soymilk at the factory of Dr. Stephen Youngberg, in Peña Blanca, Honduras. (4) Cost estimates for the production of soymilk as made at the factory of Dr. Stephen Youngberg, in Peña Blanca, Honduras (in Lps. = lempiras). (5) Equipment and costs of the proposed Maisoy project in Honduras.

Page 20: Work with soy in Africa is relatively recent if compared with early recorded work with soy in Asia. Many of the developing African nations recognize the nutritional needs of their population and have started to experiment with the soybean and soy products. Soybean variety trials have been conducted in the Ivory Coast, Rhodesia, Sierra Leone, and Mauritania. Ethiopia has incorporated soy flour and soybeans into traditional dishes. Ruanda and Nigeria have introduced soybean cultivation technology and local consumption, on account of the severe malnutrition that exists in those countries. Nigeria is producing soybeans for export."

Note: Looking at endnote 5 in this bibliography, which cites the source of this information about soy in Africa, it seems quite clear that the word "Mauritania" was accidentally and incorrectly substituted for the word "Mauritius" in the "Country Reports" (see p. 218 of these Reports).

Page 20: In Honduras. The Ministry of Natural Resources, in cooperation with other organizations, has conducted soybean cultivation / production trials in selected areas in Honduras. In Comayagua, the company named Compañía Mejores Alimentos [Best Foods Company] initiated commercial soybean production within the last few years. Small projects of soybean production and consumption are prospering in communities in the following areas: Sonaguera, Colón; Tela, Atlántida; Buena Fé, Santa Bárbara; Las Animas, El Paraíso; Olanchito, Yoro y Barrancho, Choluteca.

The goal of these projects is to introduce soya as a nutritional supplement in the local diet. These projects are carried out within homemaker's clubs, schools, child dining halls, and various communities, with the support of CARE, CARITAS, The National Board of Social Comfort, like our communities and local agronomics. The largest area for cultivating soybeans is five blocks and the smallest is a quarter block. The majority of these projects can be found in the first stages of experimentation but the participants foresee good results. These small scale projects are important to note because they consist of cooperative efforts and are self-sufficient. On the other hand, the participants will manage their time and labor, and will be twice as motivated to incorporate soy into their daily menus. Address: Honduras.

1468. Muchtadi, Dedi; Rahmat, Ansori; Jenie, Benny S.L.; Bunasor, Tati N.; Oskandar, Rosalie. 1977. Pengaruh varietas kedelai, bahan perendam dan lama perendaman, serta inokulum yang digunakan terhadap mutu tempe [Effects of using different soybean varieties, soaking agents, soaking times, and inocula on the quality of tempeh]. Paper presented at Lokakarya Bahan Pangan Berprotein Tinggi (Conference on High Protein Food). 16 p. Held 22-24 Feb. 1977 at Bandung, Indonesia. [Ind]*

1469. Tanuwidjaja, Lindayati. 1977. Pengaruh kadar minyak dan kadar air pada fermentasi tepung kedelai [Effects of oil content and water content on soy flour fermentation]. Paper presented at Lokakarya Bahan Pangan Berprotein Tinggi (Conference on High Protein Foods). 21 p. Held 22-24 Feb. 1977 at Bandung, Indonesia. [Ind]*
• ***Summary:*** Discusses soy flour tempeh.

1470. Shurtleff, William. 1977. Re: Bali Foods becoming a commercial supplier of tempeh starter culture. Letter to Mr. Henoch Khoe at Bali Foods, Baldwin Park (Los Angeles area), California 91706, March 6. 1 p.
• ***Summary:*** "I am writing concerning a business proposal... It concerns the possibility of Bali Foods becoming a supplier and producer of *Rhizopus oligosporus,* the starter or inoculum that could be used by people around North America who wish to make their own tempeh. At present there is a great demand for this starter and not one single commercial supplier."

According to a letter from Dr. H.L. Wang of the USDA Northern Regional Research Laboratory in Peoria, Illinois, they are now receiving an average of 30 requests for tempeh starter daily, and have been during the past 3 months. Address: New-Age Foods Study Center, c/o Aoyagi, 278-28 Higashi Oizumi, Nerima-ku, Tokyo 177, Japan. Phone: (03) 925-4974.

1471. Hansen, Barbara. 1977. Cookery of the Spice Islands: Sumatra native instructs. *Los Angeles Times.* March 24. p. J1, J6.

• ***Summary:*** Until now it has been hard to learn Indonesian cookery, unless you have an Indonesian friend, or visit the country itself, or eat extensively in Holland, which has an Indonesian restaurant in almost every town. The Dutch ruled Indonesia for about 365 years, from about 1585 to 1950.

The best way is to learn first-hand. This is now possible in the Los Angeles area since Danny Unger is teaching a series of classes in Pasadena. He was born in Bukit Tinggi on the Island of Sumatra.

The first lesson focused on sate [pronounced sah-TAY] (grilled cubes of meat on skewers), the Indonesian dish that is probably best known outside that country. "The peanut sauce that is traditionally served with sate introduced to the class such specialized ingredients as terasi, a pungent fish condiment; sambal oelek, a paste of hot red chilies and kecap (pronounced 'ketjap'), the sweetened Indonesian soy sauce."

A recipe titled Peanut sauce for gado gado calls for "2 tablespoons kecap (Indonesian soy sauce)."

A note at the end of the article reads: "Terasi, galanga, sambal oelek and kecap are available in Dutch import shops and in Oriental markets that stock foods from Southeast Asia."

A large photo shows Danny Unger preparing gado gado with members of his cooking class.

1472. Iso, James. 1977. Southeast Asia–emerging growth market for soybeans. *Foreign Agriculture.* April 11. p. 2-4.

• ***Summary:*** With rising incomes and changing eating habits whetting their appetite for meat and quality protein foods, four nations of Southeast Asia–the Philippines, Thailand, Malaysia, and Singapore–are turning to the world market for more livestock feed ingredients. Brazil–by gearing up its export program–has recently gained a substantial foothold in these markets. And soybeans and soybean products also have come from Asian suppliers like the People's Republic of China (PRC), Indonesia, and even Japan, the latter exporting soybean meal crushed from U.S. soybeans. Philippine imports of soybean meal in recent years have varied between 50,000 and 70,000 tons a year. The Philippines also is a viable market for soy proteins for food, thanks to the presence there of three major U.S. meatpackers. Some 50% of the processed meat produced by these firms has contained soy protein since the product's introduction into the Philippines in 1969. Ground red meat containing 20% soy protein enjoys good consumer acceptance. Owing to the large Chinese population in the Philippines, food soybean consumption already is significant. Although domestic soybeans make up the major supply for traditional foods, such as bean curds [tofu] and soy sauce, some 500-600 tons of these beans must be imported each month.

Thai soybean production has yet to make much headway. Thailand's climatic and soil conditions apparently have not been conducive to expansion, despite attempts by local growers and some Japanese interests to establish a large-scale industry in the highlands. In 1976, the country produced about 155,000 tons of soybeans, of which 20,000 tons were exported and the rest either used domestically for food or crushed. This year, if the Government approves, a multimillion-dollar soy protein plant will be constructed with the possibility of producing 10,000 tons of a soy infant food annually and 2,000 tons of meat analogue. The Institute of Feed Research and Product Development–a private Government-backed research organization affiliated with Kasetsart University–has spearheaded textured soy protein (TSP) and soy flour research. Malaysia is mainly noted for its huge and rapidly growing production of palm oil.

Although its population of 2.25 million is dwarfed by that of the rest of Southeast Asia, Singapore plays a disproportionately large role in the region's trade. This is because it is a major transshipment port for the region–and for Malaysia in particular. Most of the imported soybeans are crushed, although significant volumes of beans also are used in producing traditional soy foods for the large Chinese population. The only major soybean crusher outside of the Philippines is located in Singapore, an operation which the management anticipates will crush 100,000 tons of soybeans in calendar 1977. One firm is using soy proteins in canned foods, soy sauce, soft drinks, combined milk, and other products. Address: Foreign Market Development, Oilseeds and Products, Foreign Agricultural Service.

1473. Sudarmadji, Slamet; Markakis, Pericles. 1977. The phytate and phytase of soybean tempeh. *J. of the Science of Food and Agriculture (London)* 28(4):381-83. April. [13 ref]

• ***Summary:*** In the process of making tempeh, the "phytic acid content of soybeans was reduced by about one-third as a result of this fermentation, while an equivalent amount of phosphate was released in the tempeh. The reduction of phytic acid was due to phytase elaborated by the mould of the fermentation. The pH optimum of this enzyme was 5.6."

Address: Dep. of Food Science and Human Nutrition, Michigan State Univ., East Lansing, Michigan 48824.

1474. Ali, S.I. 1977. Flora of West Pakistan. No. 100. Papilionaceae. Karachi, Pakistan: Department of Botany, University of Karachi. 390 p. See p. 255, 257. [10 ref]
• ***Summary:*** Contains a botanical description of the genus *Glycine* and of the cultivated soybean, *Glycine max.* "Distribution: Pakistan, cultivated sparingly in plains; India; Sikkim; Nepal; Burma; E. Asia, a native of China."

Note: No early citations for the soybean in West Pakistan are given. Address: Dep. of Botany, Univ. of Karachi, Karachi [Pakistan].

1475. *INTSOY Newsletter (Urbana, Illinois).*1977. Asia-Oceania soybean rust workshop. No. 11. p. 1. May.
• ***Summary:*** "Soybean rust poses a serious economic threat to soybean production areas, particularly in the Eastern Hemisphere [Asia] A systematic, coordinated research program is urgently needed for many of the Asian and Oceanian countries where the disease occurs. The first workshop on soybean rust was convened in Manila, the Philippines, from Feb. 27 through March 4, 1977, to organize such a program. The workshop was cosponsored by the Asian Vegetable Research and Development Center (AVRDC), the Philippine Council for Agriculture and Resources Research (PCARR), and INTSOY."

More than 30 participants attended. Five program recommendations are given.

1476. Lanagan, K.J. 1977. The palm oil industry in West Malaysia. *USDA Foreign Agricultural Service.* FAS M-276. 25 p. June.

1477. Yong, F.M.; Wood, B.J.B. 1977. Biochemical changes in experimental soy sauce moromi. *J. of Food Technology* 12(3):263-273. June. [7 ref]
Address: 1. Presently: 294F Whampoa Dr., Block 83, Singapore 12; 2. Dep. of Applied Microbiology, Univ. of Strathclyde, Royal College Building, George St., Glasgow G1 1XW, Scotland.

1478. Mulyadi, Tri Suharni; Sutarto, E.E. Sutariningsih; Sidemen, I.G.P. Badjra. 1977. Protein terlarut pada tempe kedelai yang dicampur dengan bahan berkarbohidrat [Soluble protein in soy tempeh mixed with carbohydrate-containing food]. In: Collected manuscripts (Kumpulan Naskah) from Seminar Biologi V. Held 7-9 July 1977 at Malang, Indonesia. [Ind]*

1479. Timotius, K.H. 1977. *Rhizopus* species pertumbuhanya pada berbagai media alami [*Rhizopus* species: Their growth on various natural media]. Presented at Seminar Biologi V. Held 7-9 July 1977 at Malang, Indonesia. [Ind]*

1480. *ASEAN Protein Project Newsletter.*1977. Serial/ periodical. Bangkok, Thailand: Office of the Chairman of the ASEAN Sub-Committee on Protein. No. 1, Aug. 1977. Editor: Prof. Amara Bhumiratana.
• ***Summary:*** The 5 ASEAN nations are Indonesia, Malaysia, Philippines, Singapore, and Thailand. Address: Inst. of Food Research and Product Development, Kasetsart Univ., Bangkok, Thailand.

1481. Tontsirin, K.; Aranyskananda, A.; Valyasevi, A. 1977. Metabolic evaluation of Kasset Infant Food. Report of the ASEAN Workshop on Metabolic Evaluation. Held 22-28 Aug. 1977 at Bangkok, Thailand. *

1482. Escueta, E.E.; Banzon, Julian. 1977. Preextraction boiling of soybeans as a pretreatment in soymilk preparation. *Philippine Agriculturist* 61(3&4):104-14. Aug/ Sept. [27 ref]
Address: 1. Instructor; 2. Emeritus Prof. Both: Dep. of Food Science & Technology, College of Agriculture, Univ. of the Philippines at Los Baños, College, Laguna, Philippines.

1483. Sastroamidjojo, M.S.A. 1977. Re: Design of a wet-process bean dehuller for making tempeh. Letter to William Shurtleff at New-Age Foods Study Center, Oct. 11–in reply to inquiry. 2 p.
• ***Summary:*** Discusses the principles of the design. Address: Dr., Solar Energy Research Centre, Faculty of Science, Gadjah Mada Univ., Sekip III, Yogyakarta, Indonesia.

1484. Hafner, Fred. 1977. A tribute to Dr. Henry Borsook–An account of a man, a product, and a project. Unpublished manuscript. 6 p. Oct. 14. Unpublished manuscript.
• ***Summary:*** In 1942 (during World War II) when Clifford Clinton need help in developing a nutritious food from non-rationed materials to feed non-paying "customers" in his cafeteria on Olive Street in downtown Los Angeles, he contacted Dr. Henry Borsook, a biochemist at Cal-Tech. Mr. Clinton offered Dr. Borsook a monetary grant if he would undertake the project; Dr. Borsook accepted. Borsook used partially defatted soy grits or soy flour plus essential vitamins and minerals as the basic formula, then added salt, spices, and hydrolyzed vegetable protein. "The resulting product when mixed with water and heated in an oven formed a high protein, nutritious and tasty mush. This product was served from the steam table of the Clifton Cafeteria to those who had no money but were hungry and deserving of care. The product was well received by the destitute vagrants who looked to Mr. Clinton for a "hand out"; the developmental work of Dr. Borsook had met the need of the emergency created by the war.

"Mr. Clinton was able to contract with Gentry, Inc. of Oxnard, California, to manufacture the product; Gentry was selected because they had available the spices needed for the product, as well as the blending facilities."

In 1946 when World War II came to an end the Meals for Millions (MFM) Foundation was born and the Borsook formula, renamed MPF, became the key component of a program to fight hunger throughout the world. Among the many fine people associated with the Foundation were Dr. Borsook, Clifford Clinton, Edmond Clinton, Florence Rose, Ernest Chamberlain, Hazel Hopkins, Bea Azedo, Reg Helfferich, Elsie Russell, Lloyd Bellisime, Gerlad Miller, Col. "Sandy" Saunders, Larry Lyvman, Neal O'Donnell, Mark Sterner, Don Ebright and Peter Davies to name a few.

In 1958 General Mills relieved Gentry as the manufacturer of MPF. Eventually partially defatted soy grits were replaced by fully defatted soy grits, giving the product a higher protein content. And the following essential vitamins were added to the formula: Vitamin C, vitamin E, vitamin B-6, and vitamin 12.

Dr. Albert Schweitzer [who died in 1965] used MPF extensively at his hospital in Lambarene, Gabon. Dr. Tom Dooley used MPF in his MEDICO hospital in Laos. 80,000 lb of MPF were used in the Biafran war in Nigeria. During the prisoner exchange with Cuba's Castro in the mid-1960s, over 800,000 lb of MPF were shipped to Cuba and converted into MPF sausage. After earthquakes in Morocco, Turkey, and Central and South America, MPF was donated in time to relieve severe cases of protein shortage. In 1960 it was flown to needy orphanages in Morocco.

1485. Ahmad, Ibrahim H.J. 1977. Utilization of soybean milk in the production of "tairu" [or taire, a Malaysian yogurt-like product]. Paper presented at Symposium on Indigenous Fermented Foods, Bangkok, Thailand. Summarized in K.H. Steinkraus, ed. 1983. Handbook of Indigenous Fermented Foods. New York: Marcel Dekker, Inc. ix + 671 p. See p. 260-66.
• ***Summary:*** Fermented soymilk is popularly known as "tairu" in Malaysia. The author gives a table comparing the nutritional composition of tairu made from soy milk and from cow's milk. Soy milk tairu contains more protein (3.6 vs. 2.0%), less fat (1.5 vs. 2.9%), and slightly less calories (49.1 vs. 50.1%), but much less calcium (95.0 mg vs. 280 mg) than tairu made from cow's milk. Address: Product R&D, Kumpulan Fima Berhad, Tingkat 3 and 4 Blok Menara Besar, Wisma MCIS, Jalan Barat, Petaling Jaya, Selangor, Malaysia.

1486. Ford, R.E.; Sinclair, J.B. eds. 1977. Rust of soybean: The problem and research needs. *INTSOY Series* No. 12. x + 110 p. Nov. Report of a workshop held Feb. 28 to March 4, 1977 in Manila, the Philippines (College of Agric., Univ. of Illinois at Urbana-Champaign). [167 ref]
• ***Summary:*** Workshop sponsored by the Government of the Philippines, INTSOY, AVRDC, PCARR. Address: College of Agriculture, Univ. of Illinois, Urbana-Champaign.

1487. Gandjar, I. 1977. Tempe gembus [okara tempeh]. Paper presented at Symposium on Indigenous Fermented Foods, Bangkok, Thailand. Summarized in K.H. Steinkraus, ed. 1983. Handbook of Indigenous Fermented Foods. New York: Marcel Dekker, Inc. ix + 671 p. See p. 48-50.
• ***Summary:*** During World War II, when food was scarce, the people of Java used okara, the refuse of tahoo / tahu [tofu] factories, to make an acceptable, low-cost tempe. Today this kind of tempeh can be found in every market in Central and East Java, sold at a price that low-income people can afford. It is consumed (like most regular tempe) as a side dish for rice. The traditional fermentation, which is described, takes 2 days. The laboratory process is described in more detail. Address: Dep. of Biology, Faculty of Mathematics and Natural Sciences, Univ. of Indonesia, Jakarta.

1488. Ilag, Lina L. 1977. Studies on the biology of the soybean rust fungus in the Philippines. *INTSOY Series* No. 12. p. 16-17. R.E. Ford and J.B. Sinclair, eds. Rust of the Soybean. [3 ref]
Address: Assoc. Prof., Dep. of Plant Pathology, Univ. of the Philippines at Los Baños, College, Laguna.

1489. Ismail, M.S. 1977. Accelerated fermentation of fish-soy paste and fish-soy sauce by using *Aspergillus oryzae* NRRL 1989. Paper presented at Symposium on Indigenous Fermented Foods, Bangkok, Thailand. Summarized in K.H. Steinkraus, ed. 1983. Handbook of Indigenous Fermented Foods. New York: Marcel Dekker, Inc. ix + 671 p. See p. 526-30.
Address: Dep. of Food Science, Univ. of Agriculture, P.O. Box 203, Sungai Besi, Selangor, Malaysia.

1490. Merican, Z. 1977. Malaysian soy sauce (kicap). Paper presented at Symposium on Indigenous Fermented Foods, Bangkok, Thailand. Summarized in K.H. Steinkraus, ed. 1983. Handbook of Indigenous Fermented Foods. New York: Marcel Dekker, Inc. ix + 671 p. See p. 456-61.
Address: Agricultural Products Utilization Div., MARDI, Serang, Selangor, Malaysia.

1491. Noparatnaraporn, N.; Techa-akrakul, C.; Silapanapaporn, S. 1977. Factors affecting fermentation and vitamin B-12 content in tempeh and tempeh-like products. Paper presented at Symposium on Indigenous Fermented Foods, Bangkok, Thailand. Summarized in K.H. Steinkraus, ed. 1983. Handbook of Indigenous Fermented Foods. New York: Marcel Dekker, Inc. ix + 671 p. See p. 38-40. Original manuscript is 10 p. [9 ref]

Address: Dep. of Microbiology, Kasetsart Univ., Bangkok, Thailand.

1492. Ong, K.C. 1977. Malaysian soy sauce: Kicap. Paper presented at Symposium on Indigenous Fermented Foods, Bangkok, Thailand. Summarized in K.H. Steinkraus, ed. 1983. Handbook of Indigenous Fermented Foods. New York: Marcel Dekker, Inc. ix + 671 p. See p. 456-61. Address: Dep. of Botany, Universiti Malaya, Kuala Lumpur, Malaysia.

1493. Poesponegoro, M.; Tanuwidjaja, L. 1977. Indonesian soy sauce: Kecap. Paper presented at Symposium on Indigenous Fermented Foods, Bangkok, Thailand. Summarized in K.H. Steinkraus, ed. 1983. Handbook of Indigenous Fermented Foods. New York: Marcel Dekker, Inc. ix + 671 p. See p. 456-65.
Address: National Inst. for Chemistry, Jalan Cisitu-Sangkuriang, Bandung, Indonesia.

1494. Saono, S.; Brotonegoro, S.; Basuki, T.; Sastraatmadja, D.D.; Badjre, I.G.P.; Jutono, -; Gandjar, I. 1977. Indonesian kecap. Paper presented at Symposium on Indigenous Fermented Foods, Bangkok, Thailand. Summarized in K.H. Steinkraus, ed. 1983. Handbook of Indigenous Fermented Foods. New York: Marcel Dekker, Inc. ix + 671 p. See p. 461-65.
Address: Treub Lab., National Biological Inst., Bogor, Indonesia.

1495. Saono, S.; Brotonegoro, S.; Basuki, T.; Sastraatmadja, D.D.; Jutono, -; Gandjar, I. 1977. Indonesian tauco. Paper presented at Symposium on Indigenous Fermented Foods, Bangkok, Thailand. Summarized in K.H. Steinkraus, ed. 1983. Handbook of Indigenous Fermented Foods. New York: Marcel Dekker, Inc. ix + 671 p. See p. 479-82. Address: Treub Lab., National Biological Inst., Bogor, Indonesia.

1496. Steinkraus, K.H. 1977. Philippine taosi. Paper presented at Symposium on Indigenous Fermented Foods, Bangkok, Thailand. Summarized in K.H. Steinkraus, ed. 1983. Handbook of Indigenous Fermented Foods. New York: Marcel Dekker, Inc. ix + 671 p. See p. 467.
• ***Summary:*** Clean soybeans. Soak overnight, preferably in running water to prevent acidification. Drain, then boil in excess water for 1 hour, drain and cool. Coat with either raw or roasted wheat flour. Inoculate with *Aspergillus oryzae* mold (the soy sauce mold). Spread inoculated soybeans on woven bamboo trays [especially and repeatedly used for this fermentation]; cover with banana leaves. Incubate in a warm place for 2-3 days, or until the soybeans are overgrown with a white mycelium. Place soybeans in a salt brine (18 gm salt dissolved in 100 ml water), bring to a boil, remove from heat and drain. The taosi is now ready to eat.

Note that there is no brine fermentation as the last step, as with most soy nuggets. Address: New York State Agric. Exp. Station, Geneva, NY 14456.

1497. Tanuwidjaja, Lindayati. 1977. Utilization of defatted soybean flour in tempeh fermentation. Paper presented at Symposium on Indigenous Fermented Foods, Bangkok, Thailand. Summarized in K.H. Steinkraus, ed. 1983. Handbook of Indigenous Fermented Foods. New York: Marcel Dekker, Inc. ix + 671 p. See p. 64-66.
• ***Summary:*** The highest quality tempe is made from whole dehulled soybeans. Lower qualities of tempe are made by adding varying amounts of waste products, such as the waste from tapioca flour processing *(onggok),* young papaya, okara (left over after making tofu or soymilk), and grated coconut after the milk is pressed out. The main reason for adding these waste products is to lower the cost of the tempe. "Even though tempe is considered to be a low-cost, protein-rich food, high-quality tempe is expensive for very low income groups." Moreover, the addition of these low-protein waste products lowers the protein content and nutritional value of the tempe. Therefore the tempeh was made from low-cost, high protein defatted soy flour. The final tempe was a solid cake covered with a white mold mycelium, having typical tempe flavor and texture. Address: National Inst. of Chemistry, Bandung, Indonesia.

1498. Winarno, F.G.; Muchtadi, D.; Laksani, B.S.; Rahman, A.; Swastomo, W.; Zainuddin, D.; Santaso, S.N. 1977. Indonesian tauco. Paper presented at Symposium on Indigenous Fermented Foods, Bangkok, Thailand. Summarized in K.H. Steinkraus, ed. 1983. Handbook of Indigenous Fermented Foods. New York: Marcel Dekker, Inc. ix + 671 p. See p. 479-82.
Address: Faculty of Agricultural Engineering and Product Development, Bogor Agricultural Univ., Jalan Gunung Gede, Bogor, West Java, Indonesia.

1499. Yeoh, Q.L.; Mercian, Z. 1977. Malaysian tempeh. Paper presented at Symposium on Indigenous Fermented Foods, Bangkok, Thailand. Summarized in K.H. Steinkraus, ed. 1983. Handbook of Indigenous Fermented Foods. New York: Marcel Dekker, Inc. ix + 671 p. See p. 41-42. Original manuscript is 14 p. [7 ref]
• ***Summary:*** Tempe is made as a cottage industry in Malaysia (see Fig. 23, a tempe maker working at home with a child nearby); it is sold in markets wrapped in banana or other leaves. The initial investment is very small–a few cooking utensils, mats, and trays. The main raw material is soybeans; a little wheat flour is sometimes added. The starter / inoculum is from a previous batch of tempe along with spores present on the leaf wrappers, and is thus free of

charge. 1 kg of raw soybeans (which costs US$0,60) can be made into an estimated 42 packets (48 gm each) of tempe which are retailed at 3 packets for US$0.10. Thus a gross profit of US$0.80 can be made from each kg of soybeans processed. This does not include the cost fuel or of any banana leaves that must be purchased. Address: Agricultural Products Research Div., MARDI, Serdang, Selangor, Malaysia.

1500. Birnbaum, Alfred. 1977. Re: Report on trip to Moriguchi Kakko Shokuhin, maker of Daitokuji natto [Daitokuji soy nuggets], with color slides. Letter to William Shurtleff at New-Age Foods Study Center, Dec. 24. 1 p. Handwritten and signed.

• ***Summary:*** The name, address, and phone number of the company's two locations are written in Japanese characters (JC); see below. The company was founded 98 years ago [i.e. in about 1879]. At the first location in Kyoto, the company makes regular [sticky] large- and small-bean natto. At the second location, the company makes Daitokuji natto. Mr. Nakano (full name written in JC) has 40 years experience making various types of natto [and soy nuggets].

A brochure states that Daitokuji natto was brought from Tang (?) China by monks to Murasaki-no (JC) where it has been passed down for 650 years. The main ingredients are soybeans, barley, and salt which undergo a healthful, natural process for approximately 3 months, and because of the process later will not spoil. Daitokuji natto is said to have a subtle flavor (JC, i.e. a flavor such that one cannot say exactly from where it comes)... a flavor reminiscent of Zen. Good with tea, extra special in *o-chazuke*.

Daitokuji natto is a salt-natto rather than a sticky *(nebari)* natto. It keeps for 1½ years. Largely made as a tourist product.

The plant in Shiga prefecture makes approximately 1,200 kg/year of Daitokuji natto. The plant was moved to Shiga 5 years ago to provide the space needed for sun-drying the product on a large scale. A single vat holds approximately 25 kg.

Ingredients: Soybeans 15 kg (large beans are preferred because the ratio of contained seed to skin is larger and the beans are sweeter). Barley flour 10-15 kg. Rice koji 3-5 gm (1 handful). Salt 1½ kg.

Procedure: 1. Steam beans as for regular natto until completely soft. 2. Roast barley flour, add together with koji and mix thoroughly. 3. Ferment at approximately 33ºC (30-35ºC) for about 2 days in incubation room as for koji. Note: Higher temperatures used for sticky natto would turn the beans black. 4. Add 18% salt solution–1½ kg salt dissolved in 20 liters water; mix and let stand for about 3 days. 5. Move the vats outdoors to sun-dry (35-40ºC) for approximately 3 months; cover the vats at night or during bad weather.

Summer months are preferred for making Daitokuji natto because of the need for sun-drying–usually started in mid-July to August.

Daitokuji natto is also made in traditional wooden vats on a semi-small scale at Ikkyuji temple south of Kyoto (address in JC and phone number given) as a product for tourists.

The following slides in a numbered set, taken by Alfred, show how Daitokuji natto [Daitokuji soy nuggets] are presently made at Ikkyuji: 25. Five-foot diameter wooden vats in which Daitokuji natto are fermenting, outdoors. The wooden lids are not weighted. 26. The process is very similar to that for Hamanatto soy nuggets, except that unroasted barley flour is used, the brine fermentation lasts only 3 days, no gingerroot or sansho seeds are added, and the soybean koji is mashed than reshaped into soybean-sized balls. 27. At Ikkyuji all fermentation takes place outdoors in a lovely courtyard, surrounded by tile-roofed buildings. 28. Two men standing by the two wooden vats, which may be left. 29. A view looking down into a vat of Daitokuji natto, from which the brine has been removed. We like both Hamanatto soy nuggets and Daitokuji soy nuggets, but we prefer the former, since the latter have a sharper, slightly saltier flavor. 30. The Chinese ancestor of both these products is called *douchi*, which we see here next to the bag in which it is sold. 31. In the Philippines it is called *tao-si*, and is sold in a brining sauce. Here we see it being ladled out of glass jar in a Philippine market. Address: Tama-sô No. 1, Inokashira 1-28-30, Mitaka-shi, Tokyo 181, Japan. Phone: 0422-47-7130.

1501. Dwidjoseputro, Dakimah. 1977. Re: The process for making tempeh in Malang. Letter to William Shurtleff at New-Age Foods Study Center, Dec. 26–in reply to inquiry. 2 p.

• ***Summary:*** Describes the process. Address: Badan Penelitian dan Pengembangan IKIP Malang, Jalan Semarang No. 5, Malang, Indonesia. Phone: 5296.

1502. Hansen, Barbara. 1977. Cooking class proves its prowess: Indonesian style. *Los Angeles Times*. Dec. 29. p. H1, H14.

• ***Summary:*** A special class and rijsttafel buffet ended the series of Indonesian cooking classes taught by Danny Unger (with help from his wife, Gerdy) in Pasadena. more than 200 guests sampled the dishes, which were of excellent quality, prepared mostly by the students in the class.

The many dishes included "sayur lodeh, a vegetable and bean curd stew;..."

Three recipes are given including: Babi kecap (Soy sauce pork, with 2 tablespoons kecap). Dendeng lambok (Simmered beef, with "3 tablespoons kecap (Indonesian soy sauce")). Elsewhere in the article, kecap is twice described as "sweet soy sauce."

A photo shows Daniel Ungerer, wearing a batik scarf, as he presides over the buffet.

1503. Saono, S.; Brotonegoro, S.; Abdulkadir, S.; Basuki, T.; Jutono, -; Badjra, I.G.P. 1977. Microbiological studies of tempe, kecap, and taoco. II. Qualitative amylolytic and proteolytic activities of the isolates from various products from west Java. Progress Report Subproject III.b. ASEAN Project for Soybean and Low-Cost High Protein Foods. Jan-Dec. 1977. 8 p. [5 ref]
• ***Summary:*** An analysis is given of the types of bacteria, yeasts, and molds found in tempe, kecap, and taoco. Scientific names of these microorganisms are not given. For example, in tempeh, molds consistently gave the highest number of viable cultures on any of the test media employed, followed by yeasts and bacteria in that order. Address: 1-4. Treub Lab., the National Biological Inst., Bogor; 5-6. Faculty of Agriculture, Gadjah Mada Univ., Yogyakarta.

1504. Shurtleff, William; Aoyagi, Akiko. 1977. Report on trip to Indonesia to study tempeh (May 10–June 7), and notes from GIAM V–SIFF Symposium in Bangkok, Thailand (Nov. 16-29). Lafayette, California: New-Age Foods Study Center. 135 p. Unpublished manuscript. Illust. No index. 28 cm. [12 ref]
• ***Summary:*** 1. Shurtleff's notes on Indonesian trip (56 p.). 2. Tempeh summaries and questions (27 p.). 3. Aoyagi's notes from recipe development sessions with Indonesian cooks (30 p. Contains many recipes). 4. Shurtleff's notes from Bangkok symposium on Global Impacts of Applied Microbiology and Symposium on Indigenous Fermented Foods (22 p.). Address: 790 Los Palos Manor, Lafayette, California 94549. Phone: 283-3161.

1505. Abdul Rahman, Hussein. 1977. Production and comparative study of milk-based yoghurts (flavoured and unflavoured) and soybean-based yoghurt. Serdang. (Project Paper). Unpublished. *

1506. Coombs, C.W.; Billings, C.J.; Porter, J.E. 1977. The effect of yellow split peas *(Pisum sativum)* and other pulses on the productivity of certain strains of *Sitophilus oryzae* Coleoptera Curculionidae and the ability of other strains to breed thereon. *J. of Stored Products Research* 13(2):53-58. *

1507. Kolb, H. 1977. Herkoemmliche Verfahren zur Nutzung von Soja im asiatischen Raum [Traditional processes for using soya in Asia]. *Alimenta* 17:41-45. [35 ref. Ger]
• ***Summary:*** Discusses each of the following foods briefly and gives sources of further information: Kinako (roasted soy flour), soymilk, yuba, tofu, kori tofu (dried-frozen tofu), aburaage, namaage, kinugoshi tofu, sufu, soy cheese (Western style), soy yogurt, ganmodoki, natto, Hamanatto, koji, tempeh, miso, tao-tjo [Indonesian-style miso], kochu-jang, shoyu, and ketjap. Address: Institut fuer Lebensmitteltechnologie, Frucht- und Gemuesetechnologie, Technische Universitaet Berlin, Koenigin-Luise-Strasse 27, D-1000 Berlin 33, West Germany.

1508. Loegito, Mas. 1977. Aflatoxins in tempeh. Presented at Symposium on Indigenous Fermented Foods, Bangkok, Thailand. *

1509. Maneephong, C.; Nilapun, S. 1977. Heritability and correlation of agronomic characters in soybeans. In: Third International Congress of the Society for the Advancement of Breeding Researches in Asia and Oceania (SABRAO) in association with Australian Plant Breeding Conference Canberra, Australia. 3 vols. Canberra, A.C.T.: SABRAO. See p. 22-25. Held Feb. 22-28. *
• ***Summary:*** Vol. 1. Plant breeding papers. Vol. 2. Plant breeding papers. Vol. 3. Animal breeding papers.

SABRAO has strong links with the International Rice Research Institute (IRRI), Manila, Philippines.

1510. Manik, R.; Mintardjo, K.; Adisukresno, S. 1977. Potential protein sources of supplementary feeds formulated for shrimps and prawns in Jepara. *Bulletin of the Brackishwater Aquaculture Development Center, Jepara [Java, Indonesia]* 3(1-2):223-26. [Eng; ind]*
• ***Summary:*** Some 26 raw materials collected in Jepara, Java, Indonesia, were analyzed. Some local materials, incl. shrimp head meal, fish meal, peanut cake, and soybean waste, contained high levels of protein. These were good ingredients for supplementary feeds and formulated feeds for shrimp and prawns [both crustaceans]. Address: Brackishwater Aquaculture Development Center, Jepara [Java, Indonesia].

1511. Pascual, F.; Bandonil, L.; Dy, V. 1977. Preliminary chemical and physical evaluation of some formulated feeds for *Penaeus monodon* [giant tiger prawn] (Abstract). *Quarterly Research Report, Aquaculture Dep., Southeast Asian Fisheries Development Center (Philippines)* No. 1. p. 29-31. *
• ***Summary:*** A total of 28 feed combinations was developed for *P. monodon*. Fish meal, shrimp head meal, squid head meal, Ascetes spp., rice bran, and soybean cake were used as primary ingredients in these feeds. A commercial vitamin premix was added to the dry ingredients. Gelatinized corn starch and wheat flour were used as binders. The mixture was extruded then dried. They were analyzed for nutritional composition and water stability. When a pellet disintegrates easily, water pollution occurs and chances for the shrimp to

feed are minimized. Thus, the search for a compact, stable feed pellet must be continued.

1512. Pascual, F.; Bandonil, L. 1977. Preliminary biological evaluation of some formulated feeds for *Penaeus monodon* [giant tiger prawn] (Abstract). *Quarterly Research Report, Aquaculture Dep., Southeast Asian Fisheries Development Center (Philippines)* No. 1. p. 32-33. *
• ***Summary:*** Soybean cake is used as a feed and fertilizer in fishponds. A mixture of soybean cake and rice bran was made into pellets and used as a feed for these crustaceans when they were 127 days (about 4 months) old.

1513. Pusat Penelitian dan Pengembangan Gizi Unit Diponegoro (Committee on Nutritional Research and Deverlopment Unit at Diponegoro). 1977. ASEAN Project on soybean and protein rich foods. Jakarta: Badan Penelitian dan Pengembangan Gizi Unit Diponegoro. Research paper. *
Address: Jakarta, Indonesia.

1514. Sintha, -. 1977. Pembuatan kecap decara hidrolisa [Making Indonesian soy sauce using hydrolysis]. Bandung, Indonesia: Departemen Biologi, I.T.B. 21 p. [Ind]*
• ***Summary:*** A report of practical work.

1515. *Teknologi Desa (Village Technology).* 1977. Tempe [Tempeh]. p. 19-23. Jakarta: Departemen Tenaga Kerja/ Sekretariat Badan Kerjasama Tenaga Sukarela Indonesia (Directorate of Human Resources Development and Extension/Secretariat of Indonesian Voluntary Labor Committee). [Ind]*
• ***Summary:*** Methods of tempeh processing, from raw material selection, soaking, boiling, packaging, and storing until maturation of the tempeh. Address: Jakarta, Indonesia.

1516. Utomo, Kamaludin; Rivai, Mien A. 1977. Faktor pemadatan dalam pembuatan tempe Malang [The solidifying factor in the preparation of Malang tempeh]. *Berita Biologi (Biology News)* 2(2):ii-iii. [Ind]*
Address: Indonesia.

1517. ADM Milling Co. 1977. The growing challenge. Shawnee Mission, KS 66207. 28 p.
• ***Summary:*** The color cover of this booklet shows the sun, low in the sky, shining behind heads of wheat growing in a field. Describes ADM's involvement in the P.L. 480 Food for Peace program and the company's product of what are called "protein cereal grain blends." Contents: Nutrition, infant survival, and family planning (The four countries adding the most people to the annual world population increase are China (13.3 million), India (12.8), Indonesia (3.4), and Brazil (2.8)). Supplemental food: A vehicle to good health and national development (P.L. 480 foods fight protein-calorie malnutrition). Deficient diet: What is a food supplement (Protein-cereal food products are ideal food supplements). Pregnancy. Lactation. Children: Their special needs. WPC-Soy. Health: Good health and the school age child. Adult health and productivity. Energy requirements by year and age. Emergencies and national disaster relief. Key nutrients: Protein, amino acids, protein content, PER and NPU for protein cereal grain blends and other protein sources. PCM: Protein calorie malnutrition, marasmus and kwashiorkor. Treatment of PCM. Micronutrients. U.S. Recommended Daily Dietary Allowances.

The back flap contains product description sheets. In Oct. 1989 there were sheets for SFCM: Soy fortified cornmeal, 12% soy-fortified wheat flour, WSB: Wheat Soy Blend, CSM: Corn Soy Milk, WPC-Soy, SFB: Soy fortified bulghur, and ICSM: Instant Corn Soy Milk. Address: Shawnee Mission, Kansas.

1518. Flora of Taiwan Committee. 1977. Flora of Taiwan. Vol. III. Angiospermae. Taipei, Taiwan: Epoch Publishing Co. 1000 p. See p. 293-98. [12 soy ref. Eng]
• ***Summary:*** There are about 10 species of Glycine distributed in Africa, Asia and Australia; five in Taiwan. Those found in Taiwan are as follows; the Chinese characters, a botanical description, and an illustration are given for each: 1. *Glycine clandestina* Wendl. (Beobacht. 54. 1798). Distributed in Australia and mainland China. Found in Taiwan in open grasslands by the seashore.

2. *Glycine javanica* L. Sp. Pl. 754. Distributed in India, Ceylon, Malaysia and Java. Cultivated in Taiwan.

3. Glycine max (L.) Merr., Interp. Herb. Amb. 274. 1917.

4. Glycine soja Sieb. & Zucc. Distributed in mainland China and Japan. Cultivated in Taiwan.

5. *Glycine tomentella* Hayata, Icon. Pl. Form. 9: 29, 1920. Distributed in southern China, the Philippines and Australia. Found in Taiwan in open fields.

1519. Gomez, Arturo A.; Zandstra, H.G. 1977. Analysis of the role of legumes in multiple cropping systems. *College of Tropical Agriculture (Univ. of Hawaii), Miscellaneous Publication* No. 145. p. 81-95. J.M. Vincent, A.S. Whitney, and J. Bose, eds. Exploiting the Legume-Rhizobium Symbiosis in Tropical Agriculture. [20 ref]
• ***Summary:*** Contents: Introduction. Potential of intensive farming (multiple cropping). Some characters of legumes: Advantages, disadvantages. Environmental requirements of selected legumes. Cropping patterns involving legumes: Legumes in rotation with rice, intercropped legumes, cropping systems involving perennial legumes, legumes in rotation with other upland annual crops."

Advantages of legumes: Most legumes are very tolerant to drought, some legumes have very short life cycle, legumes are able to fix atmospheric nitrogen, legumes have

many uses, legumes have a good market. Disadvantages: Yields of grain legumes are low, many legumes are sensitive to waterlogging, legumes are sensitive to low pH.

Soybeans are mentioned on pages 84, 86-87, 91. Address: 1. Univ. of the Philippines at Los Banos, College, Laguna, Philippines.

1520. Igata, Sadaaki. 1977. Nihon kodai kokumotsu-shi no kenkyû [Research on the ancient history of cereal crops in Japan]. Tokyo: Yoshikawa Kobunkan (Koshikawa Bunkan). p. 130-49, 170. [3 ref. Jap; eng+]

• ***Summary:*** Introduction: Soybeans seem to have originated in East- or Southeast Asia. Origin of cultivation: (1) Literature" Soybeans are mentioned in the *Kojiki.* Norinaga Motoari accepted the myth of the Five Grains and thought that soybeans and the other four grains had been cultivated since the age of the Gods. Soybeans and adzuki beans are grouped together and mentioned as "beans" in the *Nihonshoki.*

(2) Archaeological study: According to a report in the journal *Toro* (Japan Archaeology Society, p. 358), wild soybeans *(tsurumame)* were excavated from the ruins of Toro.

On pages 148-49 is a section on *Edamame* (Green vegetable soybeans), which notes that the *Engishiki* (A.D. 927) describes the offering of fresh, podded soybeans at Buddhist temples. According to Taichi Fukazawa's report, soybeans were found in a pit in Komoriyama, Senya Village, Senhoku-gun, Akita prefecture, Japan. See "The pit from which grains were excavated," by R. Moriomoto (1933).

According to Dr. Nobuo Ito of Tohoku University, the naturally carbonized layer of soybeans dates back to the 1st or second century.

According to *Nara-cho shokuseikatsu no kenkyu* [Research on the eating habits of the Nara period (A.D. 710-784) in Japan], by S. Sekine (1969, p. 30), soybeans were excavated not only from the Komoriyama ruins, but also from the Yasuda Okayama ruins in Mioka Village, Kumage-gun, Yamaguchi prefecture, Japan, and from the Iba ruins in Hamamatsu city, Shizuoka prefecture, Japan.

Mr. Yoshinori Segawa mentioned that soybeans were found in the ruins of Taguchiyama, Maikata city, Osaka *(Sankei Shinbun Morning News*, 29 Sept. 1974). In summary, archaeological evidence from the Komoriyama ruins suggests that soybeans were grown in Japan by the 1st or second century A.D.

Comparison of Korea and Japan: Soybeans were cultivated in the southern Korean peninsula along with several kinds of grains, and these were found in the ruins of an army storage house in [illegible place name], Korea. These grains and beans date back to the middle of the 7th century A.D., but the earliest known mention of soybeans in Korean literature dates from the middle of the third century A.D. The author concludes that soybean cultivation seems to have started in Japan before it began in Korea, indicating that soybeans were not imported but were probably domesticated from wild soybeans.

Soybeans also appear in the *Sankoku-shiki* (Vol. 1, No. 1; Vol. 2, No. 2., Vol. 4, No. 4, and Vol. 23, No. 1).

Mr. Matsumoto wrote *Shina ni okeru Giso oyobi Shaso, Shimin seikatsu, kochi seido, kokumotsu no meisho no kenkyu* (A study of the Giso and Shaso storage houses, and the life of the Shimin people, the cultivated field system, and the names of grains). Page 148 states that "shu" includes both soybeans and azuki beans, and page 166 states that before the 6th century, both soybeans and azuki beans were cultivated. The "Five Grains" always includes "shu."

Process of cultivation: Soybeans and azuki beans are mentioned as emergency foods used to relieve shortages in A.D. 840. (See the *Zoku Nihon Koki,* vol. 9, and the *Reishûkai,* vol. 13). Therefore soybeans must have been grown widely, since they were offered to the government in place of millet when farmers could not afford millet in difficult situations.

According to the *Nihon Sandai Jitsuroku,* vol. 14, in March of A.D. 867 Japanese farmers burned the holly mountain to grow soybeans. This seems to indicate these farmers' active attitude toward growing soybeans.

In the 8th and 9th centuries, soybeans were grown in the Omi, Tanba (or Tamba), [two areas whose characters are not recognized], Bizen, Bitchu, Bingo, Kii, Awa, Sanuki, and Iyo areas. These are mainly centered around the Inland Sea area *(Seto-naikai)* of southern Honshu (Japan's main island).

The *Engishiki* (vol. 24) states that a certain island [characters not recognized] offered 24 *to* (1 *to* = 18 liters or 4.76 gallons) of soybeans.

Note: Concerning areas mentioned above in Japan in the 8th and 9th centuries: According to a map titled "The provinces of Japan" in *A history of Japan to 1334,* by George Sansome (1958, p. 2). Omi was located by today's Lake Biwa (Japan's largest lake), northeast of Kyoto. Tanba is located in the Kyoto area. Bizen, Bitchu, and Bingo are located adjacent to and directly north of the Inland Sea. Kii occupied what is today Wakayama prefecture and part of Mie prefecture. Awa, Sanuki, and Iyo were provinces on the northern side of Shikoku island.

1521. International Rice Research Institute. 1977. Annual report for 1976. Los Banos, Laguna, Philippines. Soybeans: p. 318, 324-28, 330-32, 334-35, 350. *
Address: Los Baños, Laguna, Philippines.

1522. Jimenez, F. 1977. Performance of vegetables at Mayaguez, Puerto Rico during the rainy season–1976.

Mayaguez, Puerto Rico: Mayaguez Inst. of Tropical Agriculture. 9 p. *

• ***Summary:*** The torrential rainfalls of the Mayaguez rainy season provide excellent conditions for tests of vegetable production in the hot, humid tropics. Winged bean, peanut, soybean, and green podded bean were among the vegetables tested. Note: Available from the Agricultural Information Bank for Asia (Philippines). Address: Mayaguez Inst. of Tropical Agriculture, Mayaguez, Puerto Rico.

1523. Johns, Yohanni. 1977. Dishes from Indonesia. New metricated edition. Melbourne, Australia: Thomas Nelson (Australia) Ltd. xiv + 151 p. Illust. Index. 26 cm. 1st ed. 1971.

• ***Summary:*** The author comes from a town in Indonesia named Padang Pajang, located in the mountains of West Sumatra in an area known as Minangkabu. The society is matrilineal, so ancestral property is passed down the female line and a new husband comes to live in his wife's family's home. She married an Englishman in about 1955 and they lived in Jogjakarta (in Central Java) from 1956-1958, then in Australia since 1958.

This handsome book, packed with color photos, gives a good introduction to Indonesian cookery–though it contains a disproportionate number of recipes using meat. The excellent glossary of ingredients (p. 10-16) includes: Bean curd (incl. fried bean curd), black bean sauce or salted black beans *(tauco*, sic. Note: *tauco* is Indonesian-style miso, whereas *taosi* is salted black beans; which does she mean?), and soya sauce. Note that tempeh is not mentioned. Soy-related recipes include: Eggs in soya sauce (p. 53-54). Fried fish in black bean sauce (Tauco ikan, p. 60). Stir-fried prawns with long beans and black bean sauce (p. 71). Bean curd balls with prawns (p. 72). Braised liver in soya sauce (p. 86). Braised ox tongue in soya sauce (p. 87). Braised chicken in soya sauce (p. 90). Sambal of brown bean sauce (p. 101). Soya sauce sambal (Sambal kecap, p. 102). Fried soya bean curd with sauce (p. 125). Address: Australia.

1524. Moomaw, J.C.; Park, H.G.; Shanmugasundaram, S. 1977. The role of legumes in South and Southeast Asia. *College of Tropical Agriculture (Univ. of Hawaii), Miscellaneous Publication* No. 145. p. 155-69. J.M. Vincent, A.S. Whitney, and J. Bose, eds. Exploiting the Legume-Rhizobium Symbiosis in Tropical Agriculture. [39 ref]

• ***Summary:*** Contents: Introduction: Role of legumes in agricultural production, role of legumes in human nutrition, future role of legumes.

"People in South and Southeast Asia rely heavily on cereals and legumes for their major nutrients. FAO statistics (FAO, 1975) clearly show that protein needs are inadequately met and that vulnerable groups are suffering from both calorie and protein deficiency. At least 90 million people, mostly children, are suffering from moderate to severe malnutrition. Greater legume production is necessary to provide even the generally inadequate protein and vitamins to the 2,200 million people living in the region." Legumes are usually presented in four broad categories: food legumes, oil seeds, forage and cover crops, and miscellaneous" (p. 155).

"The role of legumes in agricultural production is small relative to that of cereals, but the role of legumes in human nutrition is more important than their relative acreage or production volume (harvested crop) indicate" (p. 158).

"Among the 13,00 species of legumes, about 20 are eaten in significant quantities by man directly as food. Soybean is easily the most important of these, especially in China, Japan, Korea, Taiwan, and Indonesia. Mungbean *(Vigna radiata),* black gram *(V. mungo),* chickpea *(Cicer arietinum),* pigeon pea *(Cajanus cajan),* lentil *(Lens esculenta),* dry beans *(Phaseolus vulgaris),* lathyrus pea *(Lathyrus sativus),* broad bean *(Vicia faba),* cowpea *(Vigna sinensis),* groundnut *(Arachis hypogaea),* and dry pea *(Pisum sativum)."*

Soybean research in Asia (AVRDC 1976) has five major priorities (see p. 165).

Tables show: (1) Area, yield and production of pulses in Asia, North America, and the world, 1961-65 and 1974. Source: FAO Production Yearbook, 1974. In Asia, area harvested and production have decreased. In North America, area harvested is unchanged but production has increased. Worldwide, area harvested and production have both decreased. (4) Soybean production cost and returns in Thailand, Philippines, and Taiwan. Source: ARDC 1976. There is a very small net return (profit) on soybeans in Thailand and Philippines, and a small loss in the Philippines. (5) Protein productivity of certain tropical food crops. Soybeans produce 9.1 kg of protein per ha per day, more than twice as much as any other crop shown in this table. No. 2 are lima beans (4.5), followed by cowpea (3.3), winged bean (3.0), peanut (2.7), and chick pea. (6) Nutritional contribution of AVRDC's six crops toward balancing a rice diet. Soybean is the best source of protein (36.8 gm per 100 gm), followed by mungbean (22.9).

Figures show: (1) Food grain yields (for cereal grains) have increased dramatically since about 1966 in developing countries as a result of the introduction of "Green Revolution" technology. Source: After Chancellor and Goss 1976. Address: AVRDC, Shanhua, Taiwan.

1525. Orr, Elizabeth. 1977. The contribution of new food mixtures to the relief of malnutrition: A second look. *Food and Nutrition (U.N.)* 3(2):2-10. [4 ref]

• ***Summary:*** This is an update of the 1972 Tropical Products Institute study. A table lists products by continent and country, and categorizes them as exploratory stage, production terminated, production irregular/position not

known, and in regular production, each with its year of introduction. Soy products terminated include Saci (1968) in Brazil and Saridele (1957) in Indonesia.

Soy products with production irregular or position not known include Soya Products in Mexico (introduced by Conasupo in the early 1960s) and Solein (1963) in Brazil.

Soy products in regular production include Puma (1969) in Guyana, Pronutro (1962) in South Africa, Soya Products (1968) in Uganda, Vitasoy (1940) in Hong Kong, Vitabean (1952) in Malaysia and Singapore, and Soya Products (1963) in Thailand. Other soy products discussed include Superchil and Fortesan in Chile, Bienestarina in Colombia, Incaparina in Guatemala, Maisoy in Bolivia, Leche Avena in Ecuador, Nutri Nugget, Protesnac, Protein Plus, Shaktiahar, and Paushtikahar (all from Soya Production and Research Assoc., Bareilly) in India, and Thriposha in Sri Lanka. Address: Head, Marketing and Industrial Economics Dep., Tropical Products Inst., London.

1526. Pontecorvo, A.J. 1977. Development of appropriate technology for extending the shelf life of soy cheese (tofu) in tropical areas. MSc thesis, Cornell University. 136 p. [130+ ref]*
Address: Cornell Univ., Ithaca, New York.

1527. Scott, Gavin. 1977. Hot pursuit. New York, NY: St. Martin's Press. 193 p. See Chap. 3, p. 26. 22 cm.
• ***Summary:*** Arriving by airplane in Singapore, which was like stepping into an oven and onto another planet, he walked "down street after street, drinking glass after glass of coconut milk, freshly-squeezed orange juice, mango juice, soya bean milk bought from little carts at every corner." Address: London, England.

1528. *State of Brunei, Annual Report.* 1977. Production: Agriculture. 507 p. See p. 129, 141, 145-46. [Eng]
• ***Summary:*** In Chapter 7, "Production," in the section on "Agriculture" (p. 107-63), a subsection on "Vegetables–Introductions" (p. 128-29) states: "The culinary soybean Early Green has proved consistently successful as well as being very popular gastronomically. It is normally picked young [when green] and cooked in the pod. Owing to the bigger seed size, yield of dried seed have been heavier (2500-3000 lbs/acre) than Chippewa, a non-culinary type." The subsection on "Plant Pathology" states that "In soyabean, anthracnose *(Colletotrichum lindemuthianum)* was found but was not serious." Page 145-46 list various diseases were found on the soyabean.

Letter from Dr. Thean Soo "Bobby" Tee, Plant Breeder, Agriculture Headquarters, Dep. of Agriculture, Bandar Seri Begawan 2059, Brunei Darussalam. 1996. Oct. 17. He will try to find an earlier document than that by C.N. Williams concerning soybeans in Brunei. "I am afraid it will take some effort. Brunei has changed since 1975. Agriculture, though still important, has been oriented towards horticultural crops to meet domestic demand of the urban population. Labour intensive crops are no longer planted commercially. I will have to find some time to look in the archives. Syahril Zanan Syahab was cited in C.N. Williams' paper. This could be the earlier work of C.N. Williams and Syahril Z. Syahab at the Faculty of Agriculture, University of Malaya at Kuala Lumpur. Our records do not have a researcher by the name of Syahril Z. Syahab." Note: Dr. Tee studied at the University of California at Davis from 1968 to 1971. Letter (fax) from Dr. Tee. 1997. Feb. 19. "My efforts to locate further information concerning soybean cultivation in Brunei Darussalam have not been successful. There were no records before C.N. Williams' paper." Address: Agronomy Section, Pejabat Pertanian, Bandar Seri Begawan, Brunei.

1529. U.S. Department of Agriculture. 1977. The annual report on activities carried out under Public Law 480, 83d Congress, as amended, during the period July 1, 1975 through September 30, 1976. Washington, DC: U.S. Government Printing Office. See table 17.
• ***Summary:*** Table 18 is titled "Title II, Public Law 480–total commodities shipped by program sponsor, fiscal year 1976." The main program sponsors and distributing agencies, listed alphabetically, are AJJDC (American-Jewish Joint Distribution Committee), CARE, CRS (Catholic Relief Service), CWS (Church World Service), LWR (Lutheran World Relief), SAWS (Seventh-day Adventist World Service), UNICEF, UNRWA (United Nations Relief and Works Agency), and WRC (World Relief Commission). All of these are Private Voluntary Organizations (PVO/PVOs), registered with USAID. The following foods containing soy protein were distributed: Soy fortified sorghum grits (SFSG), CSB (corn soya blend), CSM (corn soya mix), WSB (wheat soya blend), and small amounts of soya flour. The vegetable oil which was shipped to many countries was soybean oil; it is not recorded here.

Foods containing soy protein were distributed to the following countries or areas: Near East: Bhutan, Egypt, Gaza, Jordan, Jordan West Bank, Morocco, Tunisia, Yemen.

Latin America: Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Guyana, Haiti, Honduras, Nicaragua, Panama, Paraguay, Peru.

Africa: Benin, Botswana, Burundi, Cameroon, Cape Verde, Central African Republic, Ethiopia, Gambia, Ghana, Kenya, Lesotho, Liberia, Malagasy, Malawi, Mauritania, Mauritius, Niger, Rwanda, Senegal, Seychelles, Sierra Leone, Sudan, Tanzania, Togo, Zambia.

Asia: Bangladesh, India, Indonesia, Korea, Nepal, Pakistan, Philippines, Singapore, Sri Lanka. Address: Washington, DC. Phone: 703-875-4901 (1991).

1530. Winarno, F.G.; Ekasari, I.; Jenie, B.S.L.; Muchtadi, D.; Sulistioningsih, -; Irawati, Z.; Rahman, A. 1977. Research on tauco. Phase two. IFS research project. International Foundation for Science, Dept. of Agric. Product Technology. Bogor Agricultural University, Bogor, Indonesia. 33 p. [6 ref]
• ***Summary:*** Tauco is Indonesian-style miso. Contents: 1. The effect of starters, drying temperatures and storage time on the quality of rehydrated tauco. 2. The effects of soybean varieties and different mold species mixtures for fermentation on the quality of tauco during storage. 3. The effects of mold starters, fermentation containers and storage time on the quality of tauco. Address: Bogor, Indonesia.

1531. Yustuti, Edi Budi. 1977. Perlakuan penambahan asam laktat pada pembuatan tempe sebagai pengganti perlakuan perendaman biji kedelai [Addition of lactic acid in tempeh processing as an alternative treatment to soybean soaking]. Thesis (Skripsi), Fakultas Teknologi Pertanian Universitas Gadjah Mada, Yogyakarta, Indonesia. 26 p. [Ind]*
Address: Yogyakarta, Indonesia.

1532. Abdon, Isabel C. 1978. Soy sauce industry in the Philippines. In: ASEAN Soy Sauce Committee, ed. 1978. Report of the ASEAN Workshop on Soy Sauce Manufacturing Techniques. Singapore. 252 p. See p. 32-40. [7 ref]
Address: Food Research Div., Food and Nutrition Research Inst., National Science Development Board, Manila, Philippines.

1533. American Soybean Assoc. ed. 1978. International Soya Protein Food Conference, Proceedings. Hudson, Iowa: ASA. 136 p. Held 25-27 Jan. 1978, Republic of Singapore. No index. 29 cm. [328 ref]
• ***Summary:*** Contains 34 papers, largely about the use of modern soy protein products. Individual papers are cited separately. The "registration list" (p. 127-35) is a detailed directory of participants and the press. The eight "Exhibitors" (p. 136) were American Soybean Association (Hudson, Iowa), DeKalb County Exports Inc. (Ottawa, Illinois), Intercom News (Kansas), Japan Vegetable Protein Food Association (Tokyo), Kikkoman Shoyu Co. Ltd. (Tokyo), Ralston-Purina (St. Louis, Missouri), United Vegetable Oil Co. (Pte) Ltd. (Singapore), and Wenger International Inc. (Kansas City, Missouri). Address: Hudson, Iowa.

1534. Ang, H.G.; Kwik, W.L.; Tan, S.F.; Theng, C.Y. 1978. Development of traditional and new soy products using defatted meal. In: American Soybean Assoc., ed. 1978. International Soya Protein Food Conference, Proceedings. Hudson, Iowa: ASA. 136 p. See p. 53-58.
• ***Summary:*** Contents: Abstracts. Introduction: Non-fermented products (soymilk, soybean curd, yuba), fermented products (soy sauce, soy cheese, tempeh), others (soybean sprouts, whole bean), soymilk and soymilk powder from defatted soymeal. Results and discussions: Preparation of soymilk powder. Conclusion. Address: Dep. of Scientific Services, Singapore.

1535. ASEAN Soy Sauce Committee. ed. 1978. Report of the ASEAN Workshop on Soy Sauce Manufacturing Techniques. Singapore. 252 p. Held 22-24 Jan. 1978 at Singapore. No index. 30 cm. [200 ref]
• ***Summary:*** This is the 4th ASEAN Protein Workshop. Near the front is a List of participants (directory). Address: Singapore.

1536. Bhumiratana, Amara. 1978. Infant food supplement: A soya bean based product. In: American Soybean Assoc., ed. 1978. International Soya Protein Food Conference, Proceedings. Hudson, Iowa: ASA. 136 p. See p. 77-92. [5 ref]
• ***Summary:*** Contents: Abstract: Nutritional requirement for infant, development of food supplements (kaset soy milk, kaset infant food). Appendix I: Thai baby food standards. Appendix II: Joint FAO/WHO codex alimentarius commission draft standard for infant formula.

A table gives a detailed comparison of human milk and cow's milk. Though both contain about the same number of grams of solids per 100 gm (12.9 gm and 12.7 gm respectively), the human milk contains only one-third as much protein (1.1 gm vs. 3.3 gm) and 27% as much calcium (340 mg vs. 1250 mg). Address: Inst. of Food Research and Product Development, Kasetart Univ., Bangkok, Thailaland.

1537. Hartadi, S.; Kabirun, S. 1978. Mold selection for soy sauce fermentation. In: ASEAN Soy Sauce Committee, ed. 1978. Report of the ASEAN Workshop on Soy Sauce Manufacturing Techniques. Singapore. 252 p. See p. 117-27. [9 ref. Eng]
Address: Dep. of Microbiology, Univ. of Gadjah Mada, Yogyakarta, Indonesia.

1538. Lotong, N. 1978. Soy sauce production in Thailand. In: ASEAN Soy Sauce Committee, ed. 1978. Report of the ASEAN Workshop on Soy Sauce Manufacturing Techniques. Singapore. 252 p. See p. 171-89. [2 ref]
Address: Biology Dep., Kasetsart Univ.

1539. Merican, Z. 1978. Status of soy sauce research in Malaysia. In: ASEAN Soy Sauce Committee, ed. 1978. Report of the ASEAN Workshop on Soy Sauce Manufacturing Techniques. Singapore. 252 p. See p. 159-69. [10 ref]

Address: Agricultural Product Utilization Div., Mardi, Serdang, Selangor.

1540. Nga, B.H.; Tang, T.C.; Lim, G. 1978. Genetics of microorganisms in soy sauce fermentation. In: ASEAN Soy Sauce Committee, ed. 1978. Report of the ASEAN Workshop on Soy Sauce Manufacturing Techniques. Singapore. 252 p. See p. 128-37. [12 ref. Eng]
Address: Dep. of Botany, Univ. of Singapore, Bukit Timah Rd., Singapore.

1541. Poesponegoro, M.; Tanuwidjaja, L.; Roestamsyah, -. 1978. Studies on the fermentation process of soy sauce (in Indonesia). In: ASEAN Soy Sauce Committee, ed. 1978. Report of the ASEAN Workshop on Soy Sauce Manufacturing Techniques. Singapore. 252 p. See p. 226-52. [12 ref]
Address: National Inst. for Chemistry, Indonesian Inst. for Sciences, Bandung.

1542. Shurtleff, William. 1978. Household preparation of winged bean tempeh, tofu, milk, and sprouts. In: The Winged Bean. Los Banos, Laguna, Philippines: Philippine Council for Agriculture and Resources Research (PCARR). xvii + 478 p. See p. 335-39. Jan.
• ***Summary:*** This book consists of papers presented at the 1st International Symposium on Developing the Potentials of the Winged Bean. Held Jan. 1978, at Manila, Philippines. Contents: Introduction. Homemade winged bean tempeh: Recipe, directions, polyethylene (plastic) bags, baking pans or pie tins, good tempeh, immature tempeh, inedible tempeh, troubleshooting (tempeh is too wet, mold is sparse and does not bind beans tightly, tempeh contains black spots or patches, tempeh smells strongly of ammonia, mold grew abundantly in some places but sparsely in others). Homemade winged bean tofu: Recipe, directions, troubleshooting (low yield, small curds or crumbly tofu texture, coagulant was insufficient). Homemade winged bean milk: Recipe, directions, honey-vanilla, rich and creamy, carob-honey, malt, mocha, or coffee. Homemade red winged bean miso. Homemade winged bean sprouts.

Note: This is the earliest document seen on making tofu from winged beans (Kantha 1983). Address: New-Age Foods Study Center, 278-28 Higashi Oizumi, Nerima-ku, Tokyo 177, Japan. Phone: (03) 925-4974.

1543. Soriano, Mercedes R.; Pardo, L.V. 1978. Studies on the improvement of soy sauce manufacture in the Philippines. In: ASEAN Soy Sauce Committee, ed. 1978. Report of the ASEAN Workshop on Soy Sauce Manufacturing Techniques. Singapore. 252 p. See p. 190-225. [17 ref]
Address: Food Technology Research Div., Industrial Research Center, National Inst. of Science and Technology (NIST), Manila, Philippines.

1544. Sundhagul, Malee; Piyapongse, S.; Munsakul, S.; Bhuntumkool, K. 1978. Soy sauce industry in Thailand: Techno-economic consideration. In: ASEAN Soy Sauce Committee, ed. 1978. Report of the ASEAN Workshop on Soy Sauce Manufacturing Techniques. Singapore. 252 p. See p. 53-68.
Address: Applied Scientific Research Corp. of Thailand, Bangkok, Thailand.

1545. Tang, T.C. 1978. Developments in soya sauce fermentation. In: ASEAN Soy Sauce Committee, ed. 1978. Report of the ASEAN Workshop on Soy Sauce Manufacturing Techniques. Singapore. 252 p. See p. 11-32. [46 ref]
Address: Singapore Inst. of Standards and Industrial Research.

1546. Tanuwidjaja, Lindajati; Poesponegoro, M.; Roestamsjah, -; Suharto, -. 1978. Present status of soy sauce manufacturing techniques in Indonesia. In: ASEAN Soy Sauce Committee, ed. 1978. Report of the ASEAN Workshop on Soy Sauce Manufacturing Techniques. Singapore. 252 p. See p. 41-52. [5 ref]
Address: 1. National Inst. for Chemistry, Indonesian Inst. of Sciences, Bandung, Indonesia.

1547. Villa-Abrille, Carlos. 1978. Marketing of extended meat products in Third World countries. In: American Soybean Assoc., ed. 1978. International Soya Protein Food Conference, Proceedings. Hudson, Iowa: ASA. 136 p. See p. 110-15. [1 ref]
• ***Summary:*** Contents: Statement of the problem. Applications. Case studies: Ralston Purina (reasons for developing the product, quantification and qualification of demand, determination of product type and form, communicating the value, conclusion), Pure Foods Corporation (reasons for developing the product, quantification and qualification of demand, conclusion). Summary.

Per capita consumption (kg/person) of total red meat in specified countries in 1975, in descending order of amount is: Uruguay 104, Australia 101, Argentina 98, New Zealand 95, United States 83, Canada 73, Belgium-Luxembourg 73, West Germany 68, France 67, United Kingdom 57, USSR 45, Taiwan 20, Japan 16. Address: Pure Foods Corp., Manila, Philippines.

1548. Yeoh, Q.L.; Merican, S.; Aziz, A.; Mohamed, R. 1978. Survey of some soy sauce factories in peninsular Malaysia. In: ASEAN Soy Sauce Committee, ed. 1978. Report of the ASEAN Workshop on Soy Sauce

Manufacturing Techniques. Singapore. 252 p. See p. 69-116. [5 ref]
Address: Agricultural Products Utilisation Div., Mardi, Serdang, Selangor, Malaysia.

1549. Yu, Swee Yean; Ch'ng, Guan Choo. 1978. Soy bean foods in Malaysia. In: American Soybean Assoc., ed. 1978. International Soya Protein Food Conference, Proceedings. Hudson, Iowa: ASA. 136 p. See p. 48-52. [16 ref]
• ***Summary:*** Contents: Introduction. Fermented soya bean products: Soya sauce (manufacture of 'thin' (dilute) soya sauce, manufacture of 'thick' (viscous) soya sauce, microbiology of Malaysian soya sauce, stability of the product), tempeh, tau cheo (thick paste-like sauce), tao si (soy nuggets). Non-fermented soya bean products: Soya bean sprouts, tofu (semi-firm curd), tofu fah (soft curd), tow kwa (firm curd), tin chok (dried, flat sheets [yuba]), fu chok (dried, rope-like [bamboo yuba]), tofu pok (deep-fried curd [tofu cubes]), chak tie (vegetarian [yuba] sausage), soya bean milk (tau cheong), meat analogues (soya flour is shaped into desired forms by hand). Nutritional data. Conclusion. Address: Universiti Pertanian Malaysia, Serdang.

1550. Haider, Vicky Chen. 1978. Up and down Chinatown: A guide to help shoppers, diners, and the curious orient themselves (heh-heh). *Chicago Tribune.* Feb. 5. p. H24-H26.
• ***Summary:*** About 80% Chicago's nonresidential Chinatown is located on both sides of Wentworth Avenue. This is a walking tour, starting at the west end of Wentworth at Cerniak, walking east along the south side of Wentworth, and discussing and giving the address of each shop (1-24) as she comes to it. At the top of the first page of the article is a map of this Chinatown, and each shop is represented by a number on that map–the same number it has in the text. At 24th Pl. she cross Wentworth and walks back along the north side of the street (shops 25-47)–to which she gives much less attention. That is because the shops on the southern side generally cater to local residents rather than to tourists.

During the past five years there has been a major change in Chicago's Chinatown in the form of an influx of foods and merchandise from mainland China–the People's Republic of China. Before the 1970s it was almost impossible to find imports from this country.

Shop 25, at the far northeast end of Wentworth is Wah May (No. 25), which is a huge grocery store "that also carries a large range of goods from Southeast Asia, such as *ketjap manis,* a sweet soy sauce,..."

An illustration (line drawing) above the top of the map and down the right side shows a marvelous Chinese / Asian dragon.

1551. Newell, C.A.; Hymowitz, T. 1978. A reappraisal of the subgenus *Glycine. American J. of Botany* 65(2):168-79. Feb. [45 ref]
• ***Summary:*** "The genus *Glycine* Willd, is divided into 3 subgenera, *Glycine* Willd., *Soja* (Moench) F.J. Herm., and *Bracteata* Verdc. Six species are currently recognized in the subgenus *Glycine: G. canescens* F.J. Herm., *G. clandestina* Willd., G. *falcata* Benth., *G. latrobeana* (Meissn.) Benth., *G. tabacina* (Labill.) Benth., and *G. tomentella* Hayata. Distribution of the subgenus extends from south China to Tasmania an includes several Pacific islands. A collection of these species was examined cytologically and morphologically..."

"*Bractea* is composed of *G. wightii* (R. Grah ex Wight & Arn.) Verdc., a highly variable perennial species distributed throughout Africa and parts of southeastern Asia. Verdcourt (1966 [in Taxon]) has partitioned *G. wightii* into three subspecies and four varieties. The subgenus *Glycine* includes six perennial species with a wide distribution ranging from south China to Tasmania and eastwards to the Pacific islands of Tonga.

"Considerable confusion has surrounded the taxonomy of the genus *[Glycine]* at every stage in its history. Linnaeus originally introduced the name *Glycine* in 1737 in the first edition of his Genera Plantarum and based it on *Apios* Boerhaave. *Glycine* is derived from the Greek work *glykys,* meaning sweet, and probably refers to sweetness of the edible tubers found in *Apios* Boerhaave or *Glycine apios* (L.), now known as *Apios americana* Medik. (Henderson, 1881, 1910). Eight *Glycine* species were listed in the Species Plantarum (Linnaeus, 1753), but subsequently these were all transferred to other genera with the exception, for some time, of *Glycine javanica* L... Hermann reduced the size of the genus from 286 species to 10, primarily by excluding all those species which belonged to other genera. The only remaining Linnaean *Glycine, G. javanica* L., had been retained earlier as the lectotype for the genus (Hitchcock and Green, 1947).

"Further revision became necessary when Verdcourt (1966) discovered that Linnaeus' description of *G. javanica* was based upon a specimen of *Pueraria.* In order to avoid major alterations in genera which included several agriculturally important legumes, Verdcourt proposed that the name *Glycine* be conserved from a later author, Willdenow (1802). Thus *G. clandestina* Willd. became the type for the genus and *G. javanica* L. was transferred to *Pueraria montana* (Lour.) Merr. *Glycine wightii* was introduced as a new species combination for all those populations previously interpreted as *G. javanica."* Address: Dep. of Agronomy, Univ. of Illinois at Urbana-Champaign, Urbana 61801.

1552. Salao, Andy. 1978. Meet the tofu master [William Shurtleff]. *Expressweek (Manila, Philippines).* March 16. p.

31.
• ***Summary:*** Tofu master William Shurtleff, a 37-year-old American, is recognized in the US and Japan as one of the leading authorities on natural foods. He visited the Philippines at the International Conference on the Winged Bean held in January, 1978, and "went all the way to Quezon City to see the factory, which is operated by Cherry Food Industry. Its manager, Aida Yu, was thrilled to meet the tofu master." The company manufactures Nippon Tofu, which is made from thick soymilk and packed in a thick-walled polyethylene container, which is thermally sealed and will keep for 2-3 months. Contains a brief biography of Shurtleff and numerous extracts from The Book of Tofu A photo shows Shurtleff looking at the company's tofu equipment.

1553. Brown, Lester R. 1978. The twenty-ninth day: Accommodating human needs and numbers to the earth's resources. New York, NY: W.W. Norton & Co. xiii + 363 p. Index. 21 cm. [371* ref]
• ***Summary:*** One of the best books seen on interrelationship of the world's major problems such as population, growth, hunger, and failing life support systems. "The title comes from a riddle the French use to teach their schoolchildren exponential growth. The riddle begins with a lily pond that has one leaf in it the first day, two leaves the second day, four the third day, then eight, and so on. Question: If the pond fills on the thirtieth day, when is the pond half full? Answer: The twenty-ninth day."

The author's multifaceted analysis sees the primary cause of hunger and starvation as rapid population growth and the increased stresses it puts on the planet's four major biological systems: croplands, oceanic fisheries, grasslands, and forests. In each area, as demand exceeds the sustainable yield, populations begin to eat away at the biological base that sustains them; in economic terms, they consume principal as well as interest. Population pressures coupled with unsound land-use patterns lead to erosion, deforestation, flooding, overgrazing and other disturbances in the ecosystem, which in turn affect food production. Secondary causes of hunger include the increasing use of basic food crops as livestock fodder in affluent diets.

At the present growth rate of 1.64 percent, the population of the planet will double every 43 years. Many of the poorer nations, with growth rates of 3 percent, double every 23 years and (theoretically) increase a staggering nineteenfold every century! During the seventies the rate of increase began to slow, perhaps for the first time in history–a promising sign. Yet each day 178,000 new faces appear at the breakfast table and 64 million more passengers are added to spaceship earth each year. At the same time, there has been very little net increase in the world's agricultural acreage since 1955. According to the United Nations median projections, the world's population is expected to rise from the present 4.1 billion figure to 6 billion shortly before the year 2000, with about 90 percent of the additional 2 billion people being born in developing countries. Brown states the urgent need to attack the problem of population growth from all directions at once: make family planning services universally available; liberating women from traditional roles; meeting basic social needs, such as adequate health care, nutrition, and literacy, that are usually associated with reduced fertility; educating the people about the consequences of rapid population growth; and reshaping national economic and social policies to encourage small families. Countries such as China and Singapore that have moved on all five fronts at once have been spectacularly successful in reducing their birth rates. In Indonesia, a well-organized family planning program (which has not been accompanied by extensive social restructuring) has led to a decline in birth rate only slightly less than that in China. Each of us can make a vital contribution to population control by limiting our family size to two children or less.

As people (including the upper classes in developing countries) become more affluent, they tend to increase their consumption of meat, poultry, dairy products, and eggs. In 1975, to produce these products, roughly 33 percent of the world's grain harvest (78 percent of the U.S. grain harvest) was fed to livestock, yet could have been used for human food. This represents a total of 450 million tons, or a whopping 248 pounds for every person on the planet. Thus, according to Brown, while population growth accounts for about two-thirds of the annual growth in world food demand, this affluent pattern of feeding livestock grain (the feedlot system which was developed in the U.S. in the 1950s as a way of reducing grain surpluses) accounts for the rest. Since more than 14 pounds of feedlot fodder protein are required to produce 1 pound of beef protein, a small increase in the demand for meat leads to an enormous decrease in the amount of grain and soy proteins available for human consumption and simultaneously tends to raise prices. Thus hungry people throughout the world are now in direct competition with livestock for basic foods. Because of their meat-heavy diet based on the feedlot system, Americans consume about *five times* as much basic foods (and *twenty times* as much total resources) per capita as people in the developing countries. This wasteful pattern should be phased out as soon as possible.

Brown sees hunger as an extremely complex problem with no single cause and requiring a combination of approaches. Population growth, patterns of land ownership, environmental deterioration, affluent diets, miserable social conditions, inappropriate technology, and hunger all form a vicious circle which must be attacked at every point along its circumference.

Pages 152-56 discuss world soybean production and price increases (focusing on the USA, Brazil, and China),

and the world protein bind. "In 1975, roughly one-third of the world's grain harvest–some 450 million tons–was fed to livestock and poultry." Between 1950 and 1975, the world soybean harvest nearly quadrupled, rising from 16 to 61 million tons. Unfortunately in parts of Brazil, soybeans compete with table beans and are bidding land away from the production of table beans and increasing their price. This in turn aggravates protein hunger among low-income Brazilians for whom they are a staple. Address: Worldwatch Inst., Washington, DC.

1554. Murali, N.S.; Nielsen, J.M. 1978. Evaluation of nutritional status of soybean based on the chemical composition of young plants. *Indian J. of Agricultural Sciences* 48(3):125-31. March. [10 ref]
Address: Asian Inst. of Technology, Bangkok, Thailand.

1555. **Product Name:** Full Fat Soy Flour.
**Manufacturer's Name:** ASEAN Protein Project.
**Manufacturer's Address:** Mae Chan, near Chiang Rai, Thailand.
**Date of Introduction:** 1978. April.
**New Product–Documentation:** Hicks. 1978. ASEAN Protein Project Newsletter. No. 3. p. 3-5. May. By 1979 this plant was producing 100 tonnes a month of this soy flour. Some of it was used for infants and nursing mothers.

1556. Potts, H.C.; Duangpatra, J.; Hairston, W.G.; Delouche, J.C. 1978. Some influences of hardseededness on soybean seed quality. *Crop Science* 18(2):221-24. March/April. [14 ref]
Address: 1-2. Univ. of Kasetsart, Bangkok, Thailand; 3-4. Mississippi State Univ., Mississippi 39762.

1557. Saono, Susono; Basuki, Triadi. 1978. The amylolytic, lipolytic and proteolytic activities of yeasts and mycelial molds from ragi and some Indonesian traditional fermented foods. *Annales Bogorienses* 6(4):207-19. April. [9 ref]
• ***Summary:*** The only tempeh mentioned is okara tempeh *(oncom hitam)*. Address: Treub Lab., National Biological Inst., Bogor, Indonesia.

1558. Steinkraus, Keith H. 1978. Tempeh–An Asian example of appropriate/intermediate food technology. *Food Technology* 32(4):79-80. April. [7 ref]
• ***Summary:*** Discusses tempeh processes, process improvements, and transfer of these technology improvements to Indonesia. Address: Cornell Univ., Geneva, New York.

1559. Richman, Phyllis. 1978. Richman on restaurants: Siam Inn. *Washington Post*. May 14. p. SM38.
• ***Summary:*** This is a review of Siam Inn, a Thai restaurant at 11407 Amherst Ave., Wheaton, Maryland (just north of Washington, DC). "Fish at the Siam Inn comes deep-fried or sautéed, a delicious choice being a whole fish buried under ginger, black beans, and a julienne of pork and vegetables in a thin brown gravy."

1560. Johns, Yohanni. 1978. Re: Thoughts on The Book of Tempeh manuscript. Letter to William Shurtleff at New-Age Foods Study Center, May 15. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "Your book should have been published many years ago. It will be a hit even in Indonesia... I am from Central Sumatra, thus, there are many recipes that I have never seen before. Moreover, in Central Sumatra, where much more meat is eaten than in Java, people tend to look down on tempeh. In fact, I seldom ate tempeh until I made my first visit to java at the age of twenty.

"Your recipes are fascinating... There is however, one important point: the making of tempeh making residual press-cake from sun-dried coconut is now banned in Indonesia. It may be lethal!"

Note: Yohanni is a well-known cookbook author. See *Dishes from Indonesia* (1977). Address: Lecturer, Dep. of Indonesian Languages and Literatures, Faculty of Asian Studies, The Australian National Univ., Box 4, P.O., Canberra, A.C.T.,.

1561. Guhardja, Edi. 1978. Re: Names and descriptions of lesser-known Indonesian soyfoods. Letter to William Shurtleff at New-Age Foods Study Center, May 16–in reply to inquiry. 1 p. Typed, with signature.
• ***Summary:*** Dry roasted soybeans (Javanese: Dele Sangan; Sundanese: Kedele Sangrai). Raw soybeans, with or without their seed coats, are soaked in cold water for ½-1 day. Sometimes salt is added. The swollen beans are dried, roasted, then eaten with yellow rice (rice cooked in coconut milk with turmeric), or as a snack.

Tofu chips (Indonesian: Krupuk Tahu). Salted tofu is sliced into long, this pieces, which are dried in the sun, then broiled until crisp. They are eaten with Gado-Gado (cooked vegetables with peanut sauce) or as a snack.

"Fresh green soybeans in the pods" or "fresh vegetable (green) soybeans (Indonesian: Kedelai Rebus). Soybeans at the mature green stage are harvested by cutting the stems with the pods attached. The leaves are picked off the stems and the pods, still attached to the stems, are boiled until the seeds are soft. They are sold in bunches, with the stems tied together, and eaten as a snack.

Roasted soybean grits (Indonesian: *Bubuk Kedelai).* Roasted soybeans are pounded into grits, usually with a wooden mortar and pestle. The grits are spread over glutinous rice and grated coconut meat, then coconut sugar syrup is poured over the top. They are eaten as a snack. Address: Dr., Dep. of Botany, Bogor Agricultural Univ. (IPB) Bogor, West Java.

1562. Arbianto, Purwo. 1978. Tempe. Presented at ASEAN Workshop on Solid Substrate Fermentation. Held 8-13 May 1978 at Bandung, Indonesia. [Eng]*
Address: Team Bioteknologi, Departemen Kimia, Institut Teknologi, Bandung, Indonesia.

1563. ASEAN Sub-Committee on Protein. ed. 1978. Report on the First ASEAN Workshop on Solid Substrate Fermentation. Bandung, Indonesia. Held 8-13 May 1978 at Bandung, Indonesia. [100+ ref]*
• ***Summary:*** This is the 5th ASEAN Protein Workshop. Address: Malaysia.

1564. Hicks, P. Alastair. 1978. ASEAN full fat soy flour produced for first time! Start up for full fat soy flour factory, Chieng Rai, Thailand. *ASEAN Protein Project Newsletter* No. 3. p. 3-5. May.
• ***Summary:*** The first full-fat soy flour was produced here on 27 April 1978. The following equipment is used in processing the beans: Food hopper, grain cleaner, de-stoner, clean bean storage, fluidized bed debittering, cracking mill, hull cleaner, hull removal, turbo mill (Buehler). Address: Australia.

1565. Claiborne, Craig. 1978. Rijsttafel: The easy feast. *New York Times.* June 21. p. C1, C6.
• ***Summary:*** Rijsttafel, literally "rice table," is a traditional Indonesian buffet. The recipe for "Ketjap manis (Sweet soy sauce ketjap)" calls for: 2½ cups sugar, 22 ounces "dark soy sauce," 3 cloves of garlic–peeled and crushed, 1 teaspoon star anise, 2 salam leaves, 2 slices laos, and ½ cup water.

1566. *New York Times.*1978. Pirate's paste and coconut milk. June 21. p. C6.
• ***Summary:*** Recipes are given for the dishes that comprise one type of "rijsttafel (A small Indonesian dinner for summer)." One of these is "Ketjap manis (Sweet soy sauce ketjap)" which has the following ingredients: 2½ cups sugar, 1 bottle (22 ounces) dark soy sauce, 2 cloves, peeled and crushed, 1 teaspoon star anise (see box), 2 slices laos (see box), and ½ cup water. The directions are giving, starting with caramelizing the sugar. Yields about 3 cups. It will keep for months if properly refrigerated.

1567. Lee, K.W. 1978. Update on palm oil. *Soybean Digest.* May/June. p. 1, 2, 4, 8, 10-SID.

1568. Sudarmadji, S.; Markakis, P. 1978. Lipid and other changes occurring during the fermentation and frying of tempeh. *Food Chemistry* 3(3):165-70. July. Originally presented in 1977 at the Symposium on Indigenous Fermented Foods, Bangkok, Thailand. Summarized in K.H. Steinkraus, ed. 1983. Handbook of Indigenous Fermented Foods. New York: Marcel Dekker, Inc. [10 ref]
• ***Summary:*** As tempeh is fermented for 30 hours, there is a rapid increase in free fatty acid (FFA) content, number of bacteria, and temperature, along with a copious growth of the mould. "Upon frying in coconut oil, tempeh undergoes a sharp reduction in FA content with a concomitant increase in the FFA content of the frying oil. While frying alters the percentage composition of the glycerides of tempeh because of coconut oil absorption, the glyceride composition of the frying oil barely changes." Address: Dep. of Food Science & Human Nutrition, Michigan State Univ., East Lansing, MI 48824.

1569. **Product Name:** Bali Foods Tempeh Chips.
**Manufacturer's Name:** Bali Foods.
**Manufacturer's Address:** 4219 Alderson Ave., Unit B, Baldwin Park, CA 91706. Phone: (213) 338-7178 or 337-1682.
**Date of Introduction:** 1978. August.
**Ingredients:** Yuca (cassava) flour, tempeh, soy oil, salt, seasoning.
**Wt/Vol., Packaging, Price:** 2 oz in poly bag.
**How Stored:** Shelf stable.
**New Product–Documentation:** Letter from Henoch Khoe. 1978. Aug. 29. "Tempeh Chips are selling nationwide and our sales are increasing by leaps and bounds because a lot of money, time and efforts have been spent in promoting our Tempeh and Tempeh Chis in the U.S. market. Tempeh, therefore, has become a very sacred word to us. We strongly suggest that you immediately seek legal advice before you make any foolish decision to publish and sell your forthcoming 'Book of Tempeh." Note: He is trying to use tempeh as a registered trademark.

Label. 1979, undated. Printed on plastic bag, 8.5 by 11 inches. Red and green on yellow. Reprinted in Soyfoods Marketing. Lafayette, CA: Soyfoods Center.

1570. *Soybean Digest.*1978. Far East market expands. July/ Aug. p. 8, 10-SID.

1571. Whigham, D.K.; Judy, W.H. 1978. International soybean variety experiment: Third report of results, 1975. *INTSOY Series* No. 15. x + 369 p. Aug. (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** In the ISVEX trials, soybeans were tested in the following regions and countries: Africa: Algeria, Burundi, Cameroon, Congo, Dahomey, Egypt, Ethiopia, Gambia, Ghana, Ivory Coast, Lesotho, Mali, Mauritius, Niger, Reunion, Rhodesia (Salisbury), Rwanda, Senegal, Sierra Leone, Swaziland, Tanzania, Togo, Upper Volta, Zambia.

Asia: Afghanistan, Bangladesh, India, Indonesia, Korea, Nepal, Pakistan, Philippines, Sri Lanka, Taiwan,

Thailand.

Europe: Hungary, Italy, Spain, Yugoslavia.

Mesoamerica: Bahamas, Belize, Costa Rica, Honduras, Jamaica, Martinique, Nicaragua, Panama, Trinidad & Tobago.

Middle East: Iran, Israel, Jordan, Lebanon, Saudi Arabia.

North America: United States.

Oceania: Fiji, Tahiti.

South America: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, French Guiana, Guyana, Peru, Venezuela.

Note 1. This is the earliest document seen (Aug. 2008) concerning soybeans in Niger, or the cultivation of soybeans in Niger. On 3 July 1975 fifteen soybean varieties were planted at Maradi, Niger; two days later the same 15 varieties were planted at Gaya, Niger. The research was conducted under the auspices of the Director, Institut de Recherches Agronomiques Tropicales (IRAT), Station de Tarna, B.P. 6, Maradi, Niger. At Maradi, Forrest gave the highest yield, 3,501 kg/ha and nine varieties gave yields of over 3,000 kg/ha. At Gaya, Jupiter gave the highest yield, 1,925 kg/ha.

Note 2. This is the second earliest document seen (Jan. 2002) for the cultivation of soybeans in French Guiana (12 Dec. 1975). On 12 Dec. 1975, cooperators Mr. J. Larcher and Mr. P. Midras (Institut de Recherches Agronomiques Tropicales, Station de Cabassou, B.P. 60, 97301 Cayenne, French Guiana), planted fifteen varieties of soybeans at Cayenne. Jupiter gave the highest yield, 3,445 kg/ha.

Note 3. This is the 2nd earliest document seen (April 2005) concerning soybeans in French Polynesia (or Tahiti), or the cultivation of soybeans in French Polynesia. This document contains the 2nd earliest date seen for soybeans on French Polynesia, or the cultivation of soybeans on French Polynesia (3 Dec. 1975). Thirteen varieties were tested at Papeete (capital of French Polynesia on the island of Tahiti), under the direction of Mr. Jean-Louis Reboul and Mr. Robert Yau-Akui, *Service de l'Economie Rurale,* B.P. 100, Papeete, Tahiti, French Polynesia. Davis gave the highest yield, 4,902 kg/ha.

This is the earliest document seen (Jan. 2005) concerning soybeans in Niger, or the cultivation of soybeans in Niger. This document contains the earliest date seen for soybeans in Niger, or the cultivation of soybeans in Niger (3 July 1975). Fifteen varieties were tested at Maradi under the direction of IRAT, Station de Tarna, B.P. 6, Maradi, Niger. Forrest gave the highest yield, 3,501 kg/ha. On 5 July 1975, fifteen varieties were tested at Gaya; Jupiter gave the highest yield, 1,925 kg/ha.

This document also contains an early clear date seen for soybeans in Senegal, and the cultivation of soybeans in Senegal (9 July 1975; one of two documents). Fifteen varieties were tested at Sefa under the direction of Mr. Jean Durovray, C.N.R.A., Sefa, Senegal. Jupiter gave the highest yield, 2,025 kg/ha.

This is the earliest document seen (Jan. 2005) concerning soybeans in Martinique, or the cultivation of soybeans in Martinique. This document contains the earliest date seen for soybeans on Martinique, or the cultivation of soybeans on Martinique (10 April 1975). Fifteen varieties were tested at Fort de France, under the direction of Mr. Daly, IRAT, Le Lamentin, B.P. 427, Fort de France, Martinique. Improved Pelican gave the highest yield, 2,154 kg/ha.

This is the earliest reliable document seen (March 2006) concerning soybeans in Togo, or the cultivation of soybeans in Togo. This document contains the earliest solid date seen for soybeans in Togo or the cultivation of soybeans in Togo (2 May 1975). On May 2 fifteen varieties of soybeans were planted at Davié in southern Togo under the direction of Mr. J. Marquette, Le Chef de la Mission, IRAT au Togo, B.P. 1163, Lome, Togo. Davis gave the best yield, 3,563 kg/ha. On May 7 fifteen varieties were grown at Amoutchou; Jupiter gave the best yield, 3,667 kg/ha. On July 8 eleven varieties were grown at Kitangbao; Jupiter gave the best yield, 3,292 kg/ha. The source of the soybeans in each country was INTSOY for ISVEX trials. Address: College of Agriculture, Univ. of Illinois, Urbana-Champaign.

1572. Gandjar, I. 1978. Solid fermented foods of Java with special reference to tempe products. Presented at Meeting of the Danish Society of Food Technology and Hygiene, and the Danish Nutrition Society. Held Sept. 1978 at Copenhagen, Denmark. *
Address: Dep. of Biology, Faculty of Mathematics and Natural Sciences, Univ. of Indonesia, Jakarta.

1573. Hevrdejs, Judy. 1978. Tangy Thai fare blasts the bland: Cheap eats. *Chicago Tribune.* Oct. 27. p. C5.
• ***Summary:*** One of the best Thai restaurants in the Chicago area is Thai Cousin, 5019 N, Western Ave., The menu is large and offers a broad assortment of inexpensive dishes–not all fiery hot. An "interesting appetizer is *tau hutod* ($1.75), which is delicately flavored, fried tofu (bean curd)."

1574. Judy, W.H.; Whigham, D.K. 1978. International soybean variety experiment: Fourth report of results, 1976. *INTSOY Series* No. 16. x + 401 p. Oct. (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** In the ISVEX trials, soybeans were tested in the following regions and countries: Africa: Algeria, Benin, Botswana, Burundi, Cameroon, Central African Empire, Congo, Egypt, Ethiopia, Gabon, Ghana, Ivory Coast, Lesotho, Mali, Niger, Nigeria, Rhodesia, Somalia, Sudan,

Swaziland, Tanzania, Togo, Uganda, Upper Volta, Zaire, Zambia.

Asia: Bangladesh, India, Indonesia, Nepal, Pakistan, Philippines, Sri Lanka, Thailand.

Europe: Hungary, Italy, Poland, Portugal, Spain, Yugoslavia.

Mesoamerica: Bahamas, Dominican Republic, Jamaica, Mexico, Nicaragua, Puerto Rico, Trinidad & Tobago.

Middle East: Iran, Iraq, Israel, Jordan, Saudi Arabia.

North America: United States.

Oceania: New Caledonia, New Hebrides, Tahiti, Hawaii.

South America: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay.

Note 1. This is the earliest document seen (Aug. 2009) concerning soybeans in Botswana, or the cultivation of soybeans in Botswana. This document contains the earliest date seen for soybeans in Botswana, or the cultivation of soybeans in Botswana (3 Nov. 1976). On 3 Nov. 1976, under the direction of Ms. Lynn A. Miller (Mahalapye Rural Training Center, Box 300, Mahalapye, Botswana), twelve varieties of soybeans were planted at Mahalapye. Ransom gave the best yield, 3,244 kg/ha. On 25 Nov. 1976 sixteen varieties were planted at Gaborone. Davis gave the best yield, 1,668 kg/ha.

Note 2. This is the second earliest document seen (April 2004) concerning soybeans in Gabon, or the cultivation of soybeans in Gabon–but the first that gives details. This document contains the earliest date seen for soybeans in Gabon, or the cultivation of soybeans in Gabon (30 Sept. 1976). Eight varieties of soybeans were grown at Ntoum, under the direction of Mr. J. van Amerongen and Mr. G. Van de Plas (Project CIAM, B.P. 5, Ntoum, Gabon). Jupiter gave the best yield, 1,159 kg/ha.

Note 3. This is the earliest document seen (March 2010) concerning soybeans in New Hebrides [later renamed Vanuatu], or the cultivation of soybeans in New Hebrides. This document contains the earliest date seen for soybeans in New Hebrides, or the cultivation of soybeans in New Hebrides (25 June 1976). Sixteen varieties of soybeans were grown at Port Vila, under the direction of Mr. B.L. Weightman (Dep. of Agriculture, Tagabe Agricultural Station, Port Vila, New Hebrides). Calland gave the best yield, 2,581 kg/ha. Port Vila, on the island of Efate (Éfaté), is the capital of Vanuatu.

Note 4. This document also contains the earliest date seen (Jan. 2001) for ISVEX soybean trials in the Central African Empire / Republic, or the cultivation of ISVEX soybeans in the Central African Empire / Republic (28 June 1976). Thirteen varieties of soybeans were grown at Bossangoa. Davis gave the best yield, 1,780 kg/ha.

The source of the soybeans in each country was INTSOY for ISVEX trials. Address: College of Agriculture, Univ. of Illinois, Urbana-Champaign.

1575. Paschal, E.H., II; Ellis, M.A. 1978. Variation in seed quality characteristics of tropically grown soybeans. *Crop Science* 18(5):837-40. Sept/Oct. [13 ref]

• ***Summary:*** "Twenty-four soybean collections were grown in two different seasons in Puerto Rico to determine the extent of variation in the incidence of seed infection by fungi and its effect on seed viability under tropical conditions." Seed quality is a major obstacle to the expansion of soybean production in the tropics, where there is high temperature and humidity. Yet soybeans have been cultivated for ages in Southeast Asia (as in Indonesia) where conditions are unfavorable to the production of high quality seed, so varieties that perform well under these conditions might exist. INTSOY as initiated research to improve seed quality in soybean varieties adapted to tropical conditions. This study found that many of the varieties that yielded seed with superior quality were, indeed, from Southeast Asia.

Table 1 shows the origin or parentage of 24 soybean accesses. Twenty of these have PI (Plant Introduction) numbers and four have names: Arisoy, Hardee, Improved Pelican, and Jupiter. The origin of those with PI numbers is: Australia, Brazil, Colombia, Guatemala, Hawaii, India, Indonesia, Japan, Philippines, Surinam, Tanzania, and Thailand. Address: Dep. of Agronomy, Univ. of Illinois, Urbana, IL, and Dep. of Crop Protection, Univ. of Puerto Rico, Mayaguez, PR 00708.

1576. Williams, C.N. 1978. Effects on drainage, spacing and fertilizer on soyabeans in paddy soils in Brunei. *Experimental Agriculture (England)* 14(4):303-07. [5 ref]

• ***Summary:*** Brunei is located at 5° north latitude. The yield of a Chippewa variety of soybean (from Nigeria) was investigated in relation to spacings and fertilizer levels on a range of rice paddy soils showing good, medium, and poor drainage. The soybeans were planted in August 1975. Under good conditions of drainage and fertilizer, the optimum yield was obtained at a density of 100,000 plants/ha. Even under sub-optimal drainage conditions, satisfactory yields of about 1,500 kg/ha were obtained from this variety, which showed a similar early-flowering response to photoperiod at all times of year.

"Soyabeans have been considered as a potential dry-season rotation crop with rice in many countries, but the two main problems affecting successful soyabean cultivation in the equatorial humid tropics are the short photoperiod that pertains at any time of the year and, in rice lands, the problems of a high water table and the hydromorphic nature of most paddy soils."

"The yields obtained were encouraging, and suggest that relatively less submerged areas of paddy lands can be used for successful soybean cultivation in the humid tropics. Higher plant densities and fertilizer use can be expected to

increase yields, particularly under marginal conditions of drainage."

Syahril Zazan Syahab has also studied soybeans in Brunei.

Note: This is the earliest document seen (May 2010) concerning the cultivation of soybeans in Brunei. This document contains the earliest date seen for the cultivation of soybeans in Brunei (August 1975, at Bandar Seri Begawan). The source of these soybeans is Nigeria. Address: Dep. of Agriculture, Bandar Seri Begawan, Brunei.

1577. Funnah, S.M.; Mak, C. 1978. Variety evaluation and correlation studies of an exotic population of soybean. *Malaysian Applied Biology* 7:131-37. Dec. [9 ref. Eng; mal]
• ***Summary:*** "A varietal evaluation and correlation study of an exotic soybean population was conducted for two seasons at the University Farm, University of Malaya. A total of 111 entries was used in the first trial [starting on 28 Feb. 1977], while the second trial included 51 entries selected from the original 111... The grand mean yields for Trials 1 and 2 were 1,844.8 and 2,137.0 kg/ha respectively." The soybean varieties used in these trials were foreign varieties already available in the country plus additional imports from AVRDC (Taiwan) and IITA (Nigeria).

"Over the years, Malaysia has been importing virtually all her soybeans. The demand is estimated to reach 71,000 metric tons by the year 1980. On the whole, records of organized research on soybean in Malaysia are relatively scant." Address: Dep. of Genetics & Cellular Biology, Univ. of Malaya.

1578. Arbianto, Purwo. 1978. Proces fermentasi tempe ditinjau dari sudut fermentasi substrat padat [The tempeh fermentation process observed from the solid substrate fermentation viewpoint]. Presented at Seminar Mikrobiologi II (Second Seminar on Microbiology). Held at Yogyakarta. [Ind]*

1579. Cruz, E.M.; Laudencia, I.L. 1978. Screening of feedstuffs as ingredients in the rations of Nile Tilapia. *Kalikasan* 7(2):159-64. [Eng]*
• ***Summary:*** Rations containing different combinations of eight ingredients, including soybean meal and fish meal, were fed to Nile Tilapia fingerlings to determine their effects on weight gain, feed conversion, mortality, and economy of feeding. Ration I, containing rice bran and fish meal, gave the highest weight gain and the best feed conversion efficiency. However Ration II, containing copra meal and fish meal, gave the least cost of feeds to produce one kg of weight gain. Soybean meal was an ingredient in any of the promising rations. Address: Freshwater Aquaculture Center, Central Luzon State Univ., Munoz, Nueva Ecija 2320, Philippines.

1580. Kuswanto, Kapti Rahayu; Kasmidjo, R.B.; Bawono, Djoko. 1978. Pengaruh penggilingan kedele rebus sebelum inokulasi pada [Effect of grinding boiled soybeans before inoculation in tempeh processing]. Presented at Seminar Mikrobiologi II (2nd Seminar on Microbiology). Held at Yogyakarta. [Ind]*

1581. Muljokusumo, E. Sudigdo. 1978. Tahu kita membuat sendiri I. [Tofu: How to make it yourself]. Bandung, Indonesia: Penerbit Tarate. [Ind]*

1582. Roestamsjah, -; et al. 1978. Improvement of traditional tempe manufacturing techniques. Bandung: Indonesian Institute of Science. *
Address: Bandung.

1583. Slamet, Dewi S.; Gandjar, I.; Suryana, -. 1978. Indonesian soy sauce. In: Collection of Papers in Seminar Microbiologi II. Yogyakarta, Indonesia. See p. 127. *

1584. **Product Name:** Nestlé Bonus Soya Bean Milk [Plain, or Almond].
**Manufacturer's Name:** United Milk Co. Ltd. Nestlé (Thailand) Ltd.
**Manufacturer's Address:** 149 Teparuk Sukhumvit Rd., Samudprakarn Box 11-60, Bangkok 11, Thailand.
**Date of Introduction:** 1978.
**Wt/Vol., Packaging, Price:** 250 ml Tetra Brik Aseptic carton. Retails for 5.00 bhat (1984).
**How Stored:** Shelf stable; refrigerate after opening.
**New Product–Documentation:** Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 99-100, 102. In 1978 Nestlé began making and marketing Bonus in Singapore. Exported to Hong Kong in 1978, it gave Vitasoy its first real brand-name competition. Color slide in Soyfoods Center Slide Library.

Photocopy of a page from a market study of unknown origin, sent by Anders Lindner. 1984. March 9. Bonus, is made in Thailand by United Milk Co. Ltd. in a plant with a production capacity of 4,000 liters/hour (UHT). It is packaged in Tetra Packs and can be classified as a milk product that is in competition with UHT milk.

Soya Bluebook. 1986. p. 104.

1585. Agustine, Nany. 1978. Pengaruh waktu perebusan kedele pada pembuatan tempe [Effect of soybean boiling time on tempeh processing]. Thesis (Skripsi), Fakultas Teknologi Pertanian Universitas Gadjah Mada, Yogyakarta, Indonesia. 26 p. [Ind]*
Address: Yogyakarta, Indonesia.

1586. Gandjar, I.; Jutono, Y. 1978. Microbiology, food and the Indonesian economy. In: W.R. Stanton and E.J. DaSilva,

eds. 1978. GIAM V; Global Impacts of Applied Microbiology: State of the Art: GIAM and its Relevance to Developing Countries. Kuala Lumpur: UNEP/UNESCO/ICRO Panel of Microbiology Secretariat. Universiti Malaya Press. 323 p. See p. 169-72. Conference held 21-26 Nov. 1977 in Bangkok, Thailand. [5 ref]

• ***Summary:*** Indonesia consists of 5 big islands and thousands of smaller ones; 65% of the 130 million people live on the islands of Java and Madura. Since 60% of the people in Indonesia earn their living from agriculture, this sector was chosen as the leading sector in the First Five Year Development Plan of Indonesia (1969/70–1973/74). Protein calorie malnutrition is the most serious nutrition problem. "The main protein source is derived from dried fish or fresh water fish and legumes (soybeans, peanuts, and several other kinds of beans). Meat, eggs, and milk are relatively expensive and are consumed more by the better-off people. It is of great concern for us that a large part of the people and many children are not able to consume the amount of protein required.

"Traditional fermented foods always play an important role in the daily diet, especially of the low-income people. They are consumed as side-dishes with rice or as snacks and often serve as sources of vitamins and protein. The mature dry leguminous seeds are often processed into a fermented form known as *tempe*. It is worth noting here that where in other countries the agricultural wastes are merely used for fodder, in Indonesia they are transformed through the aid of microorganisms into a palatable product, such as *oncom kacang* (fermented peanut presscake), *oncom tahoo* (fermented soybean milk refuse [okara onchom]) and *tempe bongkrek* (fermented coconut presscake)." Address: 1. Departemen Kesehatan, Bogor, Indonesia; 2. Gadjah Mada Univ., Yogjakarta, Indonesia.

1587. Huriati, Isna. 1978. A study of the storage stability of dehydrated tempeh. MSc thesis, University of New South Wales, Sidney, Australia. 74 p. *
Address: Sidney, Australia.

1588. International Rice Research Institute. 1978. Annual report for 1977. Los Banos, Laguna, Philippines. Soybeans: p. 390-91, 441-42, 471. *
Address: Los Baños, Laguna, Philippines.

1589. Iwaki, Mitsuro; Roechan, M.; Saleh, N.; Sugiura, M.; Hibino, H. 1978. Identity of mycoplasma-like agents of legume witches' brooms in Indonesia. *Contributions, Central Research Institute for Agriculture (Bogor, Indonesia)* No. 41. 11 p. [4 ref]

• ***Summary:*** *Webster's Dictionary* defines Witches' Broom as "an abnormal tufted growth of small branches on a tree or shrub caused especially by fungi or viruses." Witches' broom is one of the most important diseases of legume plants and causes damage to peanuts, soybeans, and mungbeans in many parts of Indonesia. Witches broom on peanuts and soybeans can be transmitted from one plant to another by the leafhopper *Orosius argentatus*. Mycoplasma-like organisms occurred in the phloem tissue of the infected plants. Address: 1&5. Plant Pathologists, Pests and Diseases Div., Central Research Inst. for Agriculture, Bogor, Indonesia under Indonesia-Japan Joint Food Crop Research Program on leave from Inst. for Plant Virus Research, Tsukuba, Ibakari, Japan; 2-3. Asst. Plant Pathologists, Pests and Diseases Div., Central Research Inst. for Agriculture, Bogor, Indonesia; 5. Plant Pathologist, Inst. for Plant Virus Research, Tsukuba, Ibakari, Japan.

1590. Muljokusumo, E. Sudigdo. 1978. Kecap: Kedelai, bungkil kacang, ikan [Soysauce: Soybean, peanut flakes, fish]. Bandung, Indonesia: Penerbit Tarate. [Ind]*

• ***Summary:*** Describes how to make Indonesian-style soy sauce from soybeans, peanut press-cake, or fish.

1591. Muljokusumo, E. Sudigdo. 1978. Hasil proses fermentasi, kedelai dijadikan lebih bergizi [As a result of the fermentation process, the soybean is made more nutritious]. Bandung: Tarate. 79 p. [Ind]*

1592. Passmore, Jacki. 1978. All Asian cookbook: Japan, China, Korea, India, Malaysia, Singapore, Indonesia, Laos, Thailand, Burma, Cambodia, Vietnam, Philippines, Sri Lanka. Secaucus, New Jersey: Chartwell Books. 224 p. Illust. (color photos). Index. 29 cm.

• ***Summary:*** Soy-related recipes: Vietnam: Soya sauce pork (Thit bho to, p. 71, with light soya sauce). Malaysia and Singapore: Mixed vegetables with salted black beans (the black beans are crushed, p. 103). Stuffed beancurd, peppers and black mushrooms (with 6 pieces hard beancurd, each 5 cm {2 inches} square, p. 103). Fried beancurd squares (Taukwa goreng, with 6 squares hard beancurd and dark soya sauce, p. 103). Chinese soup with pickled vegetables, beancurd and mixed meat (with 2 squares soft beancurd, p. 106).

Indonesia: Sweet pork (Babi kecap, with sweet soya sauce {kecap manis}, p. 118). Soya sauce sambal (with dark soya sauce, p. 124). Mixed vegetable soup (Sayur campur, with 2 cakes soft beancurd, p. 126).

Philippines: Lumpia (with dark soy sauce in the sauce, p. 136).

China: Fish with hot bean sauce (with hot bean paste or hoisin sauce, p. 146). Lobster with salted black beans and chili (p. 11). Stewed spare ribs with salted black beans (p. 159). Mixed green vegetables with salted black beans (p. 163). Hotpot of vegetables and beancurd (with 8 squares soft beancurd, p. 164). Ma po beancurd (with 6 squares soft beancurd, p. 166). Cold beancurd salad (with 6 squares soft beancurd, p. 166). Fried beancurd (with 8 squares soft

beancurd, p. 166). Sharks fin soup (with dark soya sauce, p. 167). Wonton soup (with light soya sauce, p. 168).

Japan: Soya bean paste (miso, homemade from canned chick peas + soya sauce!, p. 178). Tuna glazed with miso (Gyoden, with dark miso paste, p. 180). Sukiyaki (with 3 squares soft bean curd, p. 187). Braised pork and leek rolls (Teriyaki, with light soya sauce, p. 188). Fried eggplant in miso sauce (with white miso paste, 194). Miso soup (miso shiru, with diced bean curd and white miso paste, p. 195).

The Glossary includes: Bean paste, hot (made from chilies and soya beans, La do ban jiang, Chinese). Bean paste, salted (also known as yellow bean paste, made from soya beans, Taucheo, Chinese). Bean paste, sweet (either tien mien jiang or do ban jiang, made from soya beans, Chinese. See also hoisin sauce). Beancurd. Beancurd 'cheese,' fermented (in brine with chilies, wine, and spices, Dofu ru, Chinese). Beancurd skin [yuba] (yellowish, almost transparent sheets). Beans, salted, black: See Salted black beans. Kecap manis (Sweet, slightly thick soya sauce, Indonesian, Malaysian). Miso (Japanese). Soya sauce (light, dark, and sweet). Tahu (Malaysian): See beancurd. Taucheo (Chinese): See Bean Paste, salted. Taukwa (Chinese, hard beancurd). Tien mien jiang (Chinese): See Bean paste, sweet. Tofu (Japanese): See beancurd. Vinegar and soya sauce dip: "A sharp-flavoured Korean accompaniment made by blending 3/4 cup light soya sauce, 3 tablespoons white wine vinegar, 3 tablespoons ground sesame seeds and 2 teaspoons finely chopped spring onions. Serve in individual sauce bowls." Yellow bean paste: See Bean paste, salted. Address: Australian-born food writer.

1593. Shindumarta, Rudy Susiawan (Thung). 1978. Hidrolisa parsiil protein kedele [Partial hydrolysis of soy protein]. MSc thesis, Universitas Padjadjaran Bandung, Indonesia. 100 p. [24 ref. Ind; eng]

• ***Summary:*** This work is aimed at developing a semi-chemical soy sauce, midway in price and quality between fermented soy sauce and chemical soy sauce. Partial hydrolysis of defatted soy flour and okara with HCl 6N (hydrochloric acid) was studied at 3 different temperatures (30, 60 and 90ºC). Address: Bandung, Indonesia.

1594. U.S. Department of Agriculture. 1978. The annual report on activities carried out under Public Law 480, 83d Congress, as amended, during the period October 1, 1976 through September 30, 1977. Washington, DC: U.S. Government Printing Office. See table 18.

• ***Summary:*** Table 18 is titled "Title II, Public Law 480–total commodities shipped by program sponsor, fiscal year 1977." The main program sponsors and distributing agencies, listed alphabetically, are AJJDC (American-Jewish Joint Distribution Committee), CARE, CRS (Catholic Relief Service), CWS (Church World Service), LWR (Lutheran World Relief), SAWS (Seventh-day Adventist World Service), UNICEF, UNRWA (United Nations Relief and Works Agency), and WRC (World Relief Commission). All of these are Private Voluntary Organizations (PVO/PVOs), registered with USAID. The following foods containing soy protein were distributed: Soy fortified corn meal (SFCM), soy fortified sorghum grits (SFSG), CSM (corn soya mix), WSB (wheat soya blend), and small amounts of soya flour. The vegetable oil which was shipped to many countries was soybean oil; it is not recorded here.

Foods containing soy protein were distributed to the following countries or areas: Near East: Bhutan, Egypt, Gaza, Jordan, Jordan West Bank, Lebanon, Morocco, Tunisia, Yemen.

Latin America: Bolivia, Brazil, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Panama, Peru.

Africa: Benin, Botswana, Burundi, Cameroon, Chad, Congo, Ethiopia, Gambia, Ghana, Ivory Coast, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mauritania, Mozambique, Niger, Rwanda, Sao Tome & Principe, Senegal, Seychelles, Sierra Leone, Somalia, Sudan, Swaziland, Tanzania, Togo, Upper Volta, Zambia.

Asia: Bangladesh, India, Indonesia, Nepal, Philippine Islands, Singapore, Sri Lanka. Address: Washington, DC. Phone: 703-875-4901 (1991).

1595. Wardhani, Rose Wahyuni. 1978. Variasi pembuatan tempe di sekitar kota Bogor [Variations of tempeh processing in Bogor and its vicinity]. Thesis (Skripsi), Akademi Gizi (Academy of Nutrition), Jakarta. 39 p. [Ind]* Address: Jakarta, Indonesia.

1596. Yanwar, Afrida Nazir; Saparsih, Sri Budhi. comps. 1978. Selected abstracts of traditional fermented food. Jakarta, Indonesia: National Scientific Documentation Center, Indonesian Institute of Sciences (PDIN–LIPI). iv + 470 p. Author index. 29 cm. [506 soy ref]

• ***Summary:*** These are abstracts of documents published from 1910 to 1976 on traditional fermented food, particularly of food prepared and consumed in Southeast Asia and the Far East. Each chapter is divided into 6 sections: Method of preparation, microorganisms, fermentation studies, nutritive values, other influence in the foodstuff, storage. Within each section, the references are listed alphabetically by author. The source of most of the references is *Chemical Abstracts,* to which an exact citation is usually given.

Contents: Preface. Introduction. 1. Fermented rice (incl. tape ketan [tapeh], sake, awamori). 2. Fermented soy beans: Soysauce (p. 173-294; 350 references), tempe (p. 294-307; 43 refs), natto (p. 307-312; 13 refs), miso (p. 312-343; 100 refs). 3. Fermented coconut press cake (bongkrek; p. 345-

47). 4. Sauerkraut. 5. Fermented fish. 6. Vinegar. 7. Fermented cassava (tape / tapeh). Author index (p. 459-70).

Financial assistance was received from the National Institute of Chemistry, the Indonesian Institute of Sciences, the Indonesian Protein Project in the framework of ASEAN–Australian Economic Co-operation. Address: Indonesia.

1597. **Product Name:** Soymilk.
**Manufacturer's Name:** Rama Food Product Co., Ltd.
**Manufacturer's Address:** Bangkok, Thailand.
**Date of Introduction:** 1978?
**New Product–Documentation:** Soya Bluebook. 1981. p. 61. Bangkok. Soy beverage. Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 105-06.

1598. Claiborne, Craig; Franey, Pierre. 1979. Winging it: Food. *New York Times.* Jan. 21. p. SM16.
• ***Summary:*** Recipes are given for chicken wings. One of these is Chinese Indonesian chicken wings, which calls for "¼ cup ketjap manis (see note)."

The note says: "Ketjap manis is widely available in specialty shops that deal in Far Eastern foods."

1599. Bhumiratana, Amara. 1979. LEC activities in Thailand. *LEC Report* No. 7. p. 225-34. D.E. Wilson, ed. Low-Cost Extrusion Cookers: Second International Workshop Proceedings (Fort Collins, CO: Dept. of Agric. and Chemical Engineering, Colorado State Univ.).
• ***Summary:*** Contents: Introduction. Causes of malnutrition problems in Thailand: Population growth and food production, family income (61.1% of all families in rural Thailand live in poverty, compared with about 3% in urban areas; northeast Thailand is the poorest section), eating habits and patterns, food distribution. The use of extruded products in solving malnutrition problems in Thailand: Food and nutrition policy. The production of extruder products: The Wenger X-25 extruder (training since 1971): History, background, operation, promotion of baby food production (from Oct. 1973), conclusion. Brady extruder: Background, testing operations, Brady Crop Cooker and product development at IFDRP (protein enriched cereal foods, stabilization of rice bran). Contains nine tables, a number of which mention soy.

LEC activities in have received support from USAID and from ASEAN (Association of Southeast Asian Nations, which consists of Indonesia, Malaysia, Philippines, Singapore, and Thailand). Address: Prof., Inst. of Food Research and Product Development, Kasetsart Univ., Bangkok, Thailand.

1600. Gandjar, Indrawati. 1979. Food: Microbiological aspects. Paper presented at UNESCO Regional Training Course Development. 16 p. Held 8-24 Jan. 1979 at Bandung Institute of Technology, Bandung, Indonesia. *
Address: Nutrition Research & Development Center, Dep. of Health, Indonesia.

1601. Jansen, G.R. 1979. Nutritional aspects of the LEC program at Colorado State Univ. *LEC Report* No. 7. p. 121-41. D.E. Wilson, ed. Low-Cost Extrusion Cookers: Second International Workshop Proceedings (Fort Collins, CO: Dept. of Agric. and Chemical Engineering, Colorado State Univ.). [38 ref]
Address: Dep. of Food Science and Nutrition, Colorado State Univ., Fort Collins, CO 80523.

1602. Muchlis, Atjeng. 1979. The LEC program in Indonesia. *LEC Report* No. 7. p. 101-05. D.E. Wilson, ed. Low-Cost Extrusion Cookers: Second International Workshop Proceedings (Fort Collins, CO: Dept. of Agric. and Chemical Engineering, Colorado State Univ.).
• ***Summary:*** In 1977, soybean production in Indonesia was only 0.5 million metric tons (tonnes), and 0.75 million tonnes had to be imported from foreign countries to meet domestic needs. IPB (The author's university) and CARE (Cooperative for American Relief Everywhere) have worked together in developing supplemental foods of high nutritional value and, since April 1976, in testing food products made by a Brady crop cooker (model 206). In August 1976 a two-week LEC training program was held in Indonesia; the instructor was Mr. Ronald E. Tribelhorn of Colorado State Univ. One of the foods developed was composed of rice polish (70%) and soybean (30%). Address: Institut Pertanian Bogor (IPB, Bogor Agricultural Univ.), Bogor, Indonesia

1603. Shurtleff, William; Aoyagi, Akiko. 1979. Appendix C: Varieties of tofu in East Asia (Document part). In: William Shurtleff and A. Aoyagi. 1979. The Book of Tofu. New York: Ballantine Books. 433 p. See p. 402-05.
• ***Summary:*** Gives the local, vernacular name for and a description of many varieties of tofu found in China and Taiwan, Indonesia, South Korea, Philippines, Thailand, and Vietnam.

China: Toufu, dowfu, daufu, tofu-kan, wu-hsiang toufukan. Indonesia: Tahu. South Korea: Tubu, yubu.

Philippines: Philippine tofu *(tokwa).* Soymilk curds *(tajo).* Brine-fermented tofu *(tahuri).*

Vietnam: dau hu, dau phu.

Note: This is the earliest English-language document seen (Feb. 2004) that uses the word "daufu" to refer to Chinese-style tofu or the word "tokwa" to refer to Philippine-style tofu. Address: P.O. Box 234, Lafayette, California 94549.

1604. Wang, H.L.; Mustakas, G.C.; Wolf, W.J.; Wang, L.C.; Hesseltine, C.W.; Bagley, E.B. 1979. Soybeans as human food: Unprocessed and simply processed. *USDA Utilization Research Report* No. 5. iv + 54 p. Jan. Slightly revised, July 1979. Jan. No index. 28 cm. Compiled for USAID. [50+ ref]

• ***Summary:*** Contents: Introduction. 1. Soybean food uses in Asia. China: Soaking dry soybeans, tou chiang (soybean milk), tou fu (soybean curd), processed tou fu products, tou fu pi (protein-lipid films), huang tou ya (soybean sprouts), whole soybeans, fermented soybean foods, production and consumption. Japan: Tofu (soybean curd), kinugoshi tofu, processed tofu products, yuba (protein-lipid film), soybean milk, gô (ground soybean mash), daizu no moyashi (soybean sprouts), whole soybeans, fermented soybean food, production and consumption. Korea: Tubu (soybean curd), processed tubu product, soybean sprouts, whole soybeans, soybean flour, fermented soybean food, production and consumption. Indonesia: Tahu or tahoo (soybean curd), bubuk kedele (soybean powder), tempe kedele, tempe gembus [the name in Central and East Java for okara tempeh], oncom tahu [the name in West Java for okara onchom], other soybean products (soybean sprouts, green soybeans, roasted and boiled soybeans, kecap {soy sauce}, tauco {soybean paste}), food mixtures, production and consumption. Thailand: Tofu *(tauhu),* soy sauce, green soybeans in the pods *(tourae).* Philippines: Soybean sprouts, soybean coffee, soybean cake, soybean milk, tou fu and processed tou fu products, production and consumption. Burma. India. Malaysia. Nepal. Singapore. Sri Lanka (Ceylon). Vietnam. Middle East. References–Soybean food uses in Asia.

2. Soybean food uses in Africa. Ethiopia: Injera, wots and allichas, kitta, dabbo, dabokolo, porridge. Kenya. Morocco. Nigeria: Whole soybeans, soybean paste, corn-soy mixtures (soy-ogi). Tanzania. Uganda. Production. References–Soybean food uses in Africa.

3. Soybean food uses in Europe and U.S.S.R.

4. Soybean food uses in Latin America. Argentina. Bolivia. Brazil. Chile. Colombia. Ecuador. Guyana. Paraguay. Peru. Uruguay. Venezuela. Mexico: New village process, commercial developments. Honduras. Costa Rica. Panama. Dominican Republic. Jamaica. Haiti. Trinidad. References–Soybean food uses in Latin America.

5. Soybean food uses in North America. United States. Canada. References–Soybean food uses in North America.

6. Soybean food uses in Australia. 7. Summary of soybean food uses. Traditional soybean foods: Soybean milk, soybean curd and processed soybean curd products, protein-lipid film, soybean sprouts, tempe (tempeh), green soybeans, boiled soybeans, roasted soybeans, soybean flour, soy sauce, fermented soybean paste, fermented whole soybeans, natto, fermented soybean curd. Experimental soybean foods: Whole soybean foods, soybean paste, soy flour, soy beverage. Production and consumption.

8. Simple village process for processing whole soybeans: Equipment, process, sanitation requirements, quality of product, evaluation of product in formulas and procedures for family and institutional use in developing countries. NRRC village process. 9. Industrial production and selling prices of edible soybean protein products.

10. Barriers to accepting and using soybeans in food: Availability. Cultural and social factors. Texture. Flavor. Nutrition and food safety. Technology development. Technology transfer. Address: NRRC, Peoria, Illinois.

1605. *Whole Foods (Berkeley, California).* 1979. The food of the future. 2(1):22-24. Jan.

• ***Summary:*** The article begins: "Why devote an entire issue of *Whole Foods* to the subject of soyfoods? Soyfoods are a rapidly growing part of the natural foods industry..."

"The bringing of the 'Soyfoods Revolution' to the natural foods industry is the work of individuals, toying and playing with new recipes in their own kitchens and shops. No person deserves more credit for this revolution than William Shurtleff who, along with Akiko Aoyagi, wrote *The Book of Tofu,* and told us all how to do it. (An updated pocket-size version of *The Book of Tofu* is just off the presses of Ballantine Press.) Shurtleff travels the globe, sharing his expertise on soyfoods, covering topics as specific as chip-dip recipes and as broad as the role of soybean production in future patterns of world protein hunger.

"Other individuals, most of them with small soyfoods shops of their own, met recently to form the Soycrafters Association of North America (SANA), which is likely to serve as the backbone of the Soyfoods Revolution in the natural foods industry. [Note: This historic first meeting was held on 28-30 July 1978 at The Soy Plant in Ann Arbor, Michigan.] SANA selected Larry Needleman as its first president. Needleman, whose Bean Machines, Inc. imports the prime line of Takai tofu and soymilk equipment from Japan, has been a major source of information about soyfoods equipment for our industry.

"Needleman wrote about the spirit of the new organization at its first gathering in Ann Arbor.

"'Imagine a group of seventy people representing enthusiastic dedication (almost to the point of craziness) to the production and distribution of tofu and other soyfoods, gathered in an informal setting in a university town in the Midwest, with meetings scheduled from nine in the morning till eleven at night–and you've got a good idea of what went on... 'Sharing began immediately. Groups of people gathered here and there and began asking each other about their shop or organization. Those passing by would hear a familiar word such as 'yield' of 'pressure-cooker' and just stopped to join the conversation. It was apparent that here

was a gathering destined to be stimulating and mutually beneficial...

"'The first evening, Bill Shurtleff set up a slide show about tofu and miso production in Japan. The presentation ran the gamut from small, traditional shops built over their own well, to large, fully-automated factories turning out tens of thousand of pounds per day. Bill answered questions and added a personal touch to the showing because he had shot the photos himself over a period of years, and was familiar with the language, traditions and production of the Japanese...

"'On Saturday morning, The Soy Plant showed us their method of producing tofu and soymilk. Those with less experience absorbed information and asked questions, and those with more experience volunteered information, clarified points and offered suggestions. Then Wataru Takai, the overseas manager for Takai Tofu and Soymilk Equipment Co., Japan's largest manufacturer of this equipment, explained principles behind each step of production, and the uses of the equipment...

"'At a later session, it was remarked that many soyfoods producers are operating on an inefficient and labor-intensive basis. Some felt this was a good way to begin, first becoming intimate with the steps of production and developing a market 'track record,' and then using that base to upgrade production by purchasing more sophisticated equipment. Others felt that the time and energy involved in putting together a makeshift shop which was outgrown in about six months would be better spent in the capital to start at higher technological level...

"'In one of the most popular and exciting discussions of the conference, the consensus of the group was that tofu and soymilk were the foods that Americans have been waiting for. A list of related products that have been marketed with incredible success included tofu burgers, no-egg salad, honey soymilk ice cream, tofu chip-dips and dressings, flavored soymilk, tofu 'mayonnaise,' and pressed, marinated tofu. There was unanimous agreement that it was these new soyfoods that would capture the interest and palate of middle America, people who had turned up their noses at that tasteless white cake of tofu floating in water...

"'Later we discussed the problems of proper storage and display of our products. In US food markets, tofu has usually been sold with Oriental foods in the vegetable section. Getting it moved to a cooler, more appropriate cheese display case, where it will stay fresh longer and compete favorably with dairy products, has met with resistance...

"'In the evening, another slide show by Bill Shurtleff showed us how tempeh, a key protein source for millions of people in Indonesia, is quickly and simply produced as a cottage industry in their homes. Having sampled this unusual food at lunch, we were eager to learn about it because it was delectable. Somewhere between a deep-fried fish cake and Kentucky fried chicken in flavor and texture, it lent itself to use in a seemingly endless variety of ways...'

"Toward the end of the conference, discussion turned to marketing and finance. It was found that some firms lacked capital for growth, while others had enough capital but needed greater management skills to keep up with the growing demand for soyfoods. That demand is not uniform nationwide. Different regions show various levels of consumer awareness, interest in, and acceptance of soyfoods. Printed hand-out sheets and cooking classes were suggested as promotional efforts were an important part of the creation of a desirable image for soyfoods.

"Before leaving Ann Arbor, the participants formed the Soycrafters Association of North America as a trade association to promote soyfoods and exchange information among the members. With the founding of SANA, the Soyfoods Revolution took its longest recent stride. Soycrafters were no longer isolated persons, groups and shops, but had become a nationwide network devoted to the same purposes, sharing their experiences for mutual benefit and the ultimate benefit of the American consumer."

Note: The word "soyfoods" is used throughout this article.

1606. Hesseltine, C.W. 1979. Some important fermented foods of Mid-Asia, the Middle East, and Africa. *J. of the American Oil Chemists' Society* 56(3):367-74. March. [34 ref]

• ***Summary:*** Contents: Abstract ("These fermentations, unlike those of the Orient, use bacteria and yeasts instead of filamentous fungi"). Introduction. Eight reasons for using a fermentation process in the production of acid foods. Idli. Kishk. Ogi (The Yoruba {western Nigeria} for a fermented sour maize product found throughout Black Africa). Mahewu (Magou). Kaffir beer (Bantu beer, sorghum beer, mqombothi).

"When we think of food fermentations, aside from those we encounter daily such as cheese and bread, we think of those strange and exotic products like soy sauce, soybean paste [miso], and tempeh made in China, Japan, and the East Indies."

A photo shows Hesseltine. See also p. 380-81 of this March issue. Address: NRRC, Peoria, Illinois.

1607. Leon, Sonia V. de. 1979. Tropical foods in the Far East. In: G.E. Inglett and G. Charalambous, eds. 1979. Tropical Foods: Chemistry and Nutrition. Vol. 1. New York: Academic Press. x + 701 p. See p. 351-63. [15 ref]

• ***Summary:*** The section titled "Fermented Cereals and Grains" gives basic information about the following fermented soybean foods: Tempeh, soy sauce, miso, and sufu or Chinese cheese. Address: Dep. of Food Science and Nutrition, Univ. of the Philippines, Diliman, Quezon City, Philippines.

1608. Shanmugasundaram, S. 1979. Varietal development and germplasm utilization in soybeans. *AVRDC Technical Bulletin* No. 13 (78-102). 36 p. March. (Shanhua, Taiwan). [90 ref]

• ***Summary:*** An excellent overview of the subject. Contents: Introduction. Historical background of soybeans. Botany of the soybean. World trends in soybean production. Strategies in varietal development: U.S.A., Japan, Republic of China (Taiwan). International programs: Illinois–India, Asian Vegetable Research and Development Center (AVRDC), Program for International Research, Improvement and Development of Soybeans (PIRIDS)–International Soybean Resource Base (INTSOY), International Institute of Tropical Agriculture (IITA), Thailand–Japan, Southeast Asian Regional Center for Graduate Study and Research in Agriculture (SEARCA). Concepts for future development.

Table 2 gives the taxonomic status and nomenclatural history of the soybean. Table 3 lists vernacular names of the soybean in 36 countries or regions of the world. Gives a brief history of soybean breeding and germplasm collections in each of the major soybean countries. Address: Asian Vegetable Research & Development Center, Shanhua, Taiwan.

1609. Winarno, F.G. 1979. Fermented vegetable protein and related foods of Southeast Asia with special reference to Indonesia. *J. of the American Oil Chemists' Society* 56(3):363-66. March. [22 ref]

• ***Summary:*** Contents: Abstract. Introduction. Fermented foods and food needs. Tempeh and oncom. Bongkrek (and its toxic-producing bacteria) and tauco. Wholesomeness of fermented foods. Development of food supplement using fermented food as a basic ingredient.

Table I shows the population, population growth rate, and average national income per capita in ten Southeast Asian countries. Indonesia has by far the largest population (136.9 million), followed by Vietnam (47.3). Khmer republic (Cambodia) has the highest population growth rate (2.8%), followed by the Philippines (2.7%); Singapore has the lowest (1.3%). Singapore has by far the highest average national income per capita (US$2,510), followed by Malaysia ($720), then Maungthai (Thailand–$350); Khmer Republic and Laos have the two lowest per capita incomes ($70). Table II shows the nutritional composition of tempeh, oncom, bongkrek, and tauco per 100 gm. Table III shows 7 fermented vegetable protein foods in Southeast Asia: Tempeh, bongkrek, oncom, tauco kecap (shoyu), ang-kak, and sofu (sufu); for each is given the microorganism used, substrate, nature of product (solid, liquid), and area where article is sold commercially. Table IV shows the composition and nutritional value of TFR (Tempeh-Fish-Rice), as developed at the National Research Institute, Bogor, Indonesia. A photo shows F.G. Winarno. Address: Bogor Agricultural Univ., Fatemeta, IPB, Jalan Gunung Gede, Bogor, Indonesia.

1610. Banzon, Julian A.; Escueta, Elias E. 1979. Progress in the technology of soymilk production. In: Hideo Chiba, et al., eds. 1979. Proceedings of the Fifth International Congress of Food Science and Technology (1978-Kyoto). Tokyo: Kodansha Ltd.; Amsterdam and New York: Elsevier Scientific Publishing Co. xi + 436 p. See Chapter 2.2, p. 74-78. Illust. Author index. Subject index. 26 cm. Series: Developments in Food Science, Vol. 2. [12 ref]

• ***Summary:*** Contents: Introduction. Progress in processing. Progress in increasing acceptability. Nutritional improvement. Soybean varieties. Customer presentation. Philippine experience in soymilk production (3-year history). Simplified soymilk production. Calculation methods.

"CDCP, a construction group involved in a variety of ventures, entered into a contract with the Food Science/Technology Department of U.P. Los Banos, to produce PHILSOY, using the latter's 600 bottle/day pilot plant. PHILSOY was well received and production reached 3500 bottles/day. The retail price was kept below a competing skim milk chocolate-flavored beverage, and at about the same price as the better soft drinks. After about 3 years of operation, the venture stopped due to breakdown of the processing equipment which had been made to run at 3500 bottles/day even though it was designed for only 600 bottles/day. Acquisition of additional equipment was imperative but the contracting parties failed to make a decision. The CDCP experience proved that soymilk production can be profitable in the Philippines. The need for a nutritious beverage is in the hinterlands where transporting a bottled product from a distant processor is expensive. The buying power is low, so that the unit price must also be low. The most expensive step is in-bottle sterilization. A cheaper system lies in serving soymilk "on draught", and prepared locally as a "home brew", a system not uncommon in the villages. Unsold soymilk can be converted to tofu, and the soy press-cake [okara] can be used as an ingredient of the locally made rice cakes (puto)."

Tables show: (1) Nutrient recoveries from different soybean varieties and processing methods (incl. Clark, Bragg, Hsi-Hsi. Protein recovery ranged from 95% to 71.8%. Solids recovery ranged from 89% to 42.2%). (2) Composition of seven soymilks. Address: Dep. of Food Science and Technology, Univ. of the Philippines, Los Baños College, Laguna, The Philippines.

1611. Wilson, David E. 1979. Low-cost extrusion cooking: A spreading technology. *League for International Food Education Newsletter.* April. p. 1-3. [2 ref]

• ***Summary:*** "In January 1979, forty-five representatives of eighteen countries gathered in Dar es Salaam, Tanzania, to

exchange the latest information on their respective low-cost extrusion cooker (LEC) activities... Whereas the majority of LEC projects were just on the drawing board at the time of the first international workshop in June 1976 (L.I.F.E. *Newsletter* June 1977) and tentative expressions of interest were the order of the day, reports at Dar es Salaam focused on actual testing and production experiences gained. This time, there were no reservations; instead, the mood was one of enthusiastic optimism based on results.

"LEC technology as a means to produce nutritious foods at low cost is spreading. The Tanzania plant is producing a baby food called 'Lisha', composed of locally-grown maize and soy, milk, and imported vitamin and mineral additives, for distribution to maternal-child health centers. Other applications include the manufacture of 'Thriposha' for food donation programs in Sri Lanka, where construction on a new dual Brady cooker processing complex is slated for completion this fall. In Costa Rica the recently installed CARE plant, jointly financed by CARE and an AID operational program grant, is scheduled to begin production of fortified CSM and full-fat soy flour in May. In Bolivia, where initial production of 'Maisoy' was for use in government feeding programs, the Nutrinal Company is now marketing its expanding line of Brady-processed products commercially.

"The Guyana Pharmaceutical Corporation in Georgetown is currently engaged in test marketing and plans to begin production of its LEC baby food 'Cerex' in 1979. In Chihuahua, Mexico, Brady-processed full-fat soy flour is being used by Productos Alimenticios Delicias as a fortifying ingredient in a variety of food products sold in the marketplace. Other countries, such as Thailand, Honduras, and the Philippines, are involved in product formulation and testing or other activities preliminary to establishing production facilities." Address: Research Associate, Dep. of Agricultural & Chemical Engineering, Colorado State Univ., Fort Collins, Colorado 80523.

1612. Claiborne, Craig. 1979. Q&A. *New York Times.* May 9. p. C4.
• ***Summary:*** A displaced New Yorker, now living in Kansas City, Missouri, asks for a recipe for ketjap manis (the local Oriental grocery store has never heard of it), and for information about it, and a recommendation for a possible substitute.

"A. Ketjap manis is an ingredient widely used in Indonesian cookery. Basically it is a sweet soy sauce. Here is the recipe of Mrs. Melita Soeharjo, a marvelous Indonesian cook who lives in Manhattan."

Note: This recipe is identical in every way to the recipe that appeared in the this newspaper on 21 June 1978 (p. C6).

In New York City, a good source of Indonesian specialty ingredients is the Southeast Asia Food and Trading Company, 68A Mott Street.

1613. Hoang, Van Chi. 1979. Report to the Bureau of Industrial Guidance, FDA: Vietnamese soysauce. Its particularities and our manufacturing process. Bowie, Maryland: Vietnam Food & Drink Co. 4 p. May 25. Unpublished typescript on letterhead. 28 cm.
• ***Summary:*** Contents: Names of company director, plant manager, and technical board (in left margin). Bibliography: Translation into English of article on Vietnamese soysauce production found in *Khoa Hoc Thuong Thuc*, a scientific magazine published in Hanoi. The translation follows: General process (for making soysauce). Some differences between Chinese and Vietnamese soysauces.

Our manufacturing process: Ingredients to obtain 8 gallons of soysauce (Soybeans 10 lb. Rice 5 lb. Salt 5 lb. Sugar 5 lb. Water 5 gallons). Rice fermentation or "koji" preparation. Soybean fermentation or preparation of the brine. Preparation of soysauce. Packaging. The pH problem. The problem of oxydation [sic, oxidation]. Our request with FDA.

Vietnamese always prefer their own soysauce to the Chinese brand. After fermentation is over, the Chinese filter the product, taking only the filtrate to make their sauce, while discarding all the solid particles that remain. The Vietnamese, on the other hand, grind the whole product to obtain a sauce which is much thicker. The Chinese add *Lactobacillus* to the cooked soybeans to stimulate their fermentation. The Vietnamese roast their soybeans before cooking. Chinese like black soy sauce. To get that black color, they keep their soysauce in an open jar, exposed to the air for as long as three months; auto-oxydation turns the sauce black. Vietnamese prefer brown-colored soysauce. Vietnamese soybeans do not have a great tendency toward oxydation. Roasted soybeans and rice inoculated with *Aspergillus oryzae* are fermented separately. The finished koji has a pH of 4.0 (sample A1). During the soybean fermentation, if the temperature is maintained at 35-38ºC, the fermentation is complete in 9 days, with a pH of 5.0 to 5.2 (sample A2). "Fermented rice [koji] and fermented soybeans are mixed together, and salt and sugar are added. The whole mixture is then ground in an industrial blender and reduced to a thick paste" (sample A3). The pH of the final mixture is important since "Vietnamese customers have a traditional for a sweet and only slightly sour sauce." The addition of a few grams of vitamin C to each 8-gallon batch of soysauce helps to fight oxidation and prevent unwanted darkening of the sauce. The finished soysauce is poured into glass bottles (8 oz or 16 oz) and sealed with a cap. The company requests that the FDA consider this soysauce as a fermented food rather than an acidified food, and authorizes the company to keep its pH around 4.8–the same as some Chinese-style sauce made in the USA (sample A4).

Note 1. This is the earliest document seen (March 2001) concerning the work of Vietnamese with soyfoods or soybeans overseas (one of two documents). By June 1979 Hoang Van Chi was making Vietnamese soy sauce in Bowie, Maryland.

Note 2. The address of the company's factory is handwritten in red at the top left of page 1: 3824 Ironwood Place, Landover, Maryland 20785. Phone: (301) 322-7948. The company director, Hoang Phan, is the writer's wife. Address: Technical Director, Vietnam Food & Drink Co., Inc., 12653 Heming Lane, Bowie, Maryland 20716. Phone: (301) 262-3735.

1614. Tanuwidjaja, Lindajati; Ambijah, Koesbianti. 1979. Pembuatan inokulum tempe dengan kultur campuran [Preparation of tempeh inoculum using mixed cultures]. In: Proceeding Seminar Teknologi Pangan IV. See p. 191-99. Held 16-17 May 1979 in Bogor, Indonesia. [Ind]* Address: Bandung, Indonesia.

1615. Claiborne, Craig. 1979. A word or two about passionfruit: De gustibus. *New York Times.* June 18. p. B12.
• ***Summary:*** Part II of this article begins: "One of the great and essential ingredients for the cooking of Indonesia and other Eastern countries is a liquid called ketchap or ketjap manis. It is a dark, sweet soy sauce that is vital to impart the 'native' flavors of Indonesia."

It is quite readily available, in bottled form, in almost all fine-food specialty shops in Manhattan and throughout the United States. A recipe (that came from an excellent Indonesian cook) was recently printed in this newspaper (9 May 1979, p. C4).

Claiborne now has a letter from Rachael Baker of Princeton, New Jersey, which contains three recipes for simplified versions of ketjap manis, which she had found in cookbooks over the years; they do not require the use of any special Indonesian ingredients–such as salam leaves and laos.

The main ingredients is these are soy sauce, dark molasses, and brown sugar. The source of each recipe is given.

1616. Pardo, L.V.; Luis, E.S.; Soriano, M.R.; Bucoy, A.S. 1979. Changes in the free amino acid content of an experimental soy sauce. *Philippine J. of Food Science and Technology* 3(1):31-45. Jan/June. Paper presented at the 13th annual convention of the Philippine Assoc. of Food Technologists, 20-21 Nov. 197a, Manila. [26 ref]
• ***Summary:*** Describes changes in the content of 16 free amino acids (of which 9 were essential amino acids) in a soy sauce mash during a 12-week fermentation. "The maximum formation of amino acids was reached between the 7th and 11th week of fermentation. Glutamic acid was the most abundant and it exhibited a very irregular increase-decrease pattern. The others also showed almost the same pattern." Address: Food Technology Research Div., Industrial Research Center, National Inst. of Science and Technology, NSDB, Manila, Philippines.

1617. **Product Name:** Bodhi Sauce and Tuong Cu-Da (Vietnamese Soy Sauces).
**Manufacturer's Name:** Vietnam Food and Drink Co.
**Manufacturer's Address:** 12653 Heming Lane, Bowie, Maryland 20716. Phone: (301) 322-7948, 262-3735.
**Date of Introduction:** 1979. June.
**Ingredients:** Soy-beans, rice, salt, water.
**Wt/Vol., Packaging, Price:** 10 oz.
**How Stored:** Shelf stable.
**New Product–Documentation:** Hoang, Van Chi. 1979. "Report to the Bureau of Industrial Guidance, FDA: Vietnamese soysauce. Its particularities and our manufacturing process." Bowie, Maryland: Vietnam Food & Drink Co. 4 p. May 25.

Label. 1980. 7.25 by 3 inches. Paper. Black on white. "A wholegrain soybean sauce used for centuries by Buddhist monks in S.E. Asia. Wholegrain soysauce like this one has many virtues among which: It helps the skin remain fresh and young. There probably lies the secret of Oriental women's skin beauty. It eliminates from the body toxic substances produced by tobacco, alcohol and atomic radiation. The yeast that remains alive in the sauce prevents the development of harmful germs. It is a food for good health and longevity. Reference *The Chinese Journal,* New York. Used to dip To-Fu (bean curd), boiled vegetables or just plain rice. Non-vegetarians can use this sauce to dip: chicken, duck, pork, beef boiled or roasted."

Leviton. 1982. Soyfoods. Winter. p. 68-69. "Tuong Cu-Da is identical to Bodhi Sauce but contains added sugar for the extra sweetness the Vietnamese prefer." Both are made with glutinous rice (sweet rice). Soya Bluebook. 1987. p. 92. Address is now 3824 Ironwood Place, Landover, Maryland 20785.

Spot in *Whole Foods* magazine. 1982. Feb. p. 50. A photo shows Hoang Van Chi and many bottles of his Bodhi Sauce.

1618. Horan, F.E. 1979. Corporations and the world food problem. Paper presented at World Game '79, New York University, Loeb Student Center, New York City, NY. July 18. 20 p.
• ***Summary:*** Focuses on ADM, vegetable proteins, TVP, cereal-soy blends, and the Food for Peace Title II program. Figure 1 shows percentage of after-tax income spent on food: Canada 14.8, France 16.5, UK 16.6, Netherlands 16.9, USA 17.0, West Germany 21.2, Korea 46.8, Philippines 50.8.

In the period 1963-65, the percentage of total protein obtained from vegetable and from animal sources was:

Developing regions: 81/19. Developed regions 46/54. World 68/32. Address: Vice President, R&D Div., Archer Daniels Midland Co., Decatur, Illinois.

1619. Leviton, Richard. 1979. INTSOY: Taking soybeans around the world. *Soycraft (Greenfield, Massachusetts)* 1(1):46-49. Summer.

• ***Summary:*** Contents: Introduction. Outreach: An international soybean network. Setting up the infrastructure. INTSOY soybean varietal testing program (ISVEX). Training program. Publications & conferences. Two case studies: Peru & Sri Lanka.

"Short-term projects have been completed in Guyana, Uruguay, Peru, Bangladesh, Panama, Thailand, Iraq, Saudi Arabia, Ivory Coast, and Venezuela. Possibly the two most prominent assignments for INTSOY are the Soybean Development Project in Sri Lanka, initiated in 1975, and the Soybean and Maize Development Project in Peru, begun in 1977." Address: Colrain, Massachusetts.

1620. Shurtleff, William; Aoyagi, Akiko. 1979. The book of tempeh: A super soyfood from Indonesia. New York, NY: Harper & Row. 160 p. Illust. by Akiko Aoyagi Shurtleff. Index. July. 28 cm. [24 ref]

• ***Summary:*** Contents: Acknowledgments. What is tempeh? Preface. 1. Soybeans–Protein source of the future: Introduction, the causes of hunger and starvation–two analyses *(The Twenty-Ninth Day,* by Lester Brown–population, affluence; *Food First: Beyond the Myth of Scarcity,* by Lappé and Collins–population, narrow focus on increasing food productivity, international food exploitation, land monopolization and misuse, cash crop system of export agriculture). Ten reasons soy will be the protein source of the future: 1. Optimum land utilization. 2. Lowest cost protein. 3. High nutritional value. 4. Time tested. 5. Remarkably versatile. 6. Appropriate technology. 7. New dairylike products. 8. Hardy and adaptive. 9. Free nitrogen fertilizer. 10. Energy and resource efficient. "All of these ten factors work together synergistically, reinforcing one another, to give added weight to the prediction that soybeans will be a key protein source for the future on plant earth." Present patterns of soy protein utilization. New developments. An idea whose time has come.

2. Tempeh as a food. 3. Getting started (incl. basic preparatory techniques and 18 recipes, incl. a recipe for sweet Indonesian soy sauce *{kechap manis}).* Favorite tempeh recipes (13 Western favorites, 6 non-fried favorites, and 12 Indonesian favorites; also Suggestions for serving tempeh throughout the day). 4. Western-style and Oriental tempeh recipes (68 recipes). 5. Indonesian tempeh recipes (70 recipes). 6. Making tempeh at home or in a community. 7. Making tempeh starter. 8. Tbe Indonesian tempeh shop. Appendix A: A brief history of tempeh East and West. Appendix B: Tempeh shops in the West. Weights, Measures,

and Equivalents. Glossary. Bibliography. About the authors. About the New-Age Foods Study Center.

The first book in the world devoted entirely to tempeh. It contains the first sizeable collection of American-style and Indonesian tempeh recipes (130 in all), the first illustrated descriptions of making tempeh, tempeh starter, and onchom on various scales in Indonesian tempeh shops, the first history of tempeh, detailed discussion of tempeh in Indonesian culture and of the many varieties of Indonesian tempeh, and the first recommendations for commercial names for the more than 30 types of tempeh that could easily be made in the West. It also contains chapters and reviews of the literature on tempeh nutrition and the microbiology and biochemistry of tempeh fermentation, plus the largest bibliography on tempeh to date (including many new Indonesian references), an annotated listing of 61 people and organizations around the world connected with tempeh, and the first list of tempeh companies in the West.

Illustrations (line drawings; unnumbered, not including "spots"). Indonesian dancer in sarong and crown. Balinese lion mask dancer. Two Indonesian women dancing. Cuts of fresh tempeh on a woven bamboo tray. Woman in a traditional Indonesian kitchen cooking tempeh. Terraced rice patties in Java. Woman selling tempeh in Bali market. Masked Indonesian figure. Soybeans in the pod. A hand holding dry soybeans over a sack of such soybeans. Three women selling beans and grains in a Javanese market. Two

men selling tempeh in a Javanese market. Balinese mask. Indonesian mortar and pestle. Traditional oil skimmer for deep frying. A wok. Tamarind paste and pods. Soy sprouts. Pieces of tempeh on a bamboo tray Gado-gado. Laos root & chilies. Palm sugar. Chilies. Indonesian woman carrying fruits in a bowl on her head. Salam leaf. Botok tempeh. Peté beans. Winged and masked Balinese figure. Indonesian spices. Soybean (enlarged). Cartoon of a fuzzy little critter driving his tiny tractor over a cake of tempeh, inoculating it with a secret enzyme (The Farm, Summertown, Tennessee). Placing tempeh into a homemade Styrofoam incubator. Cross section of good tempeh and bad. Winged beans. Close-up of outside of a homemade tempeh incubator. Dry soybeans in pods on plant. Woman in the USA making tempeh. A deep woven bamboo basket for treading soaked soybeans. Ten steps in the process for making traditional soy tempeh in a small shop (GIZI, Bogor). Twenty steps in the process for making and delivering traditional soy tempeh in a large shop (Oeben, Bandung). Two views of a modern dehuller and dehuller-separator. Five steps showing making tempeh in plastic bags. Three steps showing making tempeh in banana-leaf wrappers. Fourteen steps in the process for making and delivering Malang tempeh.

Map of Southeast Asia. Map of Java, Madura, and Bali (incl. West, Central and East Java). Indonesian stilt house (house on stilts, famous among the Dayak in Borneo, the Minangkabu and Batak of Sumatra, and the Toraja of Sulawesi). Woman selling leaf-wrapped tempeh in a Balinese market (color, rear cover).

Numbered figures (line drawings unless otherwise stated. The number before the decimal refers to the chapter number). 1.1 Table: The changing pattern of world grain trade (exporters and importers). 1.2 Graph: Projected population densities in various regions of the world. 1.3 Bar chart: Per capita protein consumption in rich and poor countries. 1.4 Bar chart: Per acre yields of usable protein from various food sources (pounds per acre). 1.5 Graph: Word soybean production (1965-1977). 1.6 Bar chart: Protein consumed vs. protein returned from milk, eggs, chicken, pork, beef. 1.7. Where the world's money goes (yearly global and U.S.).

2.1 Table: Percentage of protein in various foods. 2.2 Table: Composition of nutrients in 100 grams of tempeh of different types. 2.3 Table: Protein quality (NPU) of various foods. 2.4 Table: Amino acid composition of tempeh compared with the FAO/WHO reference pattern. 2.5 Bar cart: Limiting amino acids in rice and tempeh. 2.6 Table: Combining foods to increase protein. 2.7 Bar chart: Grams of dietary fiber in 100 grams of various foods. 2.8 Table: Fatty acids in soy tempeh. 2.9 Table: Vitamins and minerals in soy tempeh. 2.0 Table: Price of one day's supply of usable protein from various foods.

3.1 Bar chart: Comparison of nutrients in brown and white rice. 3.2 Shoyu (natural soy sauce) in four wooden keg, can, bottle, and small dispenser. 3.3 Grating a coconut. 3.4 Mortar & pestle (two types). 3.5 Cross section of a coconut in the husk. 3.6 Making coconut milk (7 steps). 3.7 Ladies in a Javanese market selling chilies (in mounds). 4.1 Deep-frying tempeh, with all utensils shown. 4.2 Shallow-frying tempeh. 4.3 Seasoned crisp tempeh with dip. 4.4 Tempeh shish kebab. 4.5 Coriander & garlic crisp tempeh. 4.6 Tempeh fondue. 4.7 Making tempeh-filled pot-stickers or gyoza. 4.8 Tempeh pita bread sandwich. 4.9 Tempeh burger. 4.10 Tortilla with tempeh & guacamole. 4.11 Tempeh guacamole. 4.12 Tomatoes stuffed with tempeh.

5.1 Woman in an Indonesian village kitchen. 5.2 Woman grinding spices with a mortar. 5.3 Table: Indonesia's 7 most popular tempeh recipes, in descending order of popularity: Tempeh goreng, tempeh bachem, keripik tempeh, sayur lodeh, sambal goreng tempeh, terik tempeh, sambal goreng kering tempeh. Recipes for each are given. 5.4 Selling traditional banana-leaf wrapped tempeh in Yogyakarta, Java. 5.5 Deep-frying tempeh keripik in batter. 5.6 Deep-frying tempeh keripik in Javanese market. 5.7 Botok tempeh #1. 5.8 Botok tempeh #2. 5.9 Gadon tempeh. 5.10. Folding leaf wrappers for gadon tempeh. 5.11 Rolling leaf wrappers for pepes tempeh. 5.12. Pepes tempeh on broiler and packets ready to serve. 5.13 Folding leaf wrappers for Balinese pepesan. 5.15. Saté tempeh on broiler. 5.15 Saté vendor in Java. 5.16. Saté manis tempeh. 5.17 Tempeh sambal accompaniment for rice.

6.1 Flowchart for homemade soy tempeh. 6.2 Tempeh incubator (home-made). 6.3 Good soy tempeh (diagonally

sliced). 6.4 Four types of homemade tempeh. 6.5 Wooden tempeh incubation tray designs. 6.6 Community tempeh incubator. 6.7 Graph: Tempeh incubation time versus temperature for soy tempeh (shows slow, moderate, and quick combinations).

7.1 Graph: Loss of tempeh starter potency when stored at various temperatures and humidities. 7.2 Sporulated tempeh for starter in bread pan. 7.3 Dry-strainer spore extraction. 7.4 Sporulated rice, pressure cooker, and Mason jar method of making tempeh starter. 7.5 Picking leaves from a hibiscus tree for tempeh starter. 7.6 Arranging inoculated soybeans on hibiscus leaves. 7.7 Covering hibiscus leaf sandwiches in trays. 7.8 Hibiscus leaves for tempeh starter ready to use. 7.9 Hibiscus inoculum leaves on round tray. 7.10 Drying inoculum leaves in sun on roof. 7.11 Tying inoculum leaves under rafters to dry.

8.1 Flowchart for basic Indonesian soy tempeh method. 8.2. A small Indonesian tempeh shop (floor plan). 8.3 Floor plan of the large Oeben tempeh shop in Bandung, Java. 8.4 Flowchart for Malang tempeh. Address: New-Age Foods Study Center, P.O. Box 234, Lafayette, California 94549.

1621. Shurtleff, William; Aoyagi, Akiko. 1979. The book of tempeh: A super soyfood from Indonesia. Professional hardcover edition. New York, NY: Harper & Row. 248 p. Illust. by Akiko Aoyagi Shurtleff. Index. July. 28 cm. [190 ref]

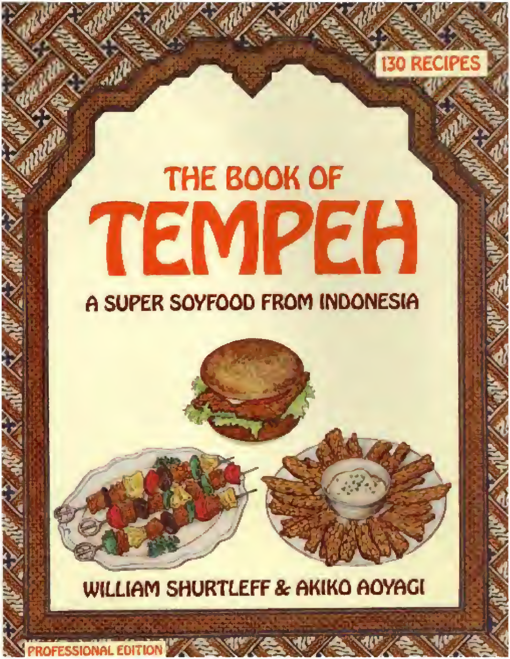
• ***Summary:*** A special cloth-bound professional edition of *The Book of Tempeh* prepared for libraries, commercial tempeh producers, microbiologists, students of Indonesian foods, and those who love fine books. In addition to the full contents of the paperback edition, it contains the following lengthy appendixes: B: Tempeh in Indonesia (an overview of the tempeh industry and market, including the number of shops by province, per capita consumption, etc.). C: The Varieties of Tempeh. D: Soybean Production and Traditional Soyfoods in Indonesia. E: The Microbiology & Chemistry of Tempeh Fermentation. H. Onchom or Ontjom. A Glossary of Indonesian Foods (the most extensive one available in English). Bibliography on Tempeh containing over 190 entries: Works on the world food crisis, works on tempeh cookery or Indonesian cuisine, scientific journal articles on tempeh, early Dutch- and German-language works on tempeh, Indonesian-language works about tempeh, key English-language works on microbiology, film and color slides on tempeh. Illustration of an Indonesian dancer. Expanded Index. A great deal of original research is contained in the extra 88 pages and 54 illustrations.

Appendix C, "The varieties of tempeh, states: "The many varieties of tempeh may be grouped into five basic types, according to the primary ingredient used: legumes, grains & soy, grains, presscake residues, and nonlegume seeds. Legume tempehs: Soy tempeh *(témpé kedelé or kedelai,* made from the seeds of *Glycine max).* Velvet-bean tempeh *(tempe benguk or tempe koro benguk,* made from the seeds of *Mucuna pruriens,* which are called *kara benguk* in Indonesian). Winged-bean tempeh *(tempe kecipir,* made from the seeds of *Psophocarpus tetragonolobus).* Leucaena tempeh *(tempe lamtoro or tempe mlandingan,* made from the seeds of *Leucena leucocephala).* Mung bean tempeh *(tempe kacang hijau,* made from the seeds of *Vigna radiata,* which are called *kachang hijau* in Indonesian). Broad-bean or fava-bean tempeh *(tempe kacang babi,* made from the seeds of *Vicia faba,* also called horse beans). Sesban-bean tempeh *(tempe turi,* made from the seeds of *Sesbania grandiflora).* Pigeon-pea tempeh *(tempe kacang iris,* made from the seeds of *Cajanus cajan).* Green-bean tempeh *(tempe kacang merah,* made from the seeds of *Phaseolus vulgaris,* which are called *kacang buncis* in Indonesian). Lima-bean tempeh *(tempe kara or tempe kara kratok,* made from the seeds of *Phaseolus lunatus).* Lablab-bean tempeh *(tempe kara-kara or tempe koro wedus,* made from the seeds of *Lablab purpureus,* which is called hyacinth bean in the USA). Jack-bean tempeh *(tempe kara bedong or tempe kara pedang,* made from the seeds of some strains of *Canavalia ensiformis).* Lupin tempeh (developed in Australia, made from the seeds of the narrow-leafed sweet lupin *(Lupinus angustifolius)* or the Andean lupin *(Lupinus mutabilis)).* Cowpea or black-eyed pea tempeh (developed in West Africa and Thailand, made from the seeds of *Vigna unguiculata).* Note: Chickpeas (garbanzo beans), baby limas, and great northern beans have also been used to make tempeh.

Grain & soy tempehs: Wheat & soy tempeh, barley & soy tempeh, rice & soy tempeh, bulgur & soy tempeh. Grain tempehs: Barley, rice, wheat, oats, and rye have been used with good results.

Presscake tempehs: Okara tempeh (called *tempe gembus* in Central and East Java where it is most popular, and called *oncom hitam* in West Java where it is not widely used). Peanut presscake tempeh (called black onchom *(oncom hitam)* in the Bogor region of West Java where it is most widely consumed, or white onchom *(oncom putih)* in the Tasikmalaya region, or "tempeh from peanut presscake" *(tempe bungkil kacang)* in East Java). Coconut presscake tempeh *(tempe bongkrek, tempe bungkil kelapa, or tempe kapuk)* comes in several varieties and can be can be poisonous if the pathogenic aerobic bacterium *Pseudomonas cocovenenans* grows on it and produces either yellow-colored toxoflavin or the more toxic colorless bongkrek acid. Peanut- & coconut-presscake tempeh *(tempe menjes).* Mung-bean-presscake tempeh *(oncom hitam or oncom ampas kacang hijau).* Soy- & peanut-presscake tempeh. Defatted soy-meal tempeh.

Seed tempehs (nonleguminous): Rubberseed tempeh *(tempe kaloko)* is made from the seeds of the rubber tree *(Hevea brasiliemsis).* Okra tempeh. Sesame & soy tempeh. Tempeh extenders and adulterants: Okara, cassava, mung-


130 RECIPES
THE BOOK OF
TEMPEH
A SUPER SOYFOOD FROM INDONESIA
WILLIAM SHURTLEFF & AKIKO AOYAGI
PROFESSIONAL EDITION

bean presscake, soybean hulls, sweet potato, coconut- or peanut presscake, papaya. The stages of tempeh fermentation (underripe to overripe): Premature tempeh *(tempe koro)*, mature tempeh, slightly overripe tempeh *(tempe semangit or tempe lanas),* overripe tempeh *(tempe busuk or tempe bosok),* rotten tempeh. Tempeh wrappers.

Appendix D: "Soybean production and traditional soyfoods in Indonesia" discusses: Soybean production in Indonesia, traditional Indonesian soyfoods: Kechap *(kecap / ketjap, incl. kecap manis),* taucho *(tauco or taoco),* okara onchom, sereh *(sere),* taokoan or takoa, tofu *(tahu).* Other nonfermented soyfoods: Soy sprouts *(taugé kedele)*, yuba *(bungah tahu)*, soymilk, roasted soybeans *(dele sangan, kedele sangrai),* roasted soy grits or full-fat flour *(bubuk kedele),* fresh green soybeans *(kedelai rebus).*

Note: This is the earliest English-language document seen (March. 2009) uses the word "taucho" (spelled in that way) to refer to Indonesian-style miso.

Appendix E: "The microbiology and chemistry of tempeh fermentation" discusses: What are fungi?, general characteristics of *Rhizopus* molds, *Rhizopus* species used to make tempeh, pure cultures versus mixed cultures, preparing soybeans for fermentation, requirements for mold growth, general changes during tempeh fermentation, changes in nutrients and digestibility, the finished tempeh, the advantages and disadvantages of tempeh fermentation, suggestions for further research.

Appendix H: "Onchom or ontjom" discusses: Introduction. The varieties of onchom *(onchom merah* or *onchom beureum):* Peanut-presscake onchom, okara onchom, soy onchom, coconut-presscake onchom. Making peanut-presscake onchom in a commercial shop. Making okara onchom in a commercial shop. The microbiology of onchom. Laboratory studies of onchom. Aflatoxins. Works on onchom and neurospora. People connected with onchom and neurospora. Continued. Address: New-Age Foods Study Center, P.O. Box 234, Lafayette, California 94549.

1622. Shurtleff, William; Aoyagi, Akiko. 1979. Kecap (Indonesian soy sauce) (Document part). In: Shurtleff & Aoyagi. 1979. The Book of Tempeh: A Super Soyfood from Indonesia. Professional hardcover edition. New York, NY: Harper & Row. 248 p. See p. 168-69. Illust. by Akiko Aoyagi Shurtleff. [190 ref]

• ***Summary:*** This section contains the most detailed English-language information on Indonesian style soy sauce. "Formerly spelled *ketjap* (and now spelled *kecap* in Indonesia) [pronounced KEH-chup], this Indonesian soy sauce, generally made from black soybeans, has a dark-brown color and pleasant aroma. Unlike Japanese soy sauce, it [usually] contains no wheat or other grain and is fermented for a relatively short time. A popular all-purpose seasoning used with the entire panorama of Indonesian cuisine, it comes in three basic types:

*"Sweet Indonesian soy sauce (kecap manis),* which is by far the most popular, accounts for an estimated 90 percent of the nation's total soy sauce production. It has a very thick consistency and a strong, sweet molasses flavor, since it may contain up to 50 percent palm sugar [jaggery, *gula merah].* Unlike most other Asian soy sauces, it contains numerous spices (such as star anise) which enrich the flavor. Widely used in stews and sambals, it is available in the West at Indonesian specialty shops. A recipe for making a similar product at home starting from Japanese soy sauce (shoyu) is given in the Preparatory Techniques section [p. 48]. The top grade contains 6% protein, 1% fat, 9% carbohydrates, 63% water (moisture), and 18% salt.

*"Mellow Indonesian soy sauce (kecap manis)* is a close relative of its sweet counterpart except that it contains only about half as much palm sugar and therefore has a somewhat thinner consistency and less dominant sweetness.

*"Salty Indonesian soy sauce (kecap asin),* also called light soya sauce, is of Chinese origin and has a thin consistency, light color, and rather salty flavor, not well suited to most Western tastes.

"The Indonesian word *ketjap* and the American word *ketchup* (tomato paste) are believed to share a common ancestry, having both been derived from the Malay word *kechap,* which refers to a kind of spiced fish sauce..."

"Kechap is traditionally made by a two-part fermentation process: a solid-substrate mold fermentation and a submerged brine fermentation. To make sweet Indonesian soy sauce, whole black soybeans (which give the product a better flavor and aroma than regular yellow soybeans) are soaked for 12 hours in excess water, boiled until tender, drained, and cooled. Spread on round trays of woven bamboo *(tampah),* they are covered with other trays (or in some cases rice straw and gunny sacks), placed in an incubation room on floor-to-ceiling shelves or racks, and allowed to stand for 3 to 5 days. During this time the beans are inoculated naturally by mold spores of *Aspergillus oryzae* and *Rhizopus* species *(R. arrhizus* and *R. oligosporus)* that are on the trays or in the air of the incubation room. No special inoculum is added. When the beans are covered with a fragrant mycelium of light yellow mold, they are crumbled by hand, sun-dried for 2 days, then rubbed with a clean cloth to remove excess mold spores, which are sifted off and discarded. The beans are now mixed with an 18 to 20% brine solution (4 to 6 liters of brine for every 1 kg of dry koji) in 2-foot-deep earthenware or wooden crocks, which are put outdoors in the sunlight; they are left open by day [unless it rains] and covered at night. The contents are stirred from time to time and allowed to stand for an average of 1 month (minimum 2 weeks; maximum 1 year)... After fermentation is completed, the mash is brought to a boil (some fresh water being added if necessary), then filtered and lightly pressed to extract the flavorful liquid. The residual solids are mixed with several

times their volume of 20% brine, boiled for several hors, and filtered again to yield the second extract. The process of adding brine, boiling, and filtering is repeated one to three more times to yield lower-grade extracts. The final residue cake, which contains very little flavor or nutrients, is used as livestock fodder. The liquid obtained from each extraction is further processed separately to provide different grades of kechap. Nitrogen (or protein) content is one of the criteria used in determining kechap quality. Grade 1, usually made from the first extract, must contain at least 6% protein...

"Next, 40 to 50 parts by weight of palm sugar is caramelized until it is light yellowish brown, then combined with 100 parts by weight of one of the extracts, together with various spices and herbs, the most important of which is star anise *(Illicium verum* or *I. anisatum;* called *pekak* or *bunga lawang* in Indonesian), the licorice-flavored tan seeds of a dry 8-pointed star-shaped fruit of an evergreen tree native to China and widely used in Chinese cookery. Also used are coriander, fennel *(adas pintang),* and sliced garlic, all of which are dry roasted. Sprigs of lemongrass, laos, and/or salam leaves may be added fresh. Some makers also add a fish sauce or extract *(sari ikan)* and/or bouillon, plus wheat flour or cassava flour thickeners. The mixture is now brought to a boil and concentrated by simmering for 4 to 5 hours; finally it is filtered through cheesecloth and stored in tanks, from which it is ladled manually via a funnel into small glass bottles bottle and hand capped. Bottles containing first and second grade kechap have a red label, while lower-grade extracts have a black label."

"Most Indonesian kechap is made in small-scale cottage industries. Of the 408 producers, 205 are located in West Java, 131 in Central Java, 68 in East Java, and 4 in Jakarta. The largest and most modern factory is the A.B.C. Kechap Factory, Tangerang, Jakarta." Address: New-Age Foods Study Center, P.O. Box 234, Lafayette, California 94549.

1623. Shurtleff, William; Aoyagi, Akiko. 1979. The book of tempeh: A super soyfood from Indonesia. Professional hardcover edition (Continued). New York, NY: Harper & Row. 248 p. Illust. by Akiko Aoyagi Shurtleff. Index. July. 28 cm. [190 ref]

• ***Summary:*** Continued: Numbered figures (line drawings unless otherwise stated. The capital letter before the decimal refers to the appendix number). B.1 Table: Tempeh shops in Indonesia by province: Home-industry scale. B.2 Table: Relative frequency of tempeh consumption in Indonesia (by province). B.3 Carrying tempeh to market in Java using a shoulder pole and trays stacked on two baskets. B.4 Cost of one day's supply of protein in Indonesia.

C.1 Table: Edible grain legumes. C.2 Map: Distribution of legumes in southeast Asia. C.3 Winged bean, showing leaves, pods, flowers and beans. C.4 Leucaena leaves and pods *(peté china).* C.5 Reduction in bongkrek toxicity from bongkrek acid during fermentation (Ko 1977). Okra. Packets of tempeh, ready to sell, wrapped in leaves and tied. A large soybean, with hilum showing.

D.1 Table: Soybean production in Indonesia (1950-1976). D.2 Table: Major Indonesian food crops, D.3 Table: Indonesian soybean production and yields (by province). D.4 Map: Major soybean producing districts in Java (1976; most are in East Java, led by Jemper and Pasuruan). Table: Daily per capita consumption of tempeh (by province, led by Central Java, then West Nusa Tenggara, Yogyakarta, and East Java). Table: Percent of dietary protein supplied by major food categories (led by cereal grains, then fish, nonlegume vegetables, and soy products). Table: Percentage of dietary protein supplied by soy products (by province, led by Central Java, then East Java, Yogyakarta, and West Java). D.5 Table: Statistics on production and consumption of basic Indonesian soyfoods (led by tempeh, then tofu, kechap, taucho). D.6 Star anise. Grinding soybeans for tofu using traditional push-pull stone mills. Pouring soy curds into cloth-lined forming box. Javanese shadow puppet *(wayang kulit).*

Table: Classification of *Rhizopus oligosporus.* E.1 Two stages in the germination of a spore (after 1½ and 10 hours). E.2 Two successive of hyphal tip growth at half-hour intervals. E.3 Rhizopus oligosporus (Frazier 1957, showing sporangium, columella, apophysis, sporangiophores, stolon, sporangiospores, node, rhizoid). E.4 *Rhizopus stolonifer.* A. Columella and attached spores. B. Collapsed (invaginated) columella (Webster 1970). E.5 Life cycle of *Rhizopus* (Raven and Everet 1976). E.6 Graph: Changes in tempeh oil and moisture content during fermentation (Sudarmadji 1977). E.7 Graph: Three phases of tempeh fermentation (rapid, transition, and deterioration; Sudarmadji 1977). E.8 Graph: Changes occurring during tempeh fermentation (temperature, soluble solids, pH, soluble nitrogen, and reducing solids; Steinkraus et al. 1960). E.9 Graph: Yields of tempeh and of solids and different stages of the fermentation process (100 gm of whole dry soybeans yield 173 gm of tempeh on average; Steinkraus 1960; Murata 1967). E.10 Table: Loss of solids and protein during tempeh fermentation. E.11 Table: Percentage changes in composition of key essential amino acids during tempeh fermentation. E.12 Table: PER (protein efficiency ratio, a measure of protein quality for humans) changes during tempeh fermentation. E.13 Graph: Changes in concentration of three carbohydrates during tempeh fermentation (sucrose, stachyose, and raffinose, all decrease; Shallenberger et al. 1976). E.14 Table: Amount of B-complex vitamins in 100 gm of tempeh vs. 100 gm unfermented soybeans (all increase in tempeh except thiamine {vitamin B-1}). Changes in peroxide value and TBA value tempeh and soy flour during storage at 37ºC (98.6ºF; both rise rapidly in soybeans, but stay near zero and stable for tempeh; Watanabe et al. 1971).

H.1 Table: Foods known in Indonesia as "onchom" (made from peanuts or soybeans). H.2 Selling onchom in a Javanese market. H.3 Graph: Changes in soy onchom during fermentation (temperature, soluble solids, pH, soluble nitrogen, and reducing solids; Steinkraus et al. 1965). H.4 Flowchart for preparation of peanut presscake onchom. Unnumbered illustrations show 12 steps in the process of making onchom in a commercial shop in Indonesia. Neurospora: Budding conidia, conidiophore. H.5 Graph: Reduction in onchom aflatoxin during fermentation with *Neurospora* (Ko 1974). A thermometer, showing both Fahrenheit and Centigrade.

Glossary of Indonesian foods, spices, etc. Agar. Amaranth, Indonesian. Apem. Arak. Aren sugar. Aromatic ginger. Asam. Bananas (pisang). Basil. Bawang merah. Bawang putih. Bayam. Bean sprouts. Belimbing. Blachan. Brem. Bumbu. Candlenuts (kemiri). Carambola (belimbing). Cassava. Chabé. Chayoté. Chilies (red, green, fiery dwarf). Two-page spread showing illustrations of Indonesian natural foods. Choko. Cirus leaves. Cloves. Coconut. Coconut, grated. Coconut milk and cream. Coconut oil. Coconut water. Coriander. Cumin. Dageh. Daun asam. Dalun jeruk purut. Daun salam. Daun seré. Daun-so. Durian. Fermented fish. Fermented fish sauce. Fruits. Galangal, greater. Galangal, lesser. Gingerroot. Indonesian amaranth. Jackfruit. Jaggery. Jinten or jintan. Kangkung leaves. Kecap (kecap) or ketjap. Kemangi leaves. Kemiri. Kenchur root. Ketjap. Ketumbar. Kluwak. Koji. Kolang-kaling. Krupuk. Kunyit. Labu siam. Laos root. Lemongrass. Lime leaves. Lombok. Melinjo leaves. Mochi, Indonesian. Mung-bean sprouts. Nutmeg. Okara. Onchom or ontjom. Palm sugar. Pandanus leaf. Pasta. Pepper. Peté beans. Petis. Peuyeum. Prawn paste. Putjung nuts. Ragi. Rempeyek. Rice. Salam leaf. Sambals. Santan, Sayur asin. Seré or serai. Shallots. Shrimp crisps. Shrimp paste. Soursop. Soy sauce, Indonesian. Star fruit. Swamp cabbage. Tahu. Tamarind. Taucho, tauco, taoco, or taotjo. Taogé or taugé. Tape. Tapioca. Taucho or tauco. Terasi. Tofu. Trasi. Tuak or tuwak. Turmeric. Winged bean. Note on monosodium glutamate. A woman holding a tray of leaf-wrapped tempeh in Surinam. Photo of Shurtleff and Aoyagi on inside rear dust jacket. Address: New-Age Foods Study Center, P.O. Box 234, Lafayette, California 94549.

1624. Suharni, Th. Tri. 1979. Pemilihan bakteri yang berpengaruh dalam pembentukan growth factor pada fermentasi tempe [Selections of bacteria that affect growth factor formation during tempeh fermentation]. Presented at Kongres Nasional Biokimia IV. Held 10-12 July 1979 at Bandung, Indonesia. [Ind]*

1625. Universiti Pertanian Malaysia. 1979. Kekacang di tropika: Sebuah bibliografi [Legumes in the tropics: A bibliography]. Serdang, Selangor, Malaysia: UPM. 70 leaves. Sept. Author index. 28 cm. [1029 ref. Eng; Mal]
• ***Summary:*** Developed in preparation for a symposium on Legumes in the Tropics, held 13-17 Nov. 1979 at Fakulti Pertanian, Universiti Pertanian Malaysia. The publications are arranged according to broad subject headings and within each heading listed alphabetically by title. Materials marked with an * are available in the university library.

Contents: Introduction. Bibliographies. Journal abbreviations. 1. Botany. 2. Agronomy (Cropping system cultivation, rhizobium, seed technology, soil science & microbiology). 3. Plant protection (General, diseases, pests). 4. Food technology (Diets and supplements, nutritive value, human instruction, products, method of processing). 5. Economic and social aspect (General, marketing trade and prices, production, supply and demand). Author indexes.

Leguminous plants are found throughout the world, but the greatest variety grows in the tropics. The main legumes covered are soya bean, groundnuts, winged bean, mung bean, and long bean. Address: Serdang, Selangar, Malaysia.

1626. *North Pacific Union Conference Gleaner (Portland, Oregon).*1979. Obituaries: Jones, Dorothea Van Gundy. Oct. 1. p. 31.
• ***Summary:*** "Dorothea Van Gundy Jones was born Feb. 16, 1903 in San Jose, California, and died Aug. 30, 1979 in Sedro Woolley, Washington. She leaves to mourn two daughters Lois Bower of Redding, California, and Evelyn Mundall of Belize, Central America; one sister, Dr. Mary Charlotte Holmes of Sulphur Springs, Arkansas; a niece, Sue Muff, Sedro Woolley; a cousin, Dr. Lloyd Waller of Chehalis, Washington. After graduating from Pacific Union College, she worked as a dietitian for the White Memorial Hospital, dietitian for La Sierra College for two years and taught three years at Walla Walla College. For 23 years, she was internationally known nutritionist for Loma Linda Foods. Her lectures on nutrition took her around the world; to India, Bangkok [Thailand], Indonesia, the Philippines, Japan, Australia, New Zealand as well as to most major cities in the U.S."

1627. Haddix, Carol. 1979. Health foods that are more than good for you: Turn health foods into class act. *Chicago Tribune.* Oct. 4. p. D1.
• ***Summary:*** These include bean sprouts, lentils, tofu, cracked wheat, bran, carob, and Graham flour (for whole wheat bread, biscuits, etc.).

Tofu is a Japanese word. The mild flavor of this bean cake makes it easy to add to just about any dish when you want to increase the protein content. Tofu adds an interesting texture and a little of its own flavor to dishes from stir-fried vegetables to noodle casserole. "We stir-fried tofu with bits of tomato, onion, and fresh basil and came up with a refreshing main dish that tasters raved about." It was

also delicious with East Indian spices, such as turmeric, or scrambled as an alternative to scrambled eggs.

1628. Nathan, Joan. 1979. The venerable soy sauce from Vietnam. *Washington Post.* Oct. 4. p. E1, E3.
• ***Summary:*** After the fall of Saigon in 1975, Vietnam no longer exported goods to the United States. So Vietnamese living in the USA were no longer able to buy their traditional soy sauce, named Tuong, a key ingredient in many Vietnamese recipes. Tuong is quite different from its Japanese or Chinese counterparts. It is "much lighter in color and thicker in consistency, with a slightly sour taste."

Now Tuong is being made in Bowie, Maryland (in the Ardmore Industrial Park), by Hoang Van Chi (a chemist) and his wife Hoang Phan. Many relatives have helped them to start the small business named Vietnam Food and Drink.

Their first shipment, in June 1975, was 4,000 pounds, sent to Paris where the largest community of expatriate Vietnamese live. "The second shipment went to California and the third to Texas."

Tuong is not used in place of salt as is soy sauce in Japanese and Chinese cookery. For that the Vietnamese use Nuoc Mam, made by layering fresh fish and salt, in alternating layers, in barrels

Describes briefly how Tuong is made and gives three Vietnamese recipes: (1) Dau phu ran cham tuong (Fried tofu dipped in Vietnamese soy sauce). (2) Bo tai tuong gung (Steak with soy sauce and ginger). (3) Banh xeo (Pork, shrimp and vegetable pancake / omelet).

Before becoming a voluntary exile in 1959, Hoang Van Chi wrote his classic book *From Colonialism to Communism.*

A photo shows Hoang and his wife holding bottles and jars of their soy sauce.

1629. Shurtleff, William. 1979. Rapid growth of tofu shops and soy dairies in North America (News release). Lafayette, California: New-Age Foods Study Center. 1 p. Nov.
• ***Summary:*** "There are presently 164 tofu shops and soy dairies in North America and, as shown in the accompanying graph, the increase in numbers is rapidly accelerating. Ninety-six of these run by Caucasian Americans have opened in the past 3 years since publication of *The Book of Tofu,* by Shurtleff & Aoyagi, which has sold over a quarter of a million copies. The industry has a brisk sales growth rate of 25 to 30% a year, and uses an estimated 35% of the industry sales; the 68 Oriental shops have 65%.

"The largest tofu factory in the U.S. is the Matsuda-Hinode company in Los Angeles; they produce about 16,000 pounds of tofu a day under 14 different labels. The largest of the new breed of Caucasian-run plants is the New England Soy Dairy in Greenfield, Massachusetts. Founded in 1977, it now produces some 4,500 pounds of tofu a day and expects revenues of $750,000 in 1979. In its April 12 front page story on the tofu industry, *The Wall Street Journal* focused on The New England Soy Dairy...

"Worldwide, the tofu and soymilk industry is rapidly expanding. There are presently a total of 211,000 producers, including 38,000 in Japan, 158,000 in mainland China, 11,000 in Indonesia, 2,500 in Taiwan, and 1,470 in Korea. The largest tofu factories, located in Japan, produce over 100,000 pounds of tofu a day (15,000 tons a year) and the largest soy dairy, located in Hong Kong, produces 500,000 bottles of soymilk a day (150 million bottles a year).

"Most of the new tofu shops and soy dairies in the U.S. have gotten into production using the technical manual *Tofu & Soymilk Production* by William Shurtleff & Akiko Aoyagi, which has just been published in both paperback and hardback editions." Address: P.O. Box 234, Lafayette, California 94549. Phone: 415-283-2991.

1630. **Product Name:** [Drinho Soya Bean Drink].
**Foreign Name:** Drinho Minuman Kacang Soya.
**Manufacturer's Name:** Ace Canning Corporation Sdn. Bhd. Imported to Singapore by Lam Soon Oil & Soap.
**Manufacturer's Address:** Jalan 205, P.O. Box 8, Petaling Jaya, Selangor, Malaysia.
**Date of Introduction:** 1979. December.
**Wt/Vol., Packaging, Price:** 250 ml Tetra Brik Aseptic carton.
**How Stored:** Shelf stable; refrigerate after opening.
**New Product–Documentation:** Brian Fitzpatrick. 1982. Soya Milk in Asia. States that Ace Canning launched the product in 1980. Tetra Pak Co. 1983. Brochure. Packaged in Tetra Brik Aseptic 250 ml. Shurtleff & Aoyagi. Soya Bluebook. 1983. p. 63. 1984. Soymilk Industry & Market. p. 121. Color photo. Package is orange, white, yellow and tan, with yellow soybeans. Boi. 1986. Sunday Times (Singapore). Sept. 7. "Soya Bean Milk Packs More Water than Flavor." Drinho sells for 35 cents per 250 ml. Comments: Too sweet, thick, artificial taste, no soya bean flavor, not tasty.

1631. Escueta, E.E.; Banzon, J. 1979. Comparative acceptability of soymilks produced by different processing methods. *Philippine Agriculturist* 62(4):248-54. Oct/Dec. [19 ref]
• ***Summary:*** Soymilks were prepared by 5 different methods: 1. Boiling-water grind technique; 2. Cold grind process followed by 30 minute boiling in a steam jacketed kettle; 3. Cold grind process followed by 30 minutes boiling by direct steam injection; 4. Soymilk from soaked soybeans plus 3 minute immersion boiling; and 5. Soymilk from unsoaked beans plus 5 minute immersion boiling.

"Soymilks produced by the 5 methods were acceptable to the Filipino tasters with previous experience with soymilk. Process 4 was more acceptable (though not significant) than the other soymilks. Addition of 1%

chocolate powder further increased the acceptability of the soymilks.

"The study shows that some factors other than the lipoxygenase enzyme action on the fats of the soybeans affect the acceptability of the soymilks." Address: Asst. Prof. and Emeritus Prof. respectively, Dep. of Food Science & Technology, Univ. of Philippines at Los Baños, College, Laguna, Philippines.

1632. Judy, W.H.; Hill, H.J. 1979. International soybean variety experiment. Fifth report of results, 1977. *INTSOY Series* No. 19. x + 285 p. Dec. (College of Agric., Univ. of Illinois at Urbana-Champaign).

• ***Summary:*** In the ISVEX trials, soybeans were tested in the following regions and countries: Africa: Algeria, Cameroon, Egypt, Ethiopia, Ghana, Liberia, Mauritius, Morocco, Niger, Rhodesia (Salisbury; in today's Zimbabwe), Rwanda, Senegal, Somalia, Sudan, Swaziland, Tanzania, Togo, Upper Volta, Zaire, Zambia.

Asia: Bangladesh, Indonesia, Malaysia, Nepal, Pakistan, Philippines, Sri Lanka, Thailand.

Europe: Czechoslovakia, Italy, Portugal.

Mesoamerica: Honduras.

Middle East: Israel, Saudi Arabia.

North America: United States.

Oceania: Fiji, Tahiti.

South America: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, French Guiana, Paraguay, Peru, Surinam, Uruguay.

Note: This is the second earliest document seen (Feb. 2006) concerning soybeans in Liberia, or the cultivation of soybeans in Liberia. This document contains the second earliest date seen for soybeans in Liberia, or the cultivation of soybeans in Liberia (21 Sept. 1977). Sixteen varieties were tested at Monrovia. Improved Pelican gave the highest yield, 1,603 kg/ha. On 14 Dec. 1977, sixteen varieties were tested at Suakoko. Calland gave the highest yield, 1,841 kg/ha. The source of these soybeans was INTSOY for ISVEX trials. Address: Univ. of Illinois, Urbana.

1633. Melching, J. Stanley; Bromfield, K.R.; Kingsolver, C.H. 1979. Infection, colonization, and uredospore production on Wayne soybean by four cultures of *Phakopsora pachyrhizi*, the cause of soybean rust. *Phytopathology* 69(12):1262-65. Dec. [12 ref]

• ***Summary:*** Under greenhouse conditions, cultures of *Phakopsora pachyrhizi* from Taiwan, India, Australia, and Indonesia were compared for quantitative characteristics. Address: Research plant pathologists, Plant Disease Research Lab., USDA, SEA, Agricultural Research, P.O. Box 1209, Frederick, Maryland 21701.

1634. *Philippine Farmer's Journal.* 1979. With seguidillas [winged beans] raisers need not import soybean meal. 20(5):48. Dec. [8 ref]*

• ***Summary:*** Winged beans can be used in place of imported soybean meal for feeding swine and poultry in the Philippines.

1635. Steinkraus, Keith H. 1979. Transfer of tempe technology. *League for International Food Education (LIFE) Newsletter.* Dec. p. 1-2. [1 ref]

• ***Summary:*** In 1959 the traditional method of removing soybean hulls when making tempeh involved loosening them by hand or under foot and floating them off in water, and the tempeh was fermented in wilted leaves. In 1965 Steinkraus and co-workers published a pilot plant process for making tempeh in which the hulls were removed by passing the dehydrated beans through a burr mill and fermenting the tempeh in trays. In 1974 Dr. Steinkraus visited a tempeh factory in Indonesia in which these modernizations had been implemented and the perforated plastic bags for incubating tempeh, pioneered in 1964 by Martinelli and Hesseltine, were also being used. Address: Cornell Univ., Geneva, New York 14456.

1636. Bruijn, J.R.; Gaastra, F.S.; Schoeffer, Ivo. eds. 1979-1987. Dutch-Asiatic shipping in the 17th and 18th centuries. 3 vols. The Hague, Netherlands: Martinus Nijhoff. Illust. Index. 28 cm. *

• ***Summary:*** Volume 1. Introductory. Vol. 2. Outward-bound voyages from the Netherlands to Asia and the Cape (1595-1794). Vol. 3. Homeward-bound voyages from Asia and the Cape to the Netherlands (1597-1795).

1637. Darmosuwito, Suhadi; et al. 1979. Studies on the performance of selected *Rhizopus* strains in tempe fermentation. *ASEAN Project Report.* *

1638. Kwon, S.H. 1979. Soybean breeding for selected tropical Asian countries (Indonesia, Malaysia, Philippines, Thailand). Rome, Italy: Food and Agricultural Organization of the United Nations. 25 p. AGPC:MISC/65. [Eng] Address: Head, Radiation Breeding Lab., Korea Atomic Energy Research Inst., Seoul, South Korea.

1639. **Product Name:** [Soya Bean Drink].
**Manufacturer's Name:** Lam Soon.
**Manufacturer's Address:** Malaysia.
**Date of Introduction:** 1979.
**Wt/Vol., Packaging, Price:** 250 ml Tetra Brik Aseptic carton.
**How Stored:** Shelf stable; refrigerate after opening.
**New Product–Documentation:** Letter from Monica Kjellker Gimre of Alfa-Laval. 1990. May 30. Alfa-Laval sold a complete soymilk plant to Lam Soon in Malaysia. It had a capacity of 5,000 liters/hour and began operation in 1979.

1640. **Product Name:** Nestlé Bonus Soya Bean Milk [Plain, or Almond].
**Manufacturer's Name:** Nestlé Products (M) Ltd.
**Manufacturer's Address:** Singapore.
**Date of Introduction:** 1979.
**New Product–Documentation:** Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 99-100, 102. In 1979 Nestlé began making and marketing Bonus in Singapore. Exported to Hong Kong, it gave Vitasoy its first real brand-name competition. Color slide in Soyfoods Center Slide Library. Color photo. Pea green, dark green, and orange yellow on white. "Flavoured Soya Bean Milk. Vitamin Enriched."

1641. Noranizam, H.M.L. 1979. Studies of *Rhizopus* isolated from tempe and soy sauce. BSc Honors Project, University of Malaya. Unpublished manuscript. *

1642. Payumo, E.M. 1979. Utilization of field legumes as food. Food Research Division, Food and Nutrition Research Inst. *

1643. Sutedja, Lenny; Roestamsjah, -; Suprapto, M.S. 1979. Lipid hydrolyses during tempeh fermentation. Paper presented at The International Symposium on Microbiological Aspects of Food Storage, Processing, and Fermentation in Tropical Asia. 30 p. Held at Bogor in 1979. *

1644. Tanuwidjaja, Lindajati; Ambjah, K. 1979. Pembuatan inokulum tempe dengan kultur campuran [Preparation of tempeh inoculum using mixed cultures]. In: Proceeding Seminar Teknologi Pangan. IV. See p. 189-203. [Ind]*
Address: 1. National Inst. for Chemistry, Indonesian Inst. of Sciences, Bandung, Indonesia.

1645. Timotins, K.H.; Iskandar, S.T. 1979. Changes during the second phase of soybean tempeh fermentation. Paper presented at The International Symposium on Microbiological Aspects of Food Storage, Processing, and Fermentation in Tropical Asia. 27 p. Held at Bogor in 1979. *

1646. **Product Name:** Yeo's Soya Bean Drink. Boisson au Soja (Soymilk).
**Manufacturer's Name:** Yeo Hiap Seng Ltd. in Singapore.
**Manufacturer's Address:** 950 Dunearn Rd., Singapore.
**Date of Introduction:** 1979.
**Ingredients:** Water, extract of soya bean, cane sugar (10/91).
**Wt/Vol., Packaging, Price:** 250 ml Tetra Brik Aseptic carton.
**How Stored:** Shelf stable; refrigerate after opening.
**New Product–Documentation:** Color photo sent by Anders Lindner of STS. 1987. Nov. 14. 250 ml Tetra Brik carton, Orange, green, and yellow on white. Shows large yellow soybeans.

Label sent by Anthony Marrese. 1991. Oct. 7. 1-liter Tetra Brik carton. Red, green, and brown on white. Shows large brown soybeans. Retails for DM 3.49. Purchased at a new Japanese food store that just opened in Bremen, Germany. The 1-liter product is now made by Yeo Hiap Seng (Malaysia) Berhad, 7 Jalan Tandang, 46050 Petaling Jaya, Selangor, Malaysia. It is imported to Europe by Tang Freres, 48 Avenue d'Lvry, 75013 Paris, France. Use before 18 March 1992.

1647. Abjah, Koesbianti. 1979. Studi perbandingan aktivitas proteolytik dan amilolytik kapang Rhizopus dan isolasi khamir dari tempe [Comparative study on the proteolytic and amylolytic activity of *Rhizopus* enzymes, and the isolation of yeasts from tempeh]. Thesis (Skripsi), Bagian Biologi Institut Teknologi Bandung, Bandung, Indonesia. 88 p. PBITB. [Ind]*
Address: Bandung, Indonesia.

1648. Boxer, Charles R. 1979. Jan Compagnie in war and peace, 1602-1799: A short history of the Dutch East India Company. Hong Kong, Singapore, Kuala Lumpur: Heinemann Asia. 115 p. Illust. Index. 25 cm. Series: East Asian Studies. [16 ref]
• ***Summary:*** Prof. Ted Hymowitz says Boxer spoke many languages and was an excellent Jewish researcher. He wrote hundreds of articles and books. Taught at Oxford but was not promoted past "Reader."

1649. Escueta, Elias E. 1979. Effect of boiling treatment and gata (coconut cream) addition to soymilk on the chemical, rheological, and sensory properties of tofu. PhD thesis, Cornell University. 155 p. Page 5304 in volume 39/11-B of Dissertation Abstracts International. *
Address: Cornell Univ.

1650. International Rice Research Institute. 1979. Annual report for 1978. Los Banos, Laguna, Philippines. Soybeans: p. 385-91, 394, 411. *
Address: Los Baños, Laguna, Philippines.

1651. Jansen, G. Richard; Harper, Judson M. 1979. Application of low-cost extrusion cooking to weaning foods in feeding programs. Fort Collins, Colorado: Dept. of Agricultural and Chemical Engineering. 43 p. Illust. 28 cm. [31 ref]
• ***Summary:*** Introduction: Background, food extrusion, alternative extrusion systems (low cost extrusion cookers), objectives of the LEC program (at Colorado State Univ.). Description of food products: Blended foods (such as CSB

or corn/soy blend), full-fat soy flour, full-fat cottonseed flour, costs of processing. Current applications in developing countries: Sri Lanka and Thriposha, Costa Rica, Tanzania and Lisha, Guyana and Cerex, other countries (Guatemala, Honduras, Korea, India, Indonesia, Philippines, Thailand). Commercial applications: Pro-Nutre in Costa Rica, Maisoy in Bolivia, Ciatech in Mexico. Nutritional issues: Calories, protein-calorie ratio, fiber, vitamins and minerals, impact of supplemental food in Sri Lanka. Significant aspects of development: Technology transfer, funding, raw material aspects, quality control, packaging, storage and distribution, implementation and evaluation. Conclusions.

"The concept of adapting low-cost extruders to the production of low cost weaning foods in developing countries was originated by Mr. Paul R. Crowley, USDA, and the program has been under his general guidance since that time."

Tanzania: The Tanzanian Government decided to locate a weaning food plant at the National Milling Corporation in Dar es Salaam. "With assistance from Colorado State University, an LEC plant (fig. 4) went into production in May 1978, and since then has been continuously making CSM by extruding a corn soy mixture and blending in milk solids, vitamins and minerals." Named Lisha, the product is distributed to Maternal and Child Health (MCH) Centers under the auspices of the MInistry of Health. It is intended to augment CSM imported into Tanzania under the Food for Peace Program (p. 13).

"CIATECH of Chihuahua, Mexico, has designed an LEC full-fat soy processing plant at Delicious, S.A., an agricultural cooperative. The product is being sold commercially to bakeries as an egg solids replacer in small bags through retail grocery channels and as a major ingredient in a frozen ice cream like product" (p. 20). Address: Colorado State Univ.

1652. Ko Swan Djien; Hesseltine, C.W. 1979. Tempe and related foods. *Economic Microbiology* 4:115-40. A.H. Rose, ed. Microbial Biomass. [65 ref]

• ***Summary:*** Contents: Introduction: Appearance and preparation, production, literature. Inoculum: Tempe mold, traditional inoculum, pure-culture inoculum. Production methods: Basic procedure, raw material, preparation of the soybeans, packaging, incubation and mould growth. Keeping qualities and preserving methods. Changes in chemical composition. Nutritive value. Other tempe-type processes: Tropical Products Institute process, oncom (ontjom), natto, thua-nao, Tate and Lyle process.

"Meanwhile, in Indonesia, the attitude towards tempe has gradually changed over the last 15 years. Although most people like tempe, it was formerly considered as an inferior food, mainly because it is less expensive than other protein foods like meat, fish and eggs; another reason was that products of low quality were sometimes sold at the market. But, during the last decade through studies by universities as well as by government agencies, more attention has been paid to this product" (p. 119). Address: 1. Dep. of Food Science, Agricultural Univ., Wageningen, Netherlands; 2. NRRC, Peoria, Illinois.

1653. National Academy of Sciences, National Research Council, Board of Science and Technology for International Development, Commission on International Relations, Advisory Committee on Technology Innovation. 1979. Microbial processes: Promising technologies for developing countries. Washington, DC. xii + 198 p. Illust. No index. 23 cm.

• ***Summary:*** Soy-related chapters include: 1. Raw materials for microbial processes. In 1977 an estimated 13,842,000 metric tons of soybeans were grown in developing countries. Soybeans were number 15 on a list of 22 major food crops grown in developing countries, and accounted for 1.59% of the total production. The largest crops produced were paddy/rice (21.36% of total), cassava (11.87%), wheat (10.90%), maize/corn (8.41%), and banana/plantain (6.33%). 2. Food and animal feed. Discusses production of meatlike flavors using miso and shoyu, the koji method of producing enzymes, and Indonesian tempeh.

3. Soil microbes in plant health and nutrition. "Mycorrhizal fungi: Most plants, both wild and cultivated, have roots infected with fungi that increase nutrient and water uptake and may also protect the root from certain diseases. These infected roots are called mycorrhizae. Although the mycorrhizal fungi probably increase uptake of all the essential elements, they are usually most important in improving phosphorus nutrition. Phosphate is generally present in the soil in low concentrations and it is also highly immobile. Strands of fungal hyphae grow out from mycorrhizae and greatly increase the volume of soil from which phosphorus is obtained. So mycorrhizal plants, in general, can grow and thrive in soils much lower in phosphate and other essential nutrients than a comparable nonmycorrhizal plant. Many plants are so dependent on mycorrhizal fungi for nutrient uptake that they may starve if these fungi are absent. There are a number of types of mycorrhizae. The two that occur on the most economically important crops, the endomycorrhizae and the ectomycorrhizae, are discussed."

4. Nitrogen fixation. "Air is four-fifths nitrogen, yet it is the absence of this particular element that most commonly limits food production. Neither man, animals, nor higher plants can use elemental nitrogen; it must first be 'fixed,' that is, combined with other elements such as hydrogen, carbon, or oxygen before it can be assimilated.

"Certain bacteria and algae have the ability to utilize (fix) gaseous nitrogen from the air. Some microorganisms

work symbiotically in nodules on the roots of plants, with the plant providing food and energy for the bacteria, which, in turn, fix nitrogen from the air for their host...

"Bacteria that fix nitrogen in nodules on the roots of leguminous plants are called rhizobia...

"Leguminous plants have been known for centuries to enrich soils, but the reason was not understood until 1886 when two German scientists, Hellriegel and Wilfarth, found that the bacteria in the nodules on the leguminous root brought about nitrogen fixation. Nitrogen-fixing microorganisms fix an estimated 175 million metric tons of nitrogen annually, or about 70% of our total supply. The remainder is produced in chemical fertilizer factories." The nitrogen fixed by the soybean-rhizobium association is about 60-80 kg/ha/year. 5. Microbial insect control agents. Green cloverworm on soybeans can be controlled by *Bacillus thuringiensis.* 10. Pure cultures for microbial processes. Discusses world culture collections. Address: Washington, DC; Peoria, Illinois.

1654. Ng Sock Nye. 1979. Soya bean–Nutritious food for the people. Malaysia: Institut Masyarakat Berhad, 9 Lorong Kucing, Pulau Tikus, Penang. 19 p. Illust. 21 cm. [3 ref]
• ***Summary:*** A very original and informative booklet, containing many photos and illustrations (line drawings). Contents: Nutritional value of soya bean, soya bean milk (tau chui; soymilk), soya bean curd (tau fu fah; soymilk curds), soya bean jelly (tau fu; tofu), fried bean cake cubes (tau fu pok; deep-fried tofu cubes), bean cakes (tau kuah; pressed tofu), dried soya strands (tau ki / fu chok; bamboo yuba), soya skin sheets (tau pui; yuba), sweet bamboo (t'im chok; sweet yuba), vegetarian duck (chai ak; Buddha's duck), vegetarian salted fish (chai kiam hu; Buddha's fish), vegetarian meat (chai tu kar; Buddha's ham), soya bean sprouts (tau geh; soy sprouts), soya sauce (tau eu; soy sauce), salted soya beans (tau chio [Malaysian soy nuggets]). Bibliography.

1655. Nuryanti, Endang. 1979. Pengaruh penggunaan ragi tempe dari beberapa daerah di pulau Jawa pada pembuatan tempe kedele [Effect on soy tempeh processing of using tempeh starter (ragi tempe) from several regions in Java]. Thesis (Skripsi), Fakultas Teknologi Pertanian Universitas Gadjah Mada, Yogyakarta, Indonesia. 37 p. [Ind]*
Address: Yogyakarta, Indonesia.

1656. Steiner, Stan. 1979. Fusang: The Chinese who built America. New York, NY: Harper & Row. 259 p. Index. 20 cm. [80* ref]
• ***Summary:*** Contents: I. The Chinese who discovered America. II. The Chinese who built America. III. The Chinese who became America. Epilogue. Bibliography.

"On a bold voyage in the fifth century [458 A.D.], several Buddhist missionaries may have landed on the shores of America by mistake..." One of the priests, named Hui shen, told of the Kingdom of Fusang [America?] located 20,000 li (about 7,000 miles) east of Tahan. His account appears in the 41st Book of Chüan, in the 230th volume of the *Great Chinese Encyclopedia,* compiled by Liang court historians from 502 to 556 A.D. He wrote that the people of Fusang were civilized, could write, made paper from the bark of a tree, domesticated cattle with very long horns and drank their milk. In 1716 the first European scholar translated the story of Hui shen, In 1885 Edward Vining published 8 translations of Hui shen's texts and related works; this plus the analysis totaled nearly 800 pages. They key question is "Where was Fusang?" Some say off Japan, where the Ainu live. Some say Sakhalin (p. 3-9).

In 138 B.C. the Emperor Wu Ti of the Han dynasty sent an ambassador / minister, Chang Ch'ien, to the West. Now called the Marco Polo of China, he was gone for 12 years, and wandered into the empire of Alexander the Great. Joseph Needham, the great British authority on Chinese history, wrote: "We did not discover China; on the contrary, China discovered us..." Chang Ch'ien traveled to the West more than 1,500 years before Marco Polo traveled to China.

Fa Hsien, a Chinese Buddhist monk, traveled to India in 399 A.D.

"It was the English addiction to tea that led to the Chinese addiction to opium and to the trade that was the harbinger of the collapse of both their empires. In 1666 the East India Company imported a mere 23 lb of tea to England; by the late 1600s it was importing 20,000 lb annually. England's insatiable thirst for tea became a severe drain on Britain's royal exchequer and it had to be paid for in millions of pounds of silver sterling. So opium poppies were grown in India under the supervision of the British government, the opium (much stronger than the traditional Chinese kind) was manufactured by the East India Company under a royal charter of the British government, and the opium was shipped to China–in violation of Chinese law–under the protection of the British fleet. The revenues were used to pay for Britain's tea. In 1773 the East India Company was granted the monopoly of the opium trade and in 1779 it was granted the monopoly of its manufacture. It was during those years that smuggling opium into China increased dramatically. It was the American colonist's rejection of Chinese tea that increased England's need for opium revenues. All this led to the Opium Wars. England invaded China and won the right to free trade in opium.

Of the Chinese who came to America, almost all came from Kwangtung province in the south, and almost all of those came from a handful of counties around Canton, especially Chung-shan and Toishan. The emigration began amid the despair and defeat of the Opium Wars, and amid the triumphant, rising hopes of Chinese nationalism in the Taiping Rebellion.

In 1519 Ferdinand Magellan (lived ca. 1480-1521), a Portuguese navigator sailing under the flag of Spain, landed in the Philippines. That started the triangle of trade between China, the Philippines, and Mexico. The first Chinese came to Mexico on Spanish galleons in 1565 from Manila, in the Philippines. Most of these galleons were built by the Chinese, especially the Chinese, based on their great sea-going junks, some of which weighed 10 times as much as Columbus' flagship. They landed in Acapulco (a port 200 miles south of Mexico City and later called "ciudad de los Chinos"), and by 1635 there was a large Chinese population in Mexico, especially in Acapulco, Mazatlán, and Mexico City. This China Trade ended in 1815.

Manila was the gateway to America. "In 1586 there were said to be ten thousand Chinese in Manila, a majority of the city's population." By 1636 it was almost 30,000 and by 1749 it was 40,000. In all those years there were not more than a few hundred Spaniards in the entire city. The men of Canton largely built the city of Manila.

In 1788 some 50-70 Chinese built one of the first English forts on the pacific coast of America (p. 93). More than 100 pioneers from China were settled on the northwest Pacific coast by the late 1700s. They preceded by almost 2 decades the famed Lewis and Clark expedition, which set forth to "discover" the Pacific in 1804. In Jan. 1848, when gold was discovered at John Sutter's sawmill ("Sutter's Mill" at Coloma) located 45 miles northeast of New Helvetia (Sutter's Fort) in Sacramento, there were only a few hundred Chinese in California. In 1852 the Chinese joined the Gold Rush. They called California the Golden Mountain. By 1852 there were 20,000 or more Chinese in California, and by 1860 there were 30-50,000, mostly young men from Kwangtung and comprising 10% of the state's population. Some came as merchants to sell goods to the gold miners, some as coolies or contract laborers. The 1870 census counted 34,933 Chinese miners, or 25% of all miners in the state. The Chinese built the railroads in the West. They were considered very strong, hard workers. Many became fishermen and farmers. In 1886 the California Bureau of Labor estimated tbat 87.5% of "all labor on farms" in California was Chinese.

"In the late 1880s there were said to be nearly 110,000 Chinese residents on the sparsely populated frontiers of the West. But 30 years later there were barely more than 60,000. Nearly half of the western pioneers had been terrorized into leaving their homes. Many were massacred and excluded by harsh, discriminatory laws. In 1882, five years after accepting as a gift the statue of liberty that welcomed European immigrants, the U.S. Congress enacted the Exclusion Act, which prohibited any Chinese man who worked with his hands or was a laborer from coming to the USA. All Chinese who were already residents were forever barred from becoming citizens.

The Chinese were the single largest nationality in the West in the frontier days, comprising at least one-quarter of the population of California and a greater part of many of the remote western territories.

One large California town populated only by Chinese was Locke. Founded in 1912, it had 1,500 residents by 1915.

1657. Sundjojo, -. 1979. Mempelajari peranan penggodokan pada pembuatan tempe kedelai [Study of the effects of boiling on soy tempeh processing]. Thesis (Skripsi), Fakultas Teknologi Pertanian Universitas Gadjah Mada, Yogyakarta, Indonesia (College of Agricultural Technology, Gadjah Mada University). 49 p. [Ind]*
Address: Yogyakarta, Indonesia.

1658. **Product Name:** Packaged Lactone Silken Tofu.
**Manufacturer's Name:** Unicurd Food Co.
**Manufacturer's Address:** Singapore.
**Date of Introduction:** 1979. January.
**New Product–Documentation:** Letter from Francis N.K. Goh. 1994. Nov. 3. This company, originally named Unicurd Food Co., was founded in 1978 as a partnership by two housewives, Madam Tan Ai Wang and Madam Chiang Kuei Chin. In late 1979 the company began to make and sell tofu, operating on a small scale in a combination 2-story shop and home, with the residence located above the shop. The approximate size was 800 square feet. They produced mainly *juten tofu* (lactone silken tofu), packed in 300 gm trays (known as 2B shape in Japan) and also 250 gm sausage-shaped polyethylene bags (known as sakura tofu in Japan), at the rate of about 150 kg/day. In 1980 the company moved into a factory building at Block 1012, Aljunied Ave. 3, #01-35/37, Singapore 1438. The building, of about 2,400 square feet, was constructed by the Government of Singapore. For more details, see separate entry for this letter.

1659. U.S. Department of Agriculture. 1979. The annual report on activities carried out under Public Law 480, 83d Congress, as amended, during the period October 1, 1977 through September 30, 1978. Washington, DC: U.S. Government Printing Office. 51 + [38] p. See table 18. 27 cm.
• ***Summary:*** Table 18 is titled "Title II, Public Law 480–total commodities shipped by program sponsor, fiscal year 1978." The main program sponsors and distributing agencies, listed alphabetically, are AJJDC (American-Jewish Joint Distribution Committee), CARE, CRS (Catholic Relief Service), CWS (Church World Service), LWR (Lutheran World Relief), SAWS (Seventh-day Adventist World Service), UNICEF, UNRWA (United Nations Relief and Works Agency), and WRC (World Relief Commission). All of these are Private Voluntary

Organizations (PVO/PVOs), registered with USAID. The following foods containing soy protein were distributed: Soy fortified corn meal (SFCM), soy fortified sorghum grits (SFSG), CSM (corn soya mix), WSB (wheat soya blend), and small amounts of soya flour. The vegetable oil which was shipped to many countries was soybean oil; it is not recorded here.

Foods containing soy protein were distributed to the following countries or areas: Near East: Bhutan, Egypt, Gaza, Jordan, Jordan West Bank, Morocco, Tunisia, Yemen.

Latin America: Bolivia, Chile, Colombia, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Jamaica, Panama, Paraguay, Peru.

Africa: Benin, Botswana, Burundi, Cameroon, Central African Empire, Chad, Comoro Islands, Congo, Djibouti, Ethiopia, Gambia, Ghana, Guinea Bissau, Ivory Coast, Kenya, Lesotho, Liberia, Madagascar, Malawi, Mali, Mauritania, Mozambique, Niger, Rwanda, Sao Tome & Principe, Senegal, Seychelles, Sierra Leone, Somalia, Sudan, Swaziland, Tanzania, Togo, Upper Volta, Zaire, Zambia.

Asia: Bangladesh, India, Indonesia, Nepal, Philippine Islands, Sri Lanka.

Note: This is the earliest document seen (Aug. 2009) concerning soybean products (soy flour) in Djibouti, or Guinea Bissau. This document contains the earliest date seen for soybean products in Djibouti, or Guinea Bissau (1978); soybeans as such had not yet been reported by that date. Address: Washington, DC. Phone: 703-875-4901 (1991).

1660. Wang, Hwa L.; Hesseltine, C.W. 1979. Mold-modified foods. In: H.J. Peppler and D. Perlman, eds. 1979. Microbial Technology. 2nd ed. Vol. 2. Fermentation Technology. New York: Academic Press. 544 p. See Vol. 1, p. 95-129. [90 ref]

• ***Summary:*** Volume 1. Microbial processes. Volume 2. Fermentation technology. Contents: 1. Introduction. 2. Soy sauce. 3. Miso. 4. Hamanatto. 5. Sufu [fermented tofu]. 6. Tempeh. 7. Ang-kak (red rice, used as a color agent). 8. Absence of mycotoxins in fermented foods. 9. Conclusions.

For each food is given: General description, method of preparation, composition [chemical / nutritional]. In addition for tempeh is given: Tempeh-like products, biochemistry and physiology of *Rhizopus oligosporus,* changes occurring during fermentation, nutritional value.

"Soy sauce "is known as chiang-yu on China, shoyu in Japan, kecap in Indonesia, kanjang in Korea, toyo in the Philippines, and see-iew in Thailand. In the Western World the product is often referred to as soy sauce." Japan is the leader worldwide in sauce production; it has the largest fermentation plant and uses the most advanced technology.

Hamanatto: Products similar to Japan's hamanatto are known as tou-shih in China, tao-si in the Philippines, and tao-tjo [sic] in the East Indies [Indonesia]. A typical process for making hamanatto in Japan, based on information supplied by Dr. T. Kaneko of Nagoya Univ., Japan, is as follows: Wash soybeans, then soak, steam until soft, drain, and cool. Mix with parched wheat flour in the ratio of 2 parts soybeans to 1 part flour. Inoculate the soybeans with a short- or medium-stalked strain of *Aspergillus oryzae.* Incubate for 1-2 days until the beans are covered with a fragrant mycelium and have become soybean koji. Pack the soybeans in a container [wooden keg] with (for example) 2.5 kg soybean koji, 650 gm salt, 3.6 liters water and some freshly sliced gingerroot. Cover the container tightly and age under pressure for 6-12 months. Remove beans from liquid and dry them in the sun to give hamanatto. The composition of the brine may differ among manufacturers.; thus the finished hamanatto differs somewhat in taste and appearance. "Japanese hamanatto is rather soft, having a high moisture content. Chinese tou-shih has a much lower moisture content... and therefore is not so soft. Tao-tjo tends to have a sweet taste because sugar is often added to the brine."

Shoyu in Japan: Although there are more than 4,000 shoyu makers in Japan, the largest 4-5 companies produce about 50% of the total. Address: NRRC, Peoria, Illinois.

1661. Wedhastri, Sri. 1979. Perubahan kimia pada beberapa komponen selama fermentasi miso [Chemical changes on several components during miso fermentation]. BSc Thesis (Skripsi Sarjana Muda), Fakultas Pertanian Universitas Gadjah Mada, Yogyakarta, Indonesia. 13 p. [Ind]*
Address: Yogyakarta, Indonesia.

1662. Abdullah, Adelina. 1980. Country report–An interview of extruder technology in Malaysia. In: Amara Bhumiratana, ed. 1980. Proceedings: ASEAN Workshop on Extruder Technology. Bangkok, Thailand: Kasetsart University. xiv + 249 p. See p. 176-92.
Address: Malaysian Agricultural Research and Development Inst.

1663. Ang, H.G.; Theng, C.Y.; Lim, K.K. 1980. Country report–High protein extruded snackfood. In: Amara Bhumiratana, ed. 1980. Proceedings: ASEAN Workshop on Extruder Technology. Bangkok, Thailand: Kasetsart University. xiv + 249 p. See p. 197-217. [16 ref]
Address: ASEAN Protein Project, Singapore, c/o Chemistry Department, Univ. of Singapore.

1664. ASEAN Sub-Committee on Protein. 1980. ASEAN Protein Project. Bangkok, Thailand. 24 p. Jan. Illust. 29 cm. [Eng]

• ***Summary:*** Contents: Introduction (incl. history, programs, and budget). Administration (incl. list of workshops held by the ASEAN Sub-Committee on Protein). Research and

development. High-protein low-cost foods. Full-fat soy flour (a plant at Chiang Rai, northern Thailand, produces 100 tons/month). Fermented foods (incl. soy sauce). Soy products (incl. tofu). ASEAN network (directory).

"The ASEAN Protein Project was conceived at a joint research project on soybeans and protein-rich foods at the first meeting of the ASEAN Permanent Committee on Science and Technology held in August 1971 in Indonesia. Meetings of food specialists soon followed, one in September 1972 in Malaysia and another in November 1972 in Indonesia. At a further meeting in August 1974, involving Australian technical experts, four areas for research co-operation were identified, namely: (1) Identification, development, and utilisation of low-cost, protein-rich foods for children and other vulnerable groups. (2) Processing and utilisation of full fat soy flour (3) Improvement of fermentation technology; and (4) Microbiological culture collection.

Workshops held by the ASEAN Sub-Committee that concern soya include: 1st Workshop on soy products (1976, Kuala Lumpur, Malaysia). 3rd Workshop on culture collection (1977, Bangkok, Thailand). 4th Workshop on soy sauce manufacturing techniques (1978, Singapore). 5th Workshop on solid substrate fermentation (1978, Bandung, Indonesia). 8th Workshop on extruder technology (1980, Bangkok, Thailand).

Photos show: (1-4) Participants, meetings, and tours. (5-6) Full fat soy plant at Chiang Rai, Thailand. (7) Commercial soy sauce factory. Address: Bangkok, Thailand.

1665. Bhumiranta, Amara. 1980. Country report–ASEAN workshop on extruder technology. In: Amara Bhumiratana, ed. 1980. Proceedings: ASEAN Workshop on Extruder Technology. Bangkok, Thailand: Kasetsart University. xiv + 249 p. See p. 218-33.
Address: Prof., Inst. of Food Research and Product Develoment, Kasetsart Univ., Bangkok, Thailand.

1666. Bhumiratana, Amara. ed. 1980. Proceedings: ASEAN workshop on extruder technology. Bangkok, Thailand: Kasetsart University. xiv + 249 p. Held 14-23 Jan. 1980 at Inst. of Food Research and Product Development, Kasetsart Univ., Bangkok, Thailand. Illust. No index. 30 cm.
• ***Summary:*** This is the eighth ASEAN Workshop. It is sponsored by the ASEAN-Australian Economic Program (through the ASEAN Sub-Committee on Protein). Contents: Acknowledgment (incl. sponsoring organization, and co-sponsoring and supporting organizations). Foreword, by Prof. Bhumiratana. Welcome address, by Prof. Dr. Phaitoon Ingkasuwan, Acting Rector, Kasetsart Univ. Keynote address, by Prof. Sanga Sabhasri, Secretary General, National Research Council at the 11th Meeting of ASEAN Sub-Committee on Protein... Opening address, by Mr. Orachun Tanaphong, Acting Director-General, ASEAN-Thailand... Technical sessions: Nine papers. Country reports: From Indonesia, Malaysia, Philippines, Singapore, and Thailand. Recommendations. List of participants (directory). Appendix–List of publications (84 references) available from American Soybean Assoc., 15012 Liat Tower, Orchard Road, Singapore. Address: Prof., Director, Inst. of Food Research and Product Development, Kasetsart Univ., Bangkok, Thailand.

1667. Bromfield, K.R.; Melching, J.S.; Kingsolver, C.H. 1980. Virulence and aggressiveness of *Phakopsora pachyrhizi* isolates causing soybean rust. *Phytopathology* 70(1):17-21. Jan. [10 ref]
• ***Summary:*** Isolates of the soybean rust pathogen from Australia, India, Puerto Rico, and Taiwan were found to differ in virulence on a variety of soybean genotypes, including the variety Wayne. Address: Research plant pathologists, Plant Disease Research Lab., AR-SEA, USDA, P.O. Box 1209, Frederick, Maryland 21701.

1668. Cilindro, Alden G. 1980. Country report–Adaptation of extrusion technology in the preparation of infant food. In: Amara Bhumiratana, ed. 1980. Proceedings: ASEAN Workshop on Extruder Technology. Bangkok, Thailand: Kasetsart University. xiv + 249 p. See p. 193-96.
Address: Food and Nutrition Research Inst., National Science Development Board, Manila, Philippines.

1669. Trisnamurti, Roy H.; Mochtar, M.; Yudha M., Adin; Roestamsjah, -. 1980. Country report–Recent activities on extruder technology in Indonesia. In: Amara Bhumiratana, ed. 1980. Proceedings: ASEAN Workshop on Extruder Technology. Bangkok, Thailand: Kasetsart University. xiv + 249 p. See p. 141-75. [5 ref]
Address: National Inst. for Chemistry, Indonesian Inst. of Sciences.

1670. Bhumiratana, A.; Flegel, T.W.; Glinsukon, T.; Somporan, W. 1980. Isolation and analysis of molds from soy sauce koji in Thailand. *Applied and Environmental Microbiology* 39(2):430-35. Feb. [12 ref]
• ***Summary:*** Studies to modernize the soy sauce fermentation industry in Thailand began in 1978 when a locally isolated Aspergillus strain was recommended for use in soy sauce factories because it was a high protease producer, it was free of aflatoxin and other toxins, and it produced good taste and aroma in the final fermentation product.

This paper was first published in 1979 by the Inst. of Food Research and Product Development, Kasetsart Univ., Bangkok. Address: 1. Dep. of Mcrobiology, Faculty of Science, Mahidol Univ., Bangkok, Thailand.

1671. *INTSOY Newsletter (Urbana, Illinois).*1980. INTSOY research highlights: Soybean genetic improvement program. No. 20. p. 1-2. Feb.

• ***Summary:*** "The purpose of this program is to identify and develop high yielding, nutritious soybean varieties suitable for production in tropical and subtropical areas. INTSOY's breeding program in centered in Puerto Rico, where soybean accessions and varieties developed by cooperating breeders are grown to identify desirable traits. These traits are then introduced into existing varieties. Crosses are made to produce segregating populations from which superior lines can be selected."

"The results from six years of variety evaluation have demonstrated that cultivars developed in temperate zones can provide large yields under experimental conditions in the tropics and subtropics. Existing germplasm was found to be more flexible and widely adapted than expected. Experimental yields have averaged between 2,200 and 3,000 kg/ha, and at selected locations have ranged from 4,000 to 6,000 kg/ha. The protein content of soybeans grown in the tropics has been comparable to that of soybeans grown in temperate zones.

"The yield potential of soybeans grown in the tropics is not always related to the maturity group. For example, Davis in group IV has consistently yielded more than later maturing varieties at almost all latitudes and altitudes. Williams in group III has produced larger yields than some later maturing types, even though it flowered earlier and did not grow as tall. However, as a group, later maturing cultivars yielded more than earlier maturing cultivars."

"Analysis of the sources of variance in ISVEX results indicates that yields from the same soybean variety may be affected more by management techniques than by environmental conditions. Crop management skills are clearly an important part of successful soybean cultivation.

"As a result of having conducting ISVEX trials, many countries have found that soybeans can be grown successfully and economically." Egypt has been a leader in soybean variety development and commercial production–which "has now exceeded 40,000 hectares. Iran, Ivory Coast, Pakistan, the Philippines, and Syria have imported large quantities of seed for soybean production; Benin, India, Kenya, Morocco, Somalia, and the Sudan have purchased smaller quantities."

1672. O'Neill, Kevin. 1980. Tempe: A traditional food for tomorrow. *Indonesia Circle (Univ. of London)* No. 21. March. p. 54-59. [13 ref]

• ***Summary:*** An interesting introduction to tempeh. "Nothing certain is known of its introduction into Indonesia but one might guess that it was during the time of regular trade between South China and Indonesia starting about A.D. 1000. One Sundanese name for soya-bean is *kacang jepun* (Japanese bean) which might be significant."

"Pure culture fermentation of *Rhizopus* [to make tempe] was developed in the United States early in the 1960s.

"Editor's note: It has recently come to our attention that Dr. J. Hedger and Mr. T. Basuki of the Department of Botany and Microbiology, University College of Wales, Aberystwyth, have been experimenting with *tempe* production and, indeed, plan to start a *tempe* factory in Britain. Mr. Basuki has produced a four-page roneo leaflet, *Tempe–an Indonesian fermented soybean food,* which provides a clear and concise guide for the home *tempe*-maker, and Professor Hedger wrote a script for the BBC2 program "Tomorrow's world", on *tempe* which was broadcast in the summer of 1979...

"Finally, readers will be interested to know that ready-made *tempe* can sometimes be bought at Lee's Emporium, Dyne Road, off Kilburn High Road, in north-west London. I.C. Glover." Address: American Indonesian Chamber of Commerce.

1673. Shurtleff, William; Aoyagi, Akiko. 1980. Tempeh production: The book of tempeh, volume II. Lafayette, California: New-Age Foods Study Center (Renamed Soyfoods Center in Sept. 1980). 176 p. Illust. by Akiko Aoyagi Shurtleff. Index. March. 28 cm. [46 ref]

• ***Summary:*** Contents: Preface. 1. How to start a tempeh shop. 2. Setting up shop: Community or kitchen shop, fire cooker shop, steam cooker plant, modern factory, tropical village shop, tropical caldron plant. 3. Ingredients. 4. Principles of tempeh production. 5. Making tempeh in North America. 6. Making tempeh in Indonesia. 7. Making specialty tempehs: Introduction, specialty soy tempehs, other legume tempehs, grain (or seed) & soy tempehs, grain tempehs, okara tempeh, soy (or grain) & okara tempehs. 8. Quantity tempeh recipes & the soy deli. 9. Making tempeh starter. Appendices: A. Resources: People and institutions connected with tempeh production. B. Tempeh shops in the West. C. Measures, weights & equivalents. Bibliography. New-Age Foods study center. D. Index. Address: New-Age Foods Study Center, P.O. Box 234, Lafayette, California 94549.

1674. Java Murni Restaurant. 1980. April. New soyfoods restaurant or deli. 4509 Adams St., Carlsbad, CA 92008.

• ***Summary:*** Questionnaire filled out by owner of restaurant or deli. 1982. Lists the company's most popular soy-based menu items in descending order of popularity. The highest weekly total sales over the past 6-2 months, the month that this occurred, and why. The average weekly sales during this period. Average hourly wages paid to workers. The business startup cost (amount of money it cost to get the business started). Current profitability status. Plans for the future. Advice the owner would give to someone starting a similar business.

Poster sent by Doug Fiske. 1981. Dec. "Prepare now for Java Murni's vegetarian X-mas dinner. Dec. 26 and Dec. 27. 5-7 or 7:15-10 pm. Contains the menu and an illustration of a shadow puppet. Soy-related dishes include: Appetizers: Gulung Rebung (bamboo shoots wrapped in crispy tofu). Tofu Kembang (tofu flowers). Salad: Gado-gado (with peanut dressing). Entree: Tempeh Treat (tempeh braised in Indonesian soy and safflower oil). Tofu-Saus-Richa (tofu in sweet-and-sour spicy sauce). Chah Tempeh (mixed-tempeh-vegetables). Keringan Tempeh (sweet-piquant tempeh). Satay Tempeh (bbq tempeh). Soyex Malakka (soy cubes in malakka sauce).

Vegetarian menu. 1982. Shurtleff & Aoyagi. 1982. Report on Soyfoods Delis, Cafes & Restaurants. p. 3. Address: Carlsbad, California. Phone: 714-434-4131.

1675. Owen, Sri. 1980. Tempe: A Javanese health food comes West. *PPC (Petits Propos Culinaires, London)* No. 5. p. 13-18. May. [Eng]

• ***Summary:*** Describes how the author (a woman) grew up in Padang Panjang (West Sumatra), then central Java (during World War II), her interest in tempeh there and in London. "Tempe is becoming in Britain one of those things of which people have vaguely heard but which remain teasingly mysterious. Even in Holland, where it is quite easy to buy, and in North America, where making tempe at home is a popular hobby for health-food lovers, it cannot yet be called a household word... A few people are now making tempe in Britain, and anyone who is seriously interested should write Dr. John Hedger, Department of Botany and Microbiology, The University College of Wales, Aberystwyth. Ready-made tempe can sometimes be bought at Lee's Emporium, Dyne Road, off Kilburn High Road in North West London." Tempeh recipes follow, starting with Tempe Goreng Bacem. Address: 96 High St., Wimbledon Village, London, SW19 5EG England. Publisher is Prospect Books, 45 Lamont Rd., London SW10 0HU.

1676. Sayavun, Daranee; Tontsirin, Kraisid. 1980. Effectiveness of "Kaset Soy Milk" in treatment of infants with diarrhea. *ASEAN Protein Project Newsletter* No. 6. p. 5-6. May. [Eng]

• ***Summary:*** Soymilk, an inexpensive product, was found to be effective in the treatment of acute diarrhea in infants. Address: Mahidol Univ., Bangkok, Thailand.

1677. *Foreign Agriculture.* 1980. Thailand: Imports of U.S. cotton, soybean meal to rise. June. p. 31-32.

• ***Summary:*** The Thai economy continues basically agricultural, with 82% of the population classed as rural and agricultural products accounting for 60% of export earnings. Thailand imported about 57,000 tons of soybean meal in 1979. Some of the U.S. shipments were financed under the Commodity Credit Corporation (CCC) export credit program.

1678. Hesseltine, C.W.; Wang, H.L. 1980. The importance of traditional fermented foods. *BioScience* 30(6):402-04. June. [12 ref]

• ***Summary:*** Table 1 gives, for each food, the name, area or country, microorganism used, substrate, nature and uses. The following soy-related foods are included: Soy sauce (chiang-yu, shoyu, toyo, kanjang, kecap, see-ieu), miso (chiang, doenjang, soybean paste, tauco), Hamanatto (toushih, tao-si, tao-tjo [sic, tao-tjo = tauco is Indonesian-style miso]), sufu (fu-ru, fu-ju, tou-fu-ju, bean cake, Chinese cheese), tempeh, bongkrek, ontjom (oncom), natto. Address: NRRC, Peoria, Illinois.

1679. Nangju, D. 1980. Soybean response to indigenous *Rhizobia* as influenced by cultivar origin. *Agronomy Journal* 72(3):403-06. May/June. [17 ref]

• ***Summary:*** "Many investigators believe that when grown for the first time, the soybean nodulates poorly unless inoculated with *Rhizobium japonicum.* However, in Nigeria the cultivar 'Malayan,' which originated from Indonesia, has nodulated quite well with indigenous strains of *Rhizobium.* We chose cultivars originating from Southeast Asia and from the USA and compared parameters associated with effective nodulation when these cultivars were grown with and without inoculation with *Rhizobium japonicum."* U.S.-bred soybean cultivars respond strongly to inoculation when grown in west Africa. Address: IITA, PMB 5320, Ibadan, Nigeria. Currently agronomist, Asian Development Bank, P.O. Box 789, Manila, Philippines.

1680. Thompson, William N. 1980. History of work with soy and views on the potential of soyfoods around the world (Interview). Conducted by William Shurtleff of Soyfoods Center, July 3. 3 p. transcript.

• ***Summary:*** 1. What is your background and how did you become interested in soy and INTSOY? Ans: He grew up on a farm in Illinois when soy was still a very small crop. In college, he was an ag economist, specializing in farm management, with work on the economics of various types of cropping systems. In 1965 he helped to develop an agricultural university in Sierra Leone, This experience was very valuable in orienting him toward the problems of the developing world. Since then, most of his work has been on these problems. He has had short-term assignments in India, Nepal, and Thailand, where he developed research and education organizations. He is the first director of Intsoy. He had no special interest in soy before joining Intsoy except that soy and maize are major crops in Illinois. He is mainly an administrator, not a technical man. His major role has been to develop and institutional structure to make knowledge on soy available worldwide.

2. What do you feel are the two or three main advancements that INTSOY has made worldwide? 1. Facilitate worldwide network to improve communications among people interested in soy. Regional conferences, newsletter, publication series, training courses at the Univ. of Illinois. 2. Focus on the key problems of soy in tropical countries. Intsoy has more impact in India than in any other country. The India program started in 1965 (funded by US AID) with the cooperation of Indian food scientists and agronomists, specially at Pantnagar and Bareilly. The two university development projects in India were in Madhya Pradesh and Uttar Pradesh. Then the Coordinated Research Project on Soybeans was developed–both utilization and production. The results were exciting. Intsoy grew out of that program as the potential became clear. Now India has 1 million acres in soybeans. Develop soybean varieties that will grow in areas where it was formerly not thought possible. Develop new Maturity Groups 0 and 00 to the north and 9 and 10 to the south as soybeans are grown ever closer to the equator. Work on soybean diseases (mosaic virus), pest control. Intsoy has done more work in soybean production than in utilization. It is hard to get financing for utilization.

New soybean countries working with Intsoy: Ecuador now has 30,000 acres of soybeans, Egypt 50,000 acres, Ivory Coast, Pakistan (good yields), Colombia, Guatemala (work with Plenty from Tennessee), Indonesia, Thailand, Zambia, Kenya, Ghana, and Nigeria. 3. The method for boiling and processing whole soybeans using sodium bicarbonate has been a breakthrough. Soy + cereals make low-cost infant foods.

3. Do you feel that in 20 to 30 years most countries in the world will be growing and processing soybeans. Yes, he thinks that, in the next 15-30 years, most developing countries will have soybeans growing somewhere in their country. This will take adaptive research domestically. Some areas and climate in most countries are suited to soybeans, which can now be grown under a wide range of conditions. The soybean is a high producer of both energy (calories) and protein per hectare.

4. What are your views on low-technology soyfoods in Third World Countries? Which particular foods do you feel will become widely used in South Asia, South America, and Africa. Intsoy's primary orientation is low-tech–using less capital and more labor. The Sri Lanka program is medium- to low-tech. Intsoy is proud of that program and its training activities. There is great potential to expand soybean utilization in this way.

5. How do you feel about the use of soy in livestock feeds in poor countries? Is there a danger that the upper classes will use most of the soy protein to make their meat leaving little for direct food use? This is not much of a problem since prices for soy will always be low for use as livestock feed. We should use soy to help as many people as possible. The more affluent, with economic and political power, will consume more animal proteins and soy. Soy will easily find its way into feed. We need strategies to get soy to the poor–those who need it most. It can also be used in feeds for animals of the poor. Intsoy's bias is to help soy find its way into the diets of low-income people. We must be very careful with the crop that is displaced, so that a net gain results. In India, the soybean fit in as a monsoon crop where no other crop was grown. Beware of the Brazil problem. Intsoy did some variety testing in the Amazon in Brazil. They now have varieties that yield very well in northern Brazil. Brazil has lifted some technologies from the U.S., such as highly mechanized farms, but this will not work in northeastern Brazil. There has been aggressive government support and subsidies for soy in Brazil. Dr. Thompson has lots of respect for Brazil and the government's support for agricultural development. Now they need to work on nutrition and food uses. The main problem for Intsoy is to figure out how soy can met the needs of a particular country or region; not to get soy growing everywhere.

6. Are you aware of a deemphasizing of the role of protein in the diet in Third World countries? How might this affect soy? If we grow enough grains, will the protein take care of itself? Soy fits in nicely with the Green Revolution, although this revolution has led to a decrease in legume production in India. This leads to more funding for IRRI and less for soy. But there is still a problem of protein of protein in some countries that have done a lot to meet calorie needs. It is an oversimplification to say that a diet with adequate calories will contain enough protein. Indians now realize this. They now want more dairy milk–the white revolution.

7. Recent findings at MIT and INCAP have shown that for humans soy protein is approximately equal in quality to that of milk and meats. How long do you think it will be before this finding has an impact in America and the Third World? Yet dairy milk is no longer considered to contain higher quality protein than soymilk. Dr. Thompson thinks this research data is solid. Perhaps more important, we can produce 4 times as much protein from a unit area of land in the form of soymilk than of dairy milk. So the key problems are acceptability and cost. ' In the U.S., as with margarine replacing butter, there is a gradual move toward vegetable proteins. That move is faster in the Third World where people have less choice with their food dollars. Dr. Thompson thinks that when people are introduced to soyfoods in the Third World, they will generally like them, and buy or make them. They are not as resistant to change as we might think–as shown clearly in the Sri Lanka program. Moreover, ingredients like ground whole soybeans or soy flour can be added to baked goods or tortillas where people are not aware that they are eating a more nutritional food.

8. How might the Soycrafters Association and our New-Age Foods Study Center cooperate with INTSOY? Specific projects? He thinks our two organizations are more oriented toward the USA, whereas Intsoy is oriented toward the Third World. Yet he sees good opportunities for cooperation–as in Intsoy learning more about traditional Asian soyfoods such as tofu, tempeh, miso, etc. He hopes our two organizations can have more of an impact on the Third World. Les Ferrier has done lots of overseas utilization work. Maybe we could be on a technical advisory committee (TAC).

9. Would you favor legislation requiring 5-10% fortification of items such as baked goods and chapaties in poor countries growing soybeans if this did not decrease the acceptability of the foods. How might it affect cost? Is there any such legislation?

10. Any other comments? Intsoy's annual budget is less than $2 million, including $850,000 from AID for Urbana and Puerto Rico. IRRI's budget is about $15 million. Part of the reason for the difference is due to the reevaluation of the importance of protein in human diets. Address: Director, INTSOY, Univ. of Illinois at Urbana-Champaign, Urbana, Illinois.

1681. Leviton, Richard. 1980. Soyfoods in Toronto. *Soyfoods* 1(3):14-19. Summer.
• ***Summary:*** Discusses Vital Eat, Pyung Hwa, Soy City Foods, and Victor Food Products. Victor Food products (102 Hymus Rd., Scarborough, Ontario, Canada M1L 2C9) was founded and is owned and managed by Mr. Stephen Yu. In the 3,600 square foot tofu factory, 13 workers (mostly Vietnamese refugees) produce 1,900 lb/day of tofu, 750 gallons/week of Nutrisoya soymilk, and about 200 quarts/ day of kinugoshi soybean pudding. Mr. Yu, who was born in China and educated in California, came to Toronto in 1977 to make an initial market survey. He opened his plant in Feb. 1978, with an initial production of 900 lb/day. Mr. Yu now has accounts in all major Toronto supermarket chains. He reaches about 40% of the Oriental market and about 40% of the overall soyfoods market. He speaks fluent English and is "far more forward looking and market conscious than his Oriental competitors in the Toronto area." His production process and equipment are described in detail. Last summer he appeared on a 10-minute television feature that depicted the story of soybeans from field to shop to table. This was followed, in Jan. 1980, by a major article which profiled his company in the *Toronto Star.* This publicity ushered his tofu into the three big supermarket chains not yet carrying it and sales in the four chains that were rose 100%. Note: This is the earliest document seen (April 2001) that mentions Victor Food Products in Canada.

Soy City Foods, at 2847 Dundas St., is a new soy production site due to open in the spring Pat Guardino is general manager and Leonard Bugyra is sales manager. The company is a subsidiary of Golden Age, Inc., a spiritual group which operates a successful vegetarian restaurant downtown and is currently installing a second one next door. The company will start by producing about 600 lb/day of tofu, as well as soymilk and soysage. They will supply their contiguous restaurant and sell bulk soyfoods from their own retail counter in the storefront. They will also produce tofu cheesecakes and okara cookies in the restaurant.

Photos show Soy City Foods and its owners (incl. Pat Guardino), Pyung Hwa Tofu Shop, and Victor Yu of Victor Food Products with Nutrisoya soymilk. Address: Colrain, Massachusetts.

1682. Walker, Martin. 1980. Serendipity on £5 a day: Overland to Asia. *Guardian (England).* Aug. 9. p. 11.
• ***Summary:*** In Bali, the writer and his wife rented the rajah's bedroom in the Tintagangga water palace. "Included in the price of the room was a meal of *nasi goreng,* a fried rice dish with peanuts and fish and vegetables, with an egg mixed into it and the whole flavoured with *kecap manis,* a sweet soy sauce."

1683. Pinnick, Sinclair. 1980. Re: Dr. Harry Miller and his work with soyfoods. Letter to William Shurtleff at Soyfoods Center, Sept. 10. 1 p. Typed.
Address: 16042 Bivelbliss, Mt. Vernon, Ohio. Phone: 614-397-8213.

1684. Arum, Nancy. 1980. A market for gourmet tastes. *New York Times.* Sept. 21. p. WC15.
• ***Summary:*** Twelve years ago, John and Anita Borghese fled their apartment in Manhattan and moved to Westchester. Together they started a specialty food store named Gourmet Bazaar (3 Purdy Ave., Rye, New York). Since many of the local residents have Dutch ancestry, they carry a good selection of Indonesian ingredients, such as "ketjap manis,... a sweet soy sauce [which] is one of the basic ingredients in Indonesian cooking."

A recipe for Rempah babi (Sumatra pork balls) calls for 1 teaspoon "ketjap manis."

A photo shows John and Anita Borghese in their Gourmet Bazaar.

1685. Hauser, Nao. 1980. The joy of eating this Thai's food. *Chicago Tribune.* Oct. 20. p. E1.
• ***Summary:*** Chanpen Ratanadilokchai is the cook at Thai Room Restaurant in Chicago. A recipe for Fried whole red snapper calls for "1 tablespoon each: soy sauce, brown bean sauce."

At the end of the recipe we read: "Note: Chanpen prefers Kikko-man soy sauce because it is the right weight."

When shopping, she buys "thick bean sauce" and "bean cake to use in fresh egg rolls."

A photo shows Chanpen happily at work in the restaurant kitchen.

1686. ASEAN Sub-Committee on Protein. ed. 1980. Report on the Second ASEAN Workshop on Solid Substrate Fermentation. Kuala Lumpur, Malaysia. 415 p. Held 27-29 Nov. 1980 at Kuala Lumpur, Malaysia. 29 cm. [100+ ref]
• ***Summary:*** This the 10th workshop organized by the ASEAN Sub-Committee on Protein and the second workshop in the series on solid substrate fermentation. The first was held in May 1978 at Bandung, Indonesia. The protein project, which has a newsletter and is directed toward the development of small industries, has been active since 1974. Members of the Main Organising Committee include Prof. Ho Coy Choke (Chairman), Dr. Ahmad Zaharudin Idrus, and Ms. Yeoh Quee Lan. At the back is a directory of participants (p. 411-15). Address: Malaysia.

1687. Brotonegoro, S.; Sudjana, Maria; Saono, S. 1980. Preservation of economically important microbial cultures by freeze drying. In: ASEAN Sub-Committee on Protein, ed. 1980. Report on the Second ASEAN Workshop on Solid Substrate Fermentation. Kuala Lumpur, Malaysia. 415 p. See p. 250-55. [2 ref]
• ***Summary:*** When freeze-dried microbial cultures were tested after 12 months for their viability, 100% of bacterial strains were still viable, while 95% of the yeast and mold strains were still viable. Freeze-drying only slightly changed the amylolytic, lipolytic, and proteolytic activities of the cultures tested. Address: National Biological Inst., Bogor, Indonesia.

1688. Flegel, T.W.; Bhumiratana, A. 1980. Studies on *Aspergillus flavus* var. *columnaris* in soy sauce koji. In: ASEAN Sub-Committee on Protein, ed. 1980. Report on the Second ASEAN Workshop on Solid Substrate Fermentation. Kuala Lumpur, Malaysia. 415 p. See p. 106-20. [6 ref]
• ***Summary:*** Reviews attempts to improve the quality of soy sauce and tao chieo [miso] in Thailand by the introduction of *Aspergillus flavus* var. *columnaris* inoculum (found to produce the most protease) for the koji stage of production. Two major proteases were isolated and characterized. A low-cost, easy, and reliable method is described for the production of koji inoculum by factory personnel using plastic bag incubators.

Good quality soy sauce should have a high soluble nitrogen and a high reducing sugar content in the final product. To obtain this, one must optimize production of protease and amylase during the koji stage. Factory owners all prefer green koji (made in cool weather, dominated by *Aspergillus* species) to black koji (resulting from hot weather and dominated by Zygomycetous molds such as *Rhizopus, Syncephal, Mucor, Absidia,* etc.). In the moromi stage, factory owners say that the total salt content of the moromi and final soy sauce should not fall below 18% (w/v = weight to volume) lest the soy sauce spoil, nor exceed 22% (w/v) lest it be too salty. Koji usually takes 5-7 days to make. The optimum growth temperature for the koji mold, determined by radial growth on agar, was found to be 30ºC. When tao chieo was made by the new method, white crystals of pure tyrosine appeared' since they were not harmful, they were accepted by factory owners. An increase in soluble nitrogen leads to a darkening of color caused by the complexing of glucose with amino acids such as lysine. Address: Microbiology Dep., Faculty of Science, Mahidol Univ., Rama VI Road, Bangkok, Thailand.

1689. Hartadi, Sri. 1980. Inoculum preparation for tempe and soysauce fermentation. In: ASEAN Sub-Committee on Protein, ed. 1980. Report on the Second ASEAN Workshop on Solid Substrate Fermentation. 415 p. See p. 256-62. Held 27-29 Nov. 1980 at Kuala Lumpur, Malaysia. [9 ref]
• ***Summary:*** Usar is the Indonesian name of the inoculum used to make tempeh. Ir consists of strains of *Rhizopus* molds, plus yeast and bacteria. It is prepared by placing inoculated soybeans on leaves of *Hibiscus* species, *Tectona grandis, Musa paradisiaca,* or *Bambusa* species. There are two ways of making tempeh inoculum: The traditional usar method in which the mold is grown on soybeans on leaves, and the powdered form inoculum, in which it is grown on rice.

Most of the soysauce made in Indonesia does not use special inoculum. However two new methods have been developed; growing a powdered inoculum on rice and rice bran, or a fresh inoculum on soybeans. Address: Dep. of Microbiology, Faculty of Agriculture, Gadjah Mada Univ., Yogykarta, Indonesia.

1690. Impoolsup, Attawut; Flegel, T.W.; Bhumiratana, A. 1980. Isolation and characterization of proteases from *Aspergillus flavus* var. *columnaris.* In: ASEAN Sub-Committee on Protein, ed. 1980. Report on the Second ASEAN Workshop on Solid Substrate Fermentation. Kuala Lumpur, Malaysia. 415 p. See p. 369-400. [21 ref]
• ***Summary:*** *Aspergillus flavus* var. *columnaris* is a mold that was isolated from a soy sauce factory near Bangkok, Thailand. It is recommended for use in preparing soy sauce koji because it does not produce aflatoxins and because it is an exceptionally high producer of protease. This study examines the various types of protease produced by the mold. Address: Dep. of Microbiology, Faculty of Science, Mahidol Univ., Rama VI Road, Bangkok 4, Thailand.

1691. Iwaki, M.; Roechan, M.; Hibino, H.; Tochihara, H.; Tantera, D.M. 1980. A persistent aphidborne virus of soybean, Indonesian soybean dwarf virus. *Plant Disease* 64(11):1027-30. Nov. [15 ref]

• ***Summary:*** Reports the Indonesian soybean dwarf virus (ISDV), found only in Indonesia and Thailand. This virus is distinct from soybean dwarf virus (SDV). Address: 1-3. Pests & Diseases Div., Central Research Inst. for Agriculture, Bogor, Indonesia.

1692. Karim, Mohamad Ismail Adbul. 1980. The role of microorganisms in food fermentation with special reference to Malaysian fermented foods. In: ASEAN Sub-Committee on Protein, ed. 1980. Report on the Second ASEAN Workshop on Solid Substrate Fermentation. Kuala Lumpur, Malaysia. 415 p. See p. 31-64. [27 ref. Eng]

• ***Summary:*** Traditional Malaysian fermented soyfoods include kicap (soy sauce), tempeh, and taucu (Malaysian miso). Fermentation is considered by most small-scale processors as more of a art than a science. The secrets of the processes have been passed down in the family from one generation to another. Much of the flavor of fermented soy products comes from fatty acids (glutamic acid, propionic acid, butyric acid, etc.), ammonia, and amines.

In Malaysia, the manufacture of soy sauce is normally done by small establishments using traditional methods. Boiled soybeans are cooled then mixed with 40-50% by weight of wheat flour. The mixture is spread onto large shallow bamboo trays (90 cm diameter and 5 cm deep) to a depth of 5 cm. The trays, which are used repeatedly, harbor many useful microorganisms. The trays are then stacked in tiers 15-30 cm apart on wooden racks for 7-10 days. The mixture is broken up and turned every 2 days to allow aeration. At the end of the fermentation, the white mycelium-impregnated mass, with its spores turning yellow and greenish yellow, is filled into earthenware jars (190 liters capacity) and covered with brine solution of 15-20% concentration. The jars are exposed to the sun and covered with lids at night or whenever it rains. The brine mixture is allowed to ferment for 2 to 24 months depending on the quality of the sauce needed. At the end of the fermentation period, the resulting dark liquid (soy sauce) is removed by siphoning or straining through a cheese cloth or suitable strainer. The sauce is then bottled. Sometimes sugar or benzoic acid (a preservative) is added to the sauce before bottling. A sauce could also be cooked and thickened with caramel (up to 80%) and bottled as thick sauce for sale. The production of thin sauce requires a short fermentation (1½-6 months) whereas thick sauce requires a longer fermentation (6-24 months). The extraction process could be repeated 4 to 6 times by topping the remaining mash with brine solution (10-14%) after each extraction.

Soybean paste or tauco is made in essentially the same way as soy sauce except that broken soybeans are used and the liquid is not removed. The final product is reddish brown. Most Malaysian tauco is not sun-dried, but is packed into wide-mouth jars in its moist paste form. Address: Jakatan Sains dan Teknologi Makanan, Universiti Pertanian Malaysia, Serdang, Selangor, Malaysia.

1693. Sastraatmadja, D.D.; Saono, S.; Brotonegoro, S. 1980. Oncom and oncom-like products prepared by using pure cultures of molds. In: ASEAN Sub-Committee on Protein, ed. 1980. Report on the Second ASEAN Workshop on Solid Substrate Fermentation. Kuala Lumpur, Malaysia. 415 p. See p. 263-72. [12 ref]

• ***Summary:*** Oncom is one of the traditional Indonesian fermented foods that is widely produced and consumed in West Java. The substrate consists of various proportions of peanut presscake, the solid residue of tapioca flour *(onggok),* and the solid residue of tahu (soybean curd [which is okara]) fermented by *Neurospora sitophila (N. intermedia).* Because these residues are cheap and still contain a significant amount of protein, oncom is thus an good, inexpensive food.

Altogether 122 mold strains were studied, comprising 13 strains of *Neurospora* spp., 15 strains of *Mucor* spp., 9 strains of *Rhizopus* spp., and 85 other strains which are most likely *Mucor* or *Rhizopus* species. *Mucor* species gave the best oncom after 24 hours, but *Rhizopus* species gave the best oncom after 48 hours. Address: National Biological Inst., Bogor, Indonesia.

1694. Somporn, Wannee. 1980. Review of solid substrate fermented products in Thailand. In: ASEAN Sub-Committee on Protein, ed. 1980. Report on the Second ASEAN Workshop on Solid Substrate Fermentation. Kuala Lumpur, Malaysia. 415 p. See p. 235-49. [3 ref]

• ***Summary:*** Table 3 shows fermented foods prepared in Thailand from legumes and cereals. Fermented foods having soybeans are the main substrate are: See iew (a condiment, made in central and south Thailand using bacteria, molds, and yeasts). Thua nao (main dish, made in north Thailand using bacteria). Tao hoo (tofu, main dish, made in central and south Thailand using bacteria, molds, and yeasts). Tao jiao (flavoring, made in central and south Thailand using bacteria, molds, and yeasts). Tao si ([soy nuggets], flavoring agent, made in south Thailand, using molds).

A survey of all soy sauce factories in Thailand was conducted in 1975. Representative samples were analyzed for both pathogenic organisms and aflatoxin, but neither was found (Biological Science Division, 1975-1976).

Note:. This is the earliest English-language document seen (Feb. 2004) that uses the word "Tao hoo" (or "Tao-hoo") to refer to tofu. Address: Biological Science Div., Dep. of Science Service, Ministry of Science, Technology and Energy, Thailand.

1695. Soriano, M.R.; Navarro, N.S.; Parel, S.O. 1980. Solid substrate food fermentation technology in the Philippines.

In: ASEAN Sub-Committee on Protein, ed. 1980. Report on the Second ASEAN Workshop on Solid Substrate Fermentation. Kuala Lumpur, Malaysia. 415 p. See p. 198-223. 29 cm. [45 ref]

• ***Summary:*** This paper gives a brief history of the development of food fermentation technology in the Philippines, including fermented soy products such as toyo (soy sauce), tausi (or tao-si [soy nuggets], called "taoushih" by the Chinese and "tao tjo" [sic] by the East Indians), tahuri (fermented tofu, sufu, or Chinese cheese. Cubes of tofu are inoculated with an *Actinomucor* mold; angkak is often used to impart a red color), and miso (called chiang in China). A related product is angkak, or "red rice," made by fermenting rice with the red mold *Monascus purpureus* Went for coloring and flavoring. The science of fermentation can be said to have dawned in the mid-1800s when Louis Pasteur discovered that every fermentation process was associated with a corresponding organism. Before World War II the use of microorganisms for the processing of foods was an unexplained field of study in the Philippines. The four pioneering studies from 1934 to 1937 included one by Yenko and Baens in 1940 the use of rice as a source of carbohydrate in the production of soy sauce. The first scientific investigation (1934, with nata) was done in the University of the Philippines, College of Agriculture in Los Baños, Laguna, and the last three studies were pursued in the former Bureau of Science, now the National Institute of Science & Technology (NIST).

There are no local written reports or scientific investigations of tausi, tahuri, or miso. Their manufacture is dominated by Chinese in the Philippines. Much attention, however, has been given to the production of soy sauce (toyo). Reviews of studies conducted in the Philippines have been given by Soriano (1975) and Soriano and Pardo (1977). Work is presently being done at NIST on the replacement of soy beans with local beans, and wheat with rice, cassava or banana flour in the production of soy sauce. Address: National Inst. of Science and Nutrition, Manila.

1696. Sutedja, L.; Roestamsjah, -; Gunawan, C. 1980. The effect of moisture content on oncom fermentation utilizing mixed substrates. In: ASEAN Sub-Committee on Protein, ed. 1980. Report on the Second ASEAN Workshop on Solid Substrate Fermentation. Kuala Lumpur, Malaysia. 415 p. See p. 301-25. [12 ref]

• ***Summary:*** Good quality oncom was prepared using a mixture of 2 parts peanut presscake (53-61% moisture), 2 parts "soybean curd waste" [okara] (75-82% moisture), and 1 part bulgur wheat (64-66% moisture). Each was steamed for at least 30 minutes before inoculation.

Note: This is the earliest English-language document seen (Oct. 2001) that uses the word "residue" or the term "soybean curd waste" to refer to okara. Address: National Inst. for Chemistry, Indonesian Inst. of Sciences, Indonesia.

1697. Tang, Charles Chang Chiu. 1980. Studies of solid substrate fermentation in Singapore. In: ASEAN Sub-Committee on Protein, ed. 1980. Report on the Second ASEAN Workshop on Solid Substrate Fermentation. Kuala Lumpur, Malaysia. 415 p. See p. 225-233. [5 ref]

• ***Summary:*** Many of Singapore's fermented foods are traditional indigenous foods. These include: (1) Fermented soya beans used in the koji to make soya sauce. (2) Fermented whole soya beans, which are preserved in brine (soy nuggets) or made into a paste (like Chinese soybean jiang). (3) Fermented cubes of tofu.

Of these fermented food products, only the fermentation process for making soya sauce has been studied at length by the National University of Singapore and the Singapore Institute of Standards and Industrial Research. Their findings of improved *Aspergillus* mutants for the production of better quality soya sauce have been reported at a previous ASEAN Workshop on Soya Sauce Manufacturing technique (1978 Singapore). "The Department of Scientific Services has analysed samples of fermented 'Tofu,' soya beans, soya sauce and shrimp paste and found that aflatoxins were absent in these fermented products." Address: PhD, Dep. of Scientific, Outram Road, Singapore 0316.

1698. Ten, Sew Keoh; Ho, Coy Choke. 1980. Characterization of *Aspergillus* from the koji phase of soy sauce fermentation in the ASEAN region. In: ASEAN Sub-Committee on Protein, ed. 1980. Report on the Second ASEAN Workshop on Solid Substrate Fermentation. Kuala Lumpur, Malaysia. 415 p. See p. 326-39. [11 ref]

• ***Summary:*** Some 178 strains of *Aspergillus* were isolated from the koji (solid substrate) phase of soy sauce fermentation from factories in West Malaysia. The authors separated these strains into two distinct morphological groups based on the color and ornamentation of the conidial heads. 90.5% of the isolates were identified as belonging to the *Aspergillus flavus oryzae* group and 9.5% as members of the *Aspergillus wentii* group. This grouping is based on the taxonomic key of Raper and Fennell (1965) and the mycological color chart of Raynor (1970). The characteristics of the two groups are shown in Table 1. Address: Dep. of Genetics and Cellular Biology, Univ. of Malaya, Kuala Lumpur, Malaysia.

1699. Tally, Gene. 1980. The Coca-Cola Company's work with soymilk in Brazil (Saci) and Mexico (Samson) (Interview). Conducted by William Shurtleff of Soyfoods Center, Dec. 1. 2 p. transcript.

• ***Summary:*** Coca-Cola Co. (CCC) taste panels have found that soymilk made with soy protein isolate is more acceptable than soymilk made from soybeans; it has less beany taste and less bitterness–a more neutral taste. Most

promising is an isolate-based soymilk. Gene says: In terms of acceptance, we've got the best soymilk so far, and we've tasted all the others." The only soft drink fortified with soy protein that CCC now sells is Saci (pronounced sa-SEE) in Brazil. Until recently, Saci has only been sold institutionally to the Brazilian School Feeding Program. Recently CCC has cut through red tape in the Brazilian government and gotten additional flavors approved. Formerly chocolate was the only flavor; now they have approval for coconut, vanilla, and café au lait (with coffee and sugar). Acceptance among Brazilian adults has not been too encouraging, except when the drink is made like a milk shake with a colloidal thickener.

60% of the people in Brazil do not drink milk, due to its shortage and high price–so soymilk is an economical alternative. CCC can make soymilk for 25% less than cow's milk including the packaging. The product has not yet hit the market, but CCC hopes to retail it in Brazil for about 25% less than milk.

A new tack is to export this soymilk, made in Brazil, to Japan, since Brazil is the world's #2 producer of soybeans and #1 producer of sugar. CCC presently plans to export it in powdered form and reconstitute it in Japan.

Samson, which CCC now makes Mexico is a whey product; it contains no soy. In Southeast Asia CCC is test marketing a soymilk product with a range of flavors in a joint venture with K.S. Lo and Vitasoy.

In the early 1960s. K.S. Lo was selling *almost* as much soymilk as Coke–of which he was the bottler and distributor. But now sales of Vitasoy are flat; they have hit a mature market situation, and with larger packages Coke is way ahead of Vitasoy. But at that time, when Mr. Lo proved what he could do, CCC got interested. "We've had a dialog and a joint venture with Mr. Lo and his family for over ten years. That now includes our joint venture with a soy-based product in Thailand."

Gene thinks CCC is almost ready to enter the soymilk market in the USA; they are waiting for the Tetra Brik package and process to be approved by the USDA, and he thinks that approval is immanent. Hydrogen peroxide is used to purge the carton before it is filled, but there is not trace of it after it is flushed through. The same process is used in a number of other food processing systems. Its turned into a real witch hunt and the Tetra Pak people are about to lose their patience.

Gene has lived and worked in Japan for 5 years, Singapore for 3, and Hong Kong for 2. So he knows the East Asian soft drink and beverage market from direct experience. Address: Coca-Cola Co., Atlanta, Georgia.

1700. Anderson, Eugene N. 1980. Re: Soybeans, tofu, and tempeh. Letter to William Shurtleff at Soyfoods Center, Dec. 12–in reply to inquiry. 2 p. Typed, with signature on letterhead. [4 ref]

• ***Summary:*** A sinophile, he is collaborating with Dr. Paul Buell (an historian at Western Washington University, Bellingham, WA) on various books on Chinese agriculture, including an economic botany. "We are currently working on the soybean article for this and drawing heavily on your books. He is an inveterate tofu maker who lives by your books."

The spices in real curry are fascinating and much different from those in the "nauseating and disgusting 'curry powder' of commerce."

He is aware of some spectacularly fine Chinese books on vegetarian soyfoods cookery, written by Buddhist religious groups. "Most of the Chinese cookbooks in English are obscene and should be banned as pornography."

It is now known that the old Shen Nung Herbal is from ca. 100 A.D.

"Tempe I assume to be an application to soybeans of earlier technology used on coconut. Incidentally the soybean was introduced to the Malay world by people from the Fujian-Guangdong border between Xinmen (Amoy) and Swatow (Shandou), as shown by the distinctive dialect words borrowed into Malay *(bahasa Indonesia, bahasa Malaysia)–taohu, taugé, taucho, tausi,* etc. These are also in Indonesian and Filipino–though tausi could be from Cantonese. These are direct borrowings of precisely the dialect forms of the border area, the southern dialects of the Southern Min or Hokkien language. Tauhu, for instance, is their pronunciation of tofu (doufu in standard Chinese). One word I can't explain is *kecap* (formerly spelled ketjap and so pronounced), the Malay word for soy sauce. It seems to have referred earlier to quite a different, local brew. It has nothing whatever to do with ketchup.

"The latest soy news is yet another proof that peasant techniques have their reasons. It now appears that soybeans have a huge amount of phytate, amounting to up to several percent of the bean. Phytate (the distinctive ion of phytic acid) takes up calcium, zinc magnesium, niacin and other chemically active items in food and makes chemical compounds that humans can't digest effectively. Thus the calcium, niacin, etc., of food is lost. This leads to calcium deficiency, zinc deficiency (as with whole-grain wheat bread eaters in the Near East), or worst of all, pellagra (corn is classically associated with pellagra because it's high in phytate and low in niacin). But of course if you add calcium or magnesium or the like to your food, it takes up the phytate and you're OK. Heat also destroys some of it. Micro-organisms such as yeasts and *Aspergillus* can also destroy it, having appropriate enzymes. Thus processing soybeans with gypsum, nigari or fungal fermentation wipes out this danger." Address: Dep. of Anthropology, Univ. of California, Riverside, CA 92521.

1701. Heltova, Olivia. 1980. Tempeh de soya. El alimento de Indonesia [Soy tempeh. The food from Indonesia].

*Natura (Mexico).* Dec. p. 58-71. [Spa]
• ***Summary:*** An introduction to tempeh in Spanish, with illustrated instructions on how to make it at home, and six recipes. Address: Mexico.

1702. Pinthong, R.; Macrae, R.; Rothwell, J. 1980. The development of a soya-based yoghurt. I. Acid production by lactic acid bacteria. *J. of Food Technology* 15(6):647-52. Dec. [11 ref]
• ***Summary:*** Graphically presented results show production of titratable acidity in soy milk by *Lactobacillus bulgaricus* and *Streptococcus thermophilus,* alone or in combination, with or without supplementation with yeast extract and/or glucose. *L. bulgaricus* did not produce acidity without supplementation; optimum conditions for this organism where 0.1% (weight/volume) yeast extract + 1% (weight/ volume) glucose, under which conditions 0.84% acidity (as lactic acid) was developed after 24 hours at 43ºC. Corresponding conditions for *S. thermophilus* were 0.1% yeast extract +0.5% glucose, producing 0.56% acidity; the same conditions were optimal for the combination of the 2 microorganisms, producing 0.68% acidity. The product produced by *L. bulgaricus* alone had sufficient acidity and a pH of 3.8. Address: Dep. of Food Science, Univ. of Reading, London Rd., Reading RG1 5AQ, Berkshire, UK; and Chiang-Mai Univ., Thailand.

1703. Pinthong, R.; Macrae, R.; Rothwell, J. 1980. The development of a soya-based yoghurt. II. Sensory evaluation and analysis of volatiles. *J. of Food Technology* 15(6):653-59. Dec. [8 ref]
• ***Summary:*** Soy milk was fermented with *Lactobacillus bulgaricus* (BULG) and *Streptococcus thermophilus* (THERM) alone or singly, with appropriate supplementation with yeast extract and glucose, and the products were evaluated organoleptically. Volatiles were collected from products by distillation with nitrogen at 40 mm mercury at 37ºC and analyzed gas chromatographically. The organoleptic results showed that fermented soy milk was rated significantly higher than soy milk (acidified to pH 4.1), and that fermented cows' milk was rated higher than all fermented soy milks. The different fermented soy milk samples were ranked for preference in the order BULG alone, the combination, THERM alone. Further studies with the apparently preferred BULG and BULG + THERM samples showed that BULG was preferred to BULG + THERM, but that addition of strawberry flavor did not improve acceptability. Addition of 5% sugar + banana flavor is stated to produce an acceptable BULG product. Amounts of volatiles in soy milk and the 3 (unflavored) fermented soy milks, BULG, BULG + THERM, and THERM are tabulated, including (relative amounts): n-hexanal 10.48, 4.47, 6.63 and 6.25, respectively; and n-pentanal 1.45, 2.42, 26.99 and 34.10. High levels of these compounds in soy milks fermented by THERM may explain their less acceptable taste; decrease in n-hexanal in fermented milks vs. soy milk may explain improvement in taste on fermentation. Contents of acetaldehyde, acetone, methanol and ethanol also differed between products. Address: Univ. of Reading, Reading, Berkshire, UK, and Chiang-Mai Univ., Thailand.

1704. Pinthong, R.; Macrae, R.; Dick, J. 1980. The development of a soya-based yoghurt. III. Analysis of oligosaccharides. *J. of Food Technology* 15(6):661-67. Dec. [9 ref]
• ***Summary:*** Oligosaccharide utilization by a number of lactic acid bacteria was studied in soy milk; tabulated data show contents of stachyose, raffinose and sucrose (determined by HPLC after Carrez treatment of ethanol extracts) after fermentation of soy milk to pH 4.0-5.8 under various conditions. Contents of stachyose and raffinose in soy milk were 438 and 114 mg/100 ml respectively: corresponding contents after fermentation were with *Lactobacillus fermenti* 351, O; *L. fermentus* 336, 37; *L. delbrueckii* 411, 93; *Pediococcus pentosaceus* 410, 93; *L. acidophilus* 442, 113; *L. bulgaricus* (in supplemented soy milk) 438, 105; and *L. fermenti* + *L. bulgaricus* (under optimum fermentation conditions) 385, 0. Decrease in oligosaccharide content was small, and inclusion of *L. fermenti* solely for this purpose would not be justified. Changes in starter preparation method and supplementation levels may also affect oligosaccharide consumption. Address: Univ. of Reading, Reading, Berkshire, UK, and Chiang-Mai Univ., Thailand.

1705. Rivai, Abdul. 1980. Optimization of tempeh manufacture from eight soybean varieties and from okara. MSc thesis, Dep. of Food Science & Nutrition, University of Minnesota, St. Paul, MN. vii + 63 p. Dec. Illust. No index. 28 cm. [55 ref]
• ***Summary:*** Contents: Abstract. Acknowledgments. List of tables and figures. Introduction. Materials and methods: Materials, preparing PDA slants, spore mass production, enumeration of mold spore viability, preparation of soybeans, preparation of okara, tempeh fermentation, preparation of samples for sensory testing, soybean characteristics. Results and discussion: Starter culture, tempeh fermentation–general observation, taste test results, whole soybean tempeh, conclusions. Appendix I. Appendix II. References.

The author returned to Indonesia in about early 1981 and in July 1982 was teaching at Padjadjaran University in Bandung. Address: Univ. of Minnesota, St. Paul.

1706. *Soya Bluebook.* 1980-1994. Serial/periodical. St. Louis, Missouri: American Soybean Assoc. Called Soybean Blue Book from 1947-1966; Soybean Digest Blue Book

from 1967-1978; Soybean Digest Bluebook in 1979; Soya Bluebook from 1980 to 1994.

• ***Summary:*** A directory and information book (general and statistical) for the soybean production and processing. In 1987 the *Soya Bluebook* contained seven major sections: Organizations (incl. Associations), Soy Directory (Crushers, Soyfoods, Industrial Products), Soybean Manufacturing Support Industries, Marketing and Auxiliary Services, Soy Statistics, Glossary, Standards and Specifications. Well indexed, with color maps. In the early 1980s the Bluebook started to include many more foreign soyfood manufacturers.

The book contains many tables, including: "World Soybean Production," which gives area and production in specified countries (1974-1980). In 1980 this included: North America: Canada, Mexico, United States. South America: Argentina, Brazil, Bolivia, Chile, Colombia, Ecuador, Paraguay, Peru, Uruguay. Europe: Bulgaria, France, Hungary, Romania, Spain, Yugoslavia. Soviet Union. Africa: Egypt, Ethiopia, Nigeria, South Africa, Tanzania, Uganda, Zaire. Asia: Burma, China (Mainland), Taiwan, India, Indonesia, Iran, Japan, Kampuchea [Cambodia], Korea (north), Korea (South), Philippines, Thailand, Turkey, Vietnam. Oceania: Australia. World total.

In early 1988 the American Soybean Association sold the *Soya Bluebook* to Soyatech, owned by Peter Golbitz. His first print run was 8,800 copies. Yellow pages were added. In Dec. 1989 Soyatech announced that in 1988 estimated readership was 10,265 in 55 countries. 33.6% of the buyers were soybean processors / manufacturers, 28.7% were importers, exporters, transporters or marketers, 15.0% were suppliers of soybean processing or handling equipment and manufacturing support services, 9.9% were consultants, booksellers, or periodicals, 8.7% were organization or government agencies, and 4.1% were colleges, universities, libraries, and information centers. By region, 64.3% were sold in North America, 15.2% in Europe, 9.1% in Asia / Pacific / Oceania, and 9.1% in Latin America.

The 1991 Soya Bluebook appeared in Aug. with a new larger (8½ by 11-inch) format and 264 pages. The indexing system is more complete and the pages are tabbed for easy access to each section. The "reference" section was expanded by adding nutritional information on soyfoods, a new chart of soyfoods products, and soybean oil trading standards.

*Health Foods Business.* 1992. Nov. p. 218. *Soya Bluebook* now reports its circulation to be 3,000.

Talk with Joy Froding of Soyatech. 1995. Jan. 12. The 1994 print run of Soya Bluebook was 2,300 copies. An estimated 4 people read each copy.

Price of the Soya Bluebook (1 book sent to USA, Canada, or Mexico): 1992 = $28 (if paid before June 1; $38 afterward). 1993 = Same price. 1994 = $38 (no prepayment discount; Available July 1994; this book has fold-out indexing tabs and 272 pages. The order form announcing the '94 Soya Bluebook states: "For 47 years Soya Bluebook has served as *the* noted information source for the world's soybean industry"). Starting in Jan. 1994 four issues of *Bluebook Update* are available free of charge to all who subscribe to or are listed in *Soya Bluebook.* 1995-96 = $38 ($48 after 1 June 1995; then in Nov. 1995 the price is raised to $58; incl. indexing tabs, 292 pages). This 1995-96 issue is titled "Soya Bluebook Plus: the annual directory of the world oilseed industry." Crops featured on the front cover are "soya, corn, cottonseed, palm, canola, rapeseed, and sunflower." Address: St. Louis, Missouri; Bar Harbor, Maine (After Jan. 1988).

1707. Baharsjah, J.S.; Azari, H. 1980. Posisi kacang-kacangan di Indonesia [The status of legumes in Indonesia]. Departemen Agronomi, Institut Pertanian Bogor. [Ind]* Address: Indonesia.

1708. Chen, Steve. 1980. Nutrition and production of soymilk. Paper presented in Bangkok, Thailand. Taipei, Taiwan: American Soybean Assoc. 10 p. [4 ref. Eng]

• ***Summary:*** Contents: Introduction: Commercial products mentioned include President and Wei-Chuan in Taiwan; Vitamilk in Bangkok (Thailand); Magnolia, Bonus, Yeo Hiap Seng, and Drinho in Singapore and Magnolia. Nutrition of soymilk: Composition of soybeans, antinutritional factors, composition of soymilk. Production of soymilk: Purposes of soymilk production, varieties of soymilk, basic steps of soymilk production, beany flavor of soymilk, production methods, soymilk quality standards. Conclusions. Address: American Soybean Assoc., Taiwan.

1709. Cintron-Velazquez, J. 1980. The development of feeds for the cichlid fish *Sarotherodon aureus* (Steindachner) using locally available feedstuffs and industrial wastes and by-products. MSc thesis, University of Puerto Rico, Mayaguez. 110 p. [Eng]*

• ***Summary:*** Tuna fishmeal and trash fishmeal were approximately equal in value in producing fish growth. Two experimental diets were formulated using discarded crackers, heated whole soybeans, spent beer and solids, blood meal, and a vitamin supplement; they showed much promise. Address: Dep. of Marine Sciences, MSc thesis, Univ. of Puerto Rico, Mayaguez, Puerto Rico.

1710. Departemen Perindustrian (Ministry of Industrial Affairs), Indonesia. 1980. Mutu dan cara uji tempe kedelai [Quality and testing methods for soy tempeh]. Jakarta: Departemen Perindustrian, Republik Indonesia. 7 p. Indonesian Industrial Standard SII.0271-80. [Ind]* Address: Jakarta, Indonesia.

1711. Iwaki, M.; Thongmeearkom, P.; Tsuchizaki, T.; Honda, Y.; Sarindu, N.; Vonghiranpinyo, L.; Tochihara, H.; Deema, N. 1980. Virus diseases of soybean in Thailand. Paper prepared for the 2nd Southeast Asian Symposium on Plant Diseases in the Tropics. Kasetsart University, Bangkok. See p. 78. *

• ***Summary:*** Reports the Indonesian soybean dwarf virus in Thailand.

1712. **Product Name:** Lactasoy (U.H.T. Soymilk/Cow's Milk Blend).

**Manufacturer's Name:** Kickapoo (Thailand) Co. Ltd.

**Manufacturer's Address:** 3532 Sukhumvit Rd., Bangna, Bangkok 26, Thailand.

**Date of Introduction:** 1980.

**Ingredients:** 1989: Soybean 10%, sugar 7%, whole milk powder 2.5%, vegetable fat 1.7%.

**Wt/Vol., Packaging, Price:** 200 ml Tetra Brik Aseptic carton. Later 250 ml. Retails for 5.50 bhat (1984).

**How Stored:** Shelf stable; refrigerate after opening.

**New Product–Documentation:** Soya Bluebook. 1982. p. 78. "Lactasoy." Tetra Pak Co. 1983. Brochure. Packaged in Tetra Brik Aseptic 250 ml. at top of front panel: "Supplementary Food." Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 105, 121.

A photocopy of a page from a market study of unknown origin, sent by Anders Lindner. 1984. March 9. Lactasoy, is made by Kickapoo Thailand Co. Ltd. in a plant with a production capacity of 4,000 liters/hour (UHT). It is packaged in Tetra Packs and can be classified as a milk product that is in competition with UHT milk.

Photocopy of Label sent by Anders Lindner. 1989. "Supplementary food."

Letter from Monica Kjellker Gimre of Alfa-Laval. 1990. May 30. Alfa-Laval sold a complete soymilk plant to Kickapoo in Thailand. It had a capacity of 4,000 liters/hour and began operation in 1980.

Label sent by Claire Wickens from Thailand. 1994. June 15. 250 ml. Blue on white. Ingredients: Soybean 10%, sugar 7%, whole milk 2.5%, vegetable fat 1.7%. The product is now packed in a Combibloc carton. The address has not changed.

1713. **Product Name:** Tofu (Made with Seawater).

**Manufacturer's Name:** Lotus Food Products.

**Manufacturer's Address:** Km. 6 Superhighway, Buhangin, Davao City 8000, Mindanao, Philippines. Phone: 241-0278.

**Date of Introduction:** 1980.

**Ingredients:** Soybeans, water, seawater.

**New Product–Documentation:** Talk with Andrew Rawlings. 1994. Nov. 1. This organization is a training center for Americans run by Ananda Marga, established by Shrii Shrii Anandamurti. Andrew is in the process of becoming a missionary in the organization, whose motto is "Self Realization & Social Service" (Namaskar). They have been making tofu for at least 5-6 years and selling it unpackaged in bulk to local people in the area and at their own health food store in Davao. The tofu maker in the community is a Filipino, who makes at least 5 lb/day each morning during meditation. It is the most delicious tofu he has ever tasted. He hopes to buy a tofu making machine in Taiwan for under $2,000.

Letter from Andrew Rawlings. 1994. Nov. 22. He reached Davo a week ago after spending 6 days in Taipei at the Ananda Marga center there. In Taipei he bought a new soybean grinder for US$200 and carried it with him on the plane to Davao. "To my surprise the fellow here has been making tofu for Ananda Marga for 14 years here. Now he is making about 15 kg/day. The name of this shop in Lotus Food Products, not Baba's Foundation as I told you before... Our people here are jubilant about all the useful info contained in your book *Tofu & Soymilk Production.*"

1714. **Product Name:** Vito or Vita (Powdered Soymilk).

**Manufacturer's Name:** Nestlé Products (M) Ltd.

**Manufacturer's Address:** Malaysia or Philippines.

**Date of Introduction:** 1980.

**New Product–Documentation:** Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 123. "By 1980 Nestlé was selling a powdered soymilk in Malaysia and the Philippines, brand named Vito or Vita, thus becoming the first company to market soymilk regionally in Southeast Asia."

Michael Loh. 1990. "An overview of export opportunities in the new markets." Filipro, Inc., which is the Philippines' licensee for Nestle S.A., reported increasing market acceptance of its re-launched powdered soya milk product Vita (chocolate flavor), and a soy-based baby cereal named Ceresoy.

1715. Slamet, Dewi Sabita; Tarwotjo, Ignatius. 1980. Komposisi zat gizi makanan Indonesia [The nutritional composition of Indonesian foods]. *Penelitian Gizi dan Makanan (Research on Food and Nutrition)* 4:21-36. [4 ref. Ind]

1716. *WIC Bibliography Series.* 1980. Food for baby's first year. W-159. 1 sheet. [Eng; Lao; Vie; Khm]*

• ***Summary:*** A table, arranged by age, illustrates when and how to add new foods to baby's diet. Cereal is introduced at 6 months; vegetables, fruit and tofu at 7 months. Published in English, Laotian, Vietnamese, and Khmer (Cambodian). Available from: St. Paul-Ramsey County Nutrition Program, 555 Cedar St., St. Paul, Minnesota 55101. Address: Beltsville, Maryland.

1717. Baharsjah, Justika S.; Guhardja, E.; Barizi, -. 1980. Effects of shading and plant density on yield and yield

components of soybean. In: Proceedings of Legumes in the Tropics. Serdang, Selangor, Malaysia: Faculty of Agriculture, Universiti Pertanian Malaysia. xi + 488 p. See p. 205-11. [16 ref]
Address: Lecturers, Institut Pertanian Bogor, Jalan Raya Pajajaran, Bogor, Indonesia.

1718. Bhumiratana, Amaret. 1980. Traditional fermented foods in Thailand. In: Proceedings of the Oriental Fermented Foods. Food Industry Research and Development Institute, P.O. Box 246, Hsinchu, (300) Taiwan. iv + 229 p. See p. 58-70. [19 ref]
• ***Summary:*** Tao-jeow is Thai miso. Sufu is fermented tofu. The author uses the terms tao-nou and thuo-nao instead of thua-nao throughout; he even misspells it when citing Sundhagul 1970. It is sold as a paste or chips. Soy sauce (the Chinese type), soy paste and fermented soybean curd are commonly available throughout the country although they are more common in the Chinese community. Tao-nou, however, is the product which is popular in the northern part of the country. Flowcharts show the processes for producing soy sauce and tao jeow, tofu and sufu, and thuo-nao. Address: Dep. of Microbiology, Faculty of Science, Mahidol Univ., Rama VI Rd., Bangkok 4, Thailand.

1719. Boonitee, Ant. 1980. Photoperiod and flowering of *Glycine max* (L.) Merrill var. S.J. 4. In: Proceedings of Legumes in the Tropics. Serdang, Selangor, Malaysia: Faculty of Agriculture, Universiti Pertanian Malaysia. xi + 488 p. See p. 67-71. [2 ref]
Address: Kasetsart Univ., Faculty of Science and Arts, Bangkok, Thailand.

1720. Brotonegoro, Soetarjo; Sudjana, M.; Saono, S. 1980. Preservation of economically important cultures by freeze drying. Paper presented at the Second ASEAN Workshop on Solid Substrate Fermentation. Held 27-29 Nov. 1980 at Kuala Lumpur, Malaysia. *
• ***Summary:*** The author isolated, identified, and preserved the microorganisms in some traditional Indonesian foods such as tempe, tauco (Indonesian miso), and kecap (soya sauce). Address: Malang Research Inst. for Food Crops (MARIF).

1721. Corbin, Frederick T. ed. 1980. World Soybean Research Conference II: Abstracts. Boulder, Colorado: Westview Press. 124 p. Conference held 26-29 March 1979 at North Carolina State Univ. Author index. 24 cm.
• ***Summary:*** The World Soybean Research Conference II was held on 26-29 March 1979 at North Carolina State University. This volume contains summaries of the more than 200 papers, both invited and contributed, presented at that meeting. The full proceedings contains 74 of the invited papers in full.

Contents: Keynote addresses. Mineral nutrition. Engineering. Nitrogen fixation. Entomology. Utilization. Breeding. Physiology. Production. Protein and oil. Plant pathology. Modeling soybean systems. Regional. Agribusiness. Marketing, transport and storage. Weed control. Research techniques. Addendum. Address: Prof. of Crop Science; North Carolina State Univ., Raleigh.

1722. Doty, Harry O., Jr. 1980. U.S. and world soybean oil markets. In: D.R. Erickson, et al., eds. 1980. Handbook of Soy Oil Processing and Utilization. American Soybean Assoc. (St. Louis, MO) and American Oil Chemists' Society (Champaign, IL). viii + 598 p. See p. 483-510. [20 ref]
• ***Summary:*** Recently introduced: New higher yielding Tenebra varieties of oil palm, and new varieties of rapeseed which minimize or eliminate erucic acid from the oil and glucosinolates from the meal.

Table 1, titled "Average yield and value per acre and per hectare for oil crops and corn in selected countries," shows that oil palm in W. Malaysia is by far the most valuable ($1,014 U.S. dollars for the oil and meal produced on one acre), followed by corn in the USA ($244), then soybeans in the USA ($200).

Fig. 13 (p. 503) is a graph showing world soybean production from 1967 to 1978. The USA has been by far the leading producer during this period. In about 1977 Brazil passed China (People's Republic of China) to take 2nd place. China is now in 3rd place. Address: Economics, Statistics, and Cooperative Service, USDA, Washington, DC.

1723. Funnah, S.M.; Mak, C. 1980. In search of locally adapted soybean varieties. In: Proceedings of Legumes in the Tropics. Serdang, Selangor, Malaysia: Faculty of Agriculture, Universiti Pertanian Malaysia. xi + 488 p. See p. 119-26. [23 ref]
Address: Dep. of Genetics and Cellular Biology Univ. of Malaya, Kuala Lumpur, Malaysia.

1724. Hartati, J. Sri. 1980. Berapa catatan tentang jenis kedele dalam pembuatan tempe [Several notes on types of soybeans used in tempeh processing]. Thesis (Skripsi), Fakultas Teknologi Pertanian Universitas Gadjah Mada, Yogyakarta, Indonesia. 19 p. [Ind]*
Address: Yogyakarta, Indonesia.

1725. Imam, M.M. 1980. Mutagenesis in soybeans I. Effects of gamma radiation on germination, survival and height of 4 genotypes for 3 consecutive generations. In: Proceedings of Legumes in the Tropics. Serdang, Selangor, Malaysia: Faculty of Agriculture, Universiti Pertanian Malaysia. xi + 488 p. See p. 145-47, 152-54. [33 ref]
Address: Universiti Kebangsaan Malaysia [Malaysia].

1726. International Rice Research Institute. 1980. Annual report for 1979. Los Banos, Laguna, Philippines. Soybeans: p. 410-12, 462. *
Address: Los Baños, Laguna, Philippines.

1727. Issariyanukula, Apisith. 1980. An econometric analysis of the supply and demand for soybeans in Thailand. PhD thesis, Washington State University. 243 p. Page 3668 in volume 41/08-A Dissertation Abstracts International. *
Address: Washington State Univ.

1728. Khalid, M.N. 1980. Optimum plot sizes and shapes for three selected legumes. In: Proceedings of Legumes in the Tropics. Serdang, Selangor, Malaysia: Faculty of Agriculture, Universiti Pertanian Malaysia. xi + 488 p. See p. 443-47. [8 ref]
Address: Faculty of Agriculture, Universiti Pertanian Malaysia.

1729. Lin, Ching-Fwu. 1980. Preparation of shrimp-flavored tempeh using a thermo-tolerable *Rhizopus* sp. T-3 isolated from Indonesia. In: Proceedings of the Oriental Fermented Foods. Food Industry Research and Development Institute, P.O. Box 246, Hsinchu, (300) Taiwan. iv + 229 p. See p. 167-79. Held 10-14 Dec. 1979 in Taipei, Taiwan. 8 tables. 3 figs. [20 ref]

• ***Summary:*** This T-3 strain of *Rhizopus* mold, which was isolated from indigenous tempeh collected on Bali island, grew vigorously even at 45ºC or more, and the stolon and sporangiophore were found to be larger than for any *Rhizopus* species listed in the "Taxonomical Studies on the Genus Rhizopus" by Inui et al. This mold produced abundant hydrolytic enzymes, such as acid protease, glucoamylase, lipase, cell separating enzymes and milk clotting enzyme in soybean substrate. The tempeh prepared by this mold after 18 hours fermentation at 30ºC–40ºC had the flavor of shrimp. The tempeh thus made was easily macerated into a single cell from slight blending in a blender.

"An improved procedure for preparation of tempeh using raw soybean as substrate is presented in this paper."
Address: Inst. for Microbial Resources, Taiwan Branch, 100 Chien-Hsing St. East, Taichung, Taiwan.

1730. Lu, Gwei-Djen; Needham, Joseph. 1980. Celestial lancets: A history and rationale of acupuncture and moxa. Cambridge, London, New York, New Rochelle, Melbourne, Sydney: Cambridge University Press. xxi + 427 p. Illust. Index. 26 cm. [300+* ref]

• ***Summary:*** Contents: List of illustrations. List of tables. List of abbreviations. Authors' foreword. 1. Introduction. 2. The *ching-lo* system and its classical theory. 3. Historical growth of the system. 4. Moxibustion. 5. Therapy and analgesia; physiological interpretations. 6. Influences on other cultures. 7. The lore of vital spots. 9. Conclusions. Bibliographies.

This is a wonderful, scholarly study of two of the most ancient therapeutic techniques of Chinese medicine. "Acupuncture is the implantation of very thin needles into subcutaneous connective tissue and muscle at a great number of different points on the body's surface: moxibustion is the burning of *Artemisia tinder* (moxa) either directly on the skin or just above it. For 2500 years the Chinese have used both techniques to relieve pain and to heal a wide variety of illnesses and malfunctions.

"Dr. Lu and Dr. Needham, in this preview of an important section of *Science and Civilisation in China,* give a full historical account of acupuncture and moxibustion in the theoretical structure of Chinese medicine, and combine this with a rationale of the two techniques in the light of modern scientific knowledge. The book is in no sense a clinical manual: rather is it a contribution, judicious and enlightened, to that oecumenical medicine which will eventually combine all the true powers discovered in China and Europe."

Authors' Foreword: "Many conclusions which had formerly to based on philological arguments about the dating of texts, have now received dazzling confirmation from archaeological discoveries, as for example the four manuscripts on silk which contain descriptions of the acu-tracts and were recovered only very recently from the Han tombs of the -2nd century at Ma-wang-tui. These scrolls reveal a development of acupuncture a good deal earlier than the *Nei Ching.* And from that same -2nd century there are the acupuncture needles found among the grave-goods of the Prince of Chung-shan, Liu Shêng. Or one could instance the acupuncture texts intended to accompany those life-size bronze figures demonstrating acu-points which were introduced first in the +11th century, texts which were later discovered inscribed on stone tablets that had been buried in the gate bastions of a city wall. It is to be expected that future archaeological finds will throw much further light on the development of Chinese medicine as a whole."

"The *Huang Ti Nei Ching* (Yellow Emperor's Manual of Corporeal Medicine) is the oldest and most famous of the Chinese medical classics... We date the *Su Wên* part of it (Questions (and Answers) about Living Matter) in the -2nd century, and the *Ling Shu* (Vital Axis) in the -1st." Acupuncture is first discussed in this remarkable book.

Concerning moxa, page 171 states that it was often desired to apply the stimulus of a heat treatment only, without actual cautery. This was called *wên chiu* (warming moxibustion) or "moxa that left no scar on the skin. The classical way of doing this was to use a layer of some vegetable substance between the skin and the burning incense-like cone. One technique was to have it burn down on a layer of soya-bean paste *(tou chiang chiu);* or else a slice of garlic, or a slice of ginger could be interposed."

Note: This is the earliest English-language document seen (March 2009) that uses the term "soya-bean paste" to refer to miso–in this case *tou chiang / doujiang* (Chinese-style miso).

Pages 268-69 state: "It was throughout the second half of the +17th century that information about acupuncture began to attract the attention of Europeans. The very first writer, so far as we can see, who spoke about acupuncture was the Dane Jacob de Bondt (1598-1631) who in his capacity as surgeon-general for the Dutch East Indian Company at Batavia had come into contact with Chinese and Japanese physicians." The first illustrations (four) of the acu-points in the Western world appeared in Willem ten Rhijne's book of +1683. Andreas Cleyer in his *Specimen Medicinae Sinicae* (1682) gave detailed illustrations of acupuncture (p. 276-83). The German naturalist Englebert Kaempfer (1651-1716) gave the clearest account to date of acupuncture which he observed among the Japanese (p. 287-92). Address: 1. Assoc. Director; 2. Director. Both: East Asian History of Science Library, Cambridge, England.

1731. Panganiban, Domingo F. 1980. The legume industry in the Philippines. In: Golden Anniversary, Bureau of Plant Industry, 1930-1980. Manila, Philippines: The Bureau. ix + 351 p. Illust. (portraits). 23 cm. *

• ***Summary:*** Cover title: "50 Years of the Bureau of Plant Industry." The earliest known cultivated soybean variety in the Philippines was the small-seeded late-maturing Ami variety. Address: Philippines.

1732. Proceedings of legumes in the tropics. 1980. Serdang, Selangor, Malaysia: Faculty of Agriculture, Universiti Pertanian Malaysia. xi + 488 p. Illust. No index. 25 cm. Held 13-17 Nov. 1979 at Univ. Pertanian Malaysia, Serdang, Selangor, Malaysia.

• ***Summary:*** Contents: 1. Seed technology (5 papers). 2. Physiology (5). 3. Breeding (6). 4. Agronomy (9). 5. Plant protection (7). 6. Soil science (10). 7. Covers and pastures (4). 8. General (6). Papers primarily about soybeans are cited separately. Also contains many papers about winged beans and about groundnuts. Address: Selangor, Malaysia.

1733. Root, Waverley. 1980. Food: An authoritative and visual history and dictionary of the foods of the world. New York, NY: Simon & Schuster. 602 p. Illust. (some color). 28 cm. [547 ref]

• ***Summary:*** This interesting book, written in the author's unique witty and erudite style, presents facts and lore about fruits, vegetables, herbs, spices and food preparations (some exotic or rare, with emphasis on animal products) in alphabetical order. It contains more than 200 major entries, and many more very minor ones. Beautiful photos and illustrations are found throughout the book, making it an informal visual history of food in art. At the beginning of each letter of the alphabet are several quotations by writers whose surname begins with that letter. For example, at "F." Horace Fletcher: "Nature will castigate those who don't masticate" At Benjamin Franklin: "Eat not to dullness. Drink not to elevation." Although he cites no sources in the text, he has an extensive bibliography ("Works consulted") at the end of the book (p. 590-97).

Even though the author has at least half a page each about angelica, anise, bass, breadfruit, and camel, under "So..." he has only two lines about the soybean: The "most important bean of China, Manchuria, Japan and Malaysia." From there he refers us to "Bean" where he expands the entry to 14 lines, noting: The soybean is the world's most important bean–followed by the American haricot bean and the European broad bean. Though most Americans associate the soybean with China, the USA is actually the world's largest producer. "If we are less conscious of them, it is because they are used in America as animal food more commonly than as human food, and also because a large proportion is shipped abroad..." the U.S. is the world's leading exporter of soybeans; we now even export them to China.

There are separate, major entries for: Almond, Almond, bean (incl. azuki bean, liked by "health food faddists"), chick-pea, corn, cowpea, cotton, lentil, and olive. Also mentioned very briefly (1-3 lines): Amaranth, bambara pea, broad bean, chufa, goa bean [winged bean], gluten, hemp, hyacinth bean (lablab niger), jack bean, job's tears, lima bean, lupine, mung bean, pigeon pea, quinoa, sunflower seeds, sword bean, rape or colza, velvet bean, yard-long bean (related to the cowpea), and sesame.

Waverley Lewis Root was born in 1903.

1734. Saxena, Naresh Chandra. 1980. Physical properties of soybeans for processing, storage and handling. In: Proceedings of Legumes in the Tropics. Serdang, Selangor, Malaysia: Faculty of Agriculture, Universiti Pertanian Malaysia. xi + 488 p. See p. 29-41. [11 ref]

• ***Summary:*** Contents: Abstract. Introduction. Engineering views of materials. Moisture-mechanism in biomaterials. Shape importance. Physical properties of seeds. Structure of soybean kernel. Physical characteristics and mechanical properties. Thermal properties. Sonic properties. Optical properties. Electrical properties. Soybean root behaviour. Conclusions. Address: Dep. of Engineering Science, Faculty of Agricultural Engineering, Universiti Partanian Malaysia.

1735. Shanmugasundaram, S.; Kuo, G.C.; Nalampang, A. 1980. Adaptation and utilization of soybeans in different environments and agricultural systems. In: R.J. Summerfield and A.H. Bunting, eds. 1980. Advances in Legume Science. Royal Botanic Gardens, Kew, Richmond, Surrey, England. xvi + 668 p. See p. 265-77. [92 ref]

Address: 1-2. AVRDC, Shanhua, Tainan, Taiwan; 3. Dep. of Agriculture, Bangkok, Thailand.

1736. Soekarna, D. 1980. Status of insect pest management in Indonesia (Abstract). In: F.T. Corbin, ed. 1980. World Soybean Research Conference II: Abstracts. Boulder, Colorado: Westview Press. 124 p. See p. 18.
• ***Summary:*** "Soybeans in Indonesia occupy the fifth place among the foodcrops. From 1973 to 1976 the average annual harvested acreage was 724,902 hectares with a total production of 550,523 tons and an average yield of 7.6 quintals [1 quintal = 100 kg] per hectare. Low production was attributed primarily to insect damage." Address: Central Research Inst. for Agriculture, Bogor, Indonesia.

1737. Somaatmadja, Sadikin; Hidayat, Omar O. 1980. Five years of soybean varietal improvement at CRIA-Sukamandi. *Indonesian Agricultural Research and Development Journal* 2(3):63-67.
• ***Summary:*** Soybean research started in 1973 at the Central Research Institute for Agriculture at Sukamandi. Address: Legume Breeders, Central Research Inst. for Agriculture, Sukamandi.

1738. Sugiarto K., Ignatius. 1980. Penelitian pendahuluan tentang kerja lapuk dalam tempe [Preliminary research on the fermenting action of tempeh molds]. Thesis (Skripsi), Departemen Kimia, Matematika dan Ilmu Pengetahuan Alam Institut Teknologi Bandung, Bandung, Indonesia. 38 p. PBITB. [Ind]*
Address: Bandung, Indonesia.

1739. Thiam, T.B. 1980. Prospects for soybeans in South East Asia (Abstract). In: F.T. Corbin, ed. 1980. World Soybean Research Conference II: Abstracts. Boulder, Colorado: Westview Press. 124 p. See p. 117.
• ***Summary:*** "In 1977, South East Asia produced only about 1% of the total world production of soybeans. The harvested area of soybeans is less than 800,000 hectares. Imports of soybeans into these countries, however, are quite considerable and total more than $100 million. Soybeans are imported in the form of whole grain and oil for human consumption and in the form of cake and meal for animal consumption. The bulk of soybean import is in the form of whole grain, cake, and meal.

"The import of soybean oil is relatively insignificant. South East Asia is the major producer of lauric and palm oil... South East Asian countries have in recent years shown an increasing interest in cultivating soybeans. This interest stems from the rapid increase in demand for soybeans and soybean products." Address: Univ. of Malaya, Kuala Lumpur, Malaysia.

1740. Yap, T.C.; Tan, K.K. 1980. Performance of some segregating lines of soybean from AVRDC under Malaysian conditions. In: Proceedings of Legumes in the Tropics. Serdang, Selangor, Malaysia: Faculty of Agriculture, Universiti Pertanian Malaysia. xi + 488 p. See p. 127-32. Held 13-17 Nov. 1979 at Univ. Pertanian Malaysia, Serdang, Selangor, Malaysia. [5 ref]
• ***Summary:*** Contents: Introduction. Materials and methods. Results. Address: Dep. of Agronomy and Horticulture, Univ. of Agriculture Malaysia, Serdang, Selangore, Malaysia.

1741. Bushman, Don H. 1981. Re: Soy beverage manufacturers in Southeast Asia. Letter to William Shurtleff at New-Age Foods Study Center, Jan. 9–in reply to inquiry of Nov. 26. 1 p. Typed, with signature.
• ***Summary:*** In Thailand: Green Spot started producing soy beverage in the early 1970s. At least three other companies, Coca-Cola, Nestle, and Siam Foods have plans to start making Soy beverage in Thailand in the next year.

In the Philippines, Nestle started making a Soy beverage (Vita) in Nov. 1988.

In Southeast Asia, soy beverages are advertised almost daily on TV, in newspapers, etc., but only for brand promotion. Address: Director, South-East Asia, Room 1501, 15th floor, Liat Towers Orchard Rd., Singapore 0923. Phone: 737-6233.

1742. Hansen, Barbara. 1981. Rice leads the flavorful parade of dishes in this Indonesian feast: "Colonial cooking' a blending of cultures. *Los Angeles Times.* Jan. 15. p. J1.
• ***Summary:*** The Indonesian *rijsttafel* is a magnificent parade of dishes, featuring rice. When Bob Blansjaar, who was born in Surabaya on the Island of Java, prepares *rijsttafel* for guests, he makes more than 20 dishes–marking it as the real thing.

A standard recipe is *Gado Gado,* a sort of salad topped with peanut sauce. "He also sliced and fried tofu for the salad, using Chinese style hard tofu rather than the softer variety."

Another key dish is Sambal Ketjap (hot sauce); the ingredients include "2½ teaspoons Indonesian sweet soy sauce." Ten recipes are given, including Gado Gado and Sambal Ketjap.

Photos show: (1) The *rijsttafel* served in many dishes on a large table. (2) Bob Blansjaar as he chops vegetables in the kitchen. Address: Staff writer.

1743. Hoang, Van Chi. 1981. Re: Vietnamese soy sauce. Questions answered on Soyfoods Center letterhead (dated 18 Jan. 1981) and returned to SC. 1 p.
• ***Summary:*** His family name is Hoang and his given names are Van Chi (he writes in the three characters).

An early Vietnamese writer about soyfoods was Bui Quang Chieu. He was a man; his family name was Bui and his given names were Quang Chieu. He was a French educated politician and journalist. He wrote in French because he could not write in Vietnamese. "His writing about Tuong is certainly not interesting, although I do not have his article. He certainly repeated something previously written by some French scientist.

"There are two types of tuong. (1) The Tuong Ban, produced in Ban village, is like the Chinese Chiang (pronounced "jiang") in texture. (2) The Tuong Cu Da, made in Cu Da village, is ground smooth [but not filtered]. That is why I call my product "Tuong Cu Da." Note: Tuong Cu Da. is a uniquely Vietnamese product is that it is not filtered, but ground. Chinese jiang is not filtered and not ground, so it has a soft, chunky consistency like applesauce.

*Ruou dau nanh* is called "soy alcohol." Most liquor is Vietnam is made from sweet [glutinous] rice; it is like Japanese sake. But the Vietnamese Ruou is distilled and, as such, is very strong, up to 100 proof. Some people in Central Vietnam make it from a mixture of soybeans and rice.

The jars or containers used to make Tuong in Vietnam have no fixed capacity, but they are usually are 15 to 20 gallons in capacity. They come in two shapes: One is shaped like a vertical cylinder, and the other bulges at the top with a smaller mouth, as used by the Chinese to make jiang. These jars are kept in the courtyard and covered with a conical woven bamboo cap, to keep out the rain while permitting aeration. Address: Bowie, Maryland.

1744. **Product Name:** Tofu.
**Manufacturer's Name:** Duta Proteina Indonesia.
**Manufacturer's Address:** P.O. Box 3137, Jakarta, Indonesia.
**Date of Introduction:** 1981. January.
**New Product–Documentation:** Soyfoods Center Computerized Mailing List. 1981. Jan. 22. Owner: Lusiani T. Saputro.

1745. **Product Name:** [Tempeh].
**Foreign Name:** Tenpe.
**Manufacturer's Name:** Firma ENTI.
**Manufacturer's Address:** 5 Tweemanspolder, 2761 Zevenhuizen, Netherlands. Phone: 018-021-986.
**Date of Introduction:** 1981. January.
**New Product–Documentation:** Soyfoods Center Computerized Mailing List. 1981. Jan. 22. Owner: Mrs. L.J. Duson.

Letter from Sjon Welters. 1983. March 2. The official name of this company is Firma Enti. It was founded by a woman named Wedding. Her man [husband] was an Indonesian. Mrs. Duson, the woman who owns it now, could not remember if Mrs. Wedding was Dutch or Indonesian.

1746. **Product Name:** Tofu.
**Manufacturer's Name:** Lucky Bean Cake.
**Manufacturer's Address:** 3925 Hampton Blvd., Norfolk, VA 23508. Phone: 804-423-4006.
**Date of Introduction:** 1981. January.
**How Stored:** Refrigerated.
**New Product–Documentation:** Soyfoods Center Computerized Mailing List. 1981. Jan. 22. Owner: Dan Nguyen. Dun & Bradstreet database search. 1984. March. Listed as: Lucky Bean Cake Tofu, 800 Elkin St., Norfolk, Virginia 23508. Phone: 804-489-1493. Manufacturer of soybean cake. Started in 1981. Has 4 employees and 30 accounts. Owners (partners): Luu Hanglong and Nguyen Van Gan.

Call telephone operator in Norfolk, VA. 1991. Sept. 19. Has no phone number listed for Lucky Bean Cake, Luu Hanglong, or Nguyen van Gan. Not there 2001/05.

1747. *Tempo.* 1981. Mengangkat martabat tempe [To raise tempeh's value]. Jan. 26. [Ind]*
• ***Summary:*** Discusses Prof. Dr. Susanto Mangkuwijoyo's discovery of the ability of tempeh to reduce the blood cholesterol level in laboratory hamsters.

1748. Sripathomswat, Nongnuch; Thasnakorn, Prayad. 1981. Survey of aflatoxin-producing fungi in certain fermented foods and beverages in Thailand. *Mycopathologia* 73(2):83-88. Feb. 13. [25 ref]
• ***Summary:*** Aflatoxin-producing fungi (four strains of the genus *Aspergillus)* were found in seven Thai foods and beverages, including soybean sauce [sic, miso] *(taotjo),* soy sauce (shoyu), peanut butter, and fermented rice *(kaomak).* Large amounts of aflatoxin were found on only the latter two products–both of which contain no soy. Address: Dep. of Microbiology, Faculty of Medicine, Siriraj Hospital, Bangkok 7, Thailand.

1749. Shurtleff, William. 1981. Dr. Harry Miller: Taking soymilk around the world. *Soyfoods* 1(4):28-36. Winter.
• ***Summary:*** Contents: Introduction. Growing up (1879-1902): Birth, early contact with Dr. J.H. Kellogg, marriage. Early years in China (1903-1911). Washington, DC (1912-1925). Pioneering soymilk in China (1925-1939): Research, development of plant, destruction of plant 13 Aug. 1937, U.S. patent, No. 2,078,962 for soymilk process and equipment, work before return to U.S. Introducing soyfoods to America (1939-1949): In Mt. Vernon, new products, work with AMA, American Soybean Assoc. speaker and lifetime member 1958, contact with K.S. Lo and Vitasoy. Research and work around the world (1949-1977): Quick visit to Shanghai, death of second wife, sale of International

Nutrition Foundation, Taiwan work, Indonesian plant, Trinidad, Libya, Japan, old age and relationship with William Shurtleff, the "Great Man." Contains 5 photos, and a sidebar titled "Early History of Soymilk." Address: Lafayette, California.

1750. Lo, K.S. 1981. Re: Early history of Hong Kong Soya Bean Products Co., Ltd., makers of Vitasoy. Letter to William Shurtleff at Soyfoods Center, March 19. 3 p. Typed, with signature on letterhead.

• ***Summary:*** William Shurtleff sent K.S. Lo a copy of an article he [Shurtleff] had written about Dr. Harry Miller, and asked for Mr. Lo's comments. "Strangely enough, it was Julian [sic, Julean] Arnold and not Dr. [Harry] Miller who first launched me onto the road of making soya bean milk. I happened to be in Shanghai in the Winter of 1936, and, while there, I attended a talk given by Julian Arnold on the subject: 'Soya Bean, the Cow of China'. I soon left Shanghai to return to Hong Kong, but, Arnold's message kept ringing in my head. Not long after, Japan invaded China and the first wave of refugees started to arrive in Hong Kong in 1938 [sic, 1939]. As I recall, a refugee camp was set up in Argyle Street on Kowloon side to receive them. Most of these refugees were either sick or suffering from malnutrition and required urgent medical care. Some of them were suffering from beri-beri. A small group of volunteers including myself used to visit the camp to find out what could be done for them. And when I saw so many were unable to walk because of beri-beri, the story of the wonder bean, as related to Arnold, came to my mind. I, therefore, suggested to our group to buy some soya bean, a stone-mill and a cooking pan and sent them to the camp. We enlisted a group of people from the camp to prepare soya bean milk in the crudest form and gave one bowl to each person every morning. The results were quite startling, as many of them showed significant improvement in their health after the first month. This little experiment gave me the full confidence in the nutritional value of soya bean milk and I decided to make it available to the masses of people in Hong Kong who could not afford to buy cows' milk.

"It is far from my intention to try to belittle Dr. Miller's contribution in the development of soya bean food, but, I think it is fair to say each of us develop our own products and marketed them independently. He concentrated more in promoting it among medical profession, hospitals and churches; whereas I took it to the street level and catered to the mass market in competition with the soft drinks. As the result, the sales of my Company are far greater than any governmental or private institution could have hope to reach. Last year alone, my Company sold over 8 million cases of soya bean milk in Hong Kong, and, since 1979, we had been exporting our products, packed in tetrabrik, to all parts of the world. There can be no question that our commercial success in Hong Kong has inspired many other companies throughout Asia and other parts of the world to follow suit.

"I thank you once again for sending me your article and I hope that my comments will help to put the record straight."

"P.S. After 45 years when it first started in a refugee camp, Vitasoy is still serving the refugees of another era. To-day, they are distributed daily to all the Vietnamese Refugees Camps in Hongkong to bring better nutrition to the Vietnamese children. I am also send you a copy of the 40th Anniversary Brochure of my Company." Address: Chairman, Hong Kong Soya Bean Products Co., Ltd., 41 Heung Yip Rd. Aberdeen, Hong Kong. Phone: 5-528211.

1751. Hicks, Alastair. 1981. Re: History of the full-fat soy flour factory in Thailand. Letter to William Shurtleff at Soyfoods Center, March 25. 2 p. Typed, with signature on letterhead.

• ***Summary:*** "The full fat soy flour factory in Thailand commenced production of soyflour during commissioning trials which I ran in the week April 24-28, 1978, as food engineer to the project. The location is Mae Chan, a small village outside Chiang Rai in the far north of Thailand, near the Golden Triangle. The plant was initiated by the ASEAN Sub-Committee on Protein, whose chairman is Professor Amara Bhumiratana, Director of the Institute of Food Research and Product Development (IFRPD), Kasetsart University, Bangkok, Thailand.

"The king of Thailand, King Bhumibol Adulyadej, provided the land and buildings, as part of the Thai contribution to the project. One aim of the Royal Preserved Foods Project is to encourage Hill tribe farmers to grow crops other than opium poppies, in this case, nutritious soybeans, as part of an overall crop substitution program...

"The factory is able to make the following products: cleaned soybeans (up to 3 ton/hour); clean, cracked, debittered soybeans (a possible tempeh raw material); enzyme inactive full fat soyflour. The latter products can be produced at 1.1 tonne/hour. Enzyme active products could also be produced. Most of the full fat soyflour is utilized in the production of Kaset Infant food, a baby food produced at the I.F.R.P.D. in Bangkok. This product in turn is supplied to the hundreds of baby health centers throughout Thailand.

"For further information on these and other details, I suggest you write to Professor Amara... Meanwhile, I would like you to record the Department of Food Technology, Hawkesbury Agricultural College of Advanced Education, Richmond, N.S.W., Australia, as a center for soyfoods processing and research in Australia.

"We have an ongoing program of agricultural research in soybean varieties suitable for the Asian market. Related to this we have developed tofu trials and soybean canning trials. Presently we are developing soymilk from full fat

soyflour and tempeh as a soyfood in Australia." Address: Lecturer, Dep. of Food Technology, Hawkesbury Agricultural College, Richmond, NSW 2753, Australia. Phone: (045) 701 333.

1752. Lo, K.S. 1981. Re: Two letters of appreciation for Vitasoy soya bean milk. Letter to William Shurtleff at Soyfoods Center, March 31. 3 p. Typed, with signature on letterhead.

• ***Summary:*** Mr. Lo encloses letters from H.D. Dale, MD, Medical Director, Sham Shui Po Transit Centre, Kowloon, and Walter Schmidt, Coordinator of Refugee Activities, Hong Kong Christian Service, Migration Services Dept. The Vitasoy was given to refugees from Vietnam in late 1979–children under age 5 and old people over age 65, and to all pregnant women. "There was a marked improvement in the general health of all those receiving this added supplement." Address: Chairman, Hong Kong Soya Bean Products Co., Ltd., 41 Heung Yip Rd. Aberdeen, Hong Kong. Phone: 5-528211.

1753. Aguilera, J.M.; Lusas, E.W. 1981. Review of earlier soya-protein fortified foods to relieve malnutrition in less developed countries. *J. of the American Oil Chemists' Society* 58(3):514-20. March. [50 ref]

• ***Summary:*** Contents: Introduction. Types of soya products: Soybean milk (Philsoy in the Philippines [3,500 bottles/day], unnamed products made in India [a small plant at a university makes nearly 700 liters/day], Mexico, and Brazil), soya-based beverages (Vitasoy in Hong Kong [produced about 120 million bottles in 1970], Puma in Guyana [in the early years, sales volume was about 29 million bottles/year; by 1976 Puma was still in regular production], Saci in Brazil [introduced in 1969, discontinued in 1976], an unnamed spray-dried infant beverage from full-fat soy flour in Mexico [developed by the NRRC at Peoria, Illinois], whey-soya drink mix [WSDM] developed by USAID), soya-fortified cereals (Ten PL-480 products such as CSM, CSB, WSB, WSDM used worldwide [a table shows product names, percentage soya flour, percentage protein increase by fortification, and amount of soy flour used in tonnes; the most soy flour has been used in CSM, CSB, and WSB], Superchil and Fortesan in Chile, Incaparina no. 14 in Colombia, ProNutro in South Africa, Maisoy in Bolivia, Lisha in Tanzania, Thriposha in Sri Lanka, Leche Avena in Ecuador, Cerex in Guyana, Faffa in Ethiopia, Bienestarina [Bienstarina] in Colombia, and a milk-like formula using soya flour in Venezuela). Soya-based infant formulas. Conclusions. Address: Food Protein R&D Center, Texas A&M Univ.

1754. Hymowitz, T.; Kaizuma, Norihiko. 1981. Soybean seed protein electrophoresis profiles from 15 Asian countries or regions: Hypotheses on paths of dissemination of soybeans from China. *Economic Botany* 35(1):10-23. March. [30 ref]

• ***Summary:*** Soybean seed protein extracts from 1,603 accessions obtained from 15 Asian countries or regions (not including Japan) were analyzed for the presence of alleles of 2 proteins. The countries were: Northeast China [Manchuria] (661 accessions), Korea (417), India (219), south and central China (142), Thailand (34), Indonesia (33), Philippines (20), Taiwan (18) USSR (16), Nepal (14), Malaysia (13), Vietnam (5), Afghanistan (5), Pakistan (4), and Burma (2). Three alleles of the Kunitz trypsin inhibitor, designated as Ti-a, Ti-b, and Ti-c, are electrophoretically distinguishable from one another by their Rf values. The seed protein beta-amylase has 2 alleles, designated as Sp1-a and Sp1-b, which are electrophoretically distinguishable from one another by their Rf values.

About 94% of all accessions had a Ti-a allele. "Only the Korean and Central Indian soybean populations have a high frequency for the Ti-b allele. Within Korea, the soybeans from those districts that lie closes to Korea have a high frequency for the Ti-b allele whereas the soybeans from those districts that lie closest to China have a low frequency for the Ti-b allele. The Ti-b allele is not present in soybeans from the Philippines, Vietnam, Thailand, Malaysia, Burma, Nepal, Pakistan, and Afghanistan. Only 1 accession each from Taiwan and Indonesia have the Ti-b allele.

"The Sp1-a allele is not present in soybeans from Taiwan, Vietnam, Thailand, Malaysia, Indonesia, Burma, Pakistan, and Afghanistan. The highest frequency of the Sp1-a allele occurs in soybean germ plasm from northern India and Nepal.

Soybean germ plasm pools: "At present we recognize 7 soybean [germ plasm] pools (SGP) in Asia which are as follows: (1) northeast China and the USSR; (2) central and south China; (3) Korea; (4) Japan; (5) Taiwan and southeast Asia; (6) north India and Nepal; and (7) central India. The eastern half of north China, where the soybean emerged as a domesticate around the 11th century B.C. is considered the most probable center for dissemination of germ plasm...

"The soybeans from Asia (including Japan) were divided into 3 gene centers... The primary soybean germ plasm pool, or in Vavilov's terminology the primary gene center, is China... From the first century A.D. to the Age of Discovery, soybeans were introduced and land races were established in Japan, southeast Asia and southcentral Asia. These regions comprise the secondary gene center for soybeans... Japan should be considered a very active microcenter and northern India a passive microcenter within the secondary gene center.

"Central India may be considered a recent or tertiary soybean gene center. Another tertiary soybean gene center lies within the U.S., while incipient tertiary centers are being established in South America and Europe. The concept of primary, secondary and tertiary gene centers

unifies time and space relationships with regard to the establishment of new genetic combinations within the species *Glycine max*. Another feature of this concept is that it establishes the foundation upon which future soybean germ plasm collection activities can be built."

Paths of dissemination: Fig. 4 is a map on which an oval shows the primary gene center of the soybean in China (in the region about 200 miles southeast of Beijing, in the moist, low plain near the mouth of the Yellow River *(Huang Ho)*, largely in Hopei and Shantung provinces) and on which arrows show the paths of dissemination of the soybean from China to Korea, Japan, Taiwan, Malaysia, Indonesia, and northern India. "By combining seed protein banding data with available historical, agronomic and biogeographical literature, we have developed an hypothesis concerning the dissemination of the soybean from China to other countries or regions in Asia. Our ideas are based partly upon the pioneering studies of Nagata (1960) who primarily used physiological and morphological data to point out possible paths of dissemination of the soybean from China to the rest of the world.

"In developing our hypothesis, we identified 2 major restraints concerning the movement of the soybean. One restraint is physiological and the other historical. Due to the fact that soybeans are day-length sensitive, they spread much easier between east and west than between north and south. Hence, in the dissemination process quantum latitudinal movement of soybeans was rare. Secondly, according to Ho (1975) the movement of the soybean out of its home area did not take place until the seventh century B.C. Therefore, the trial and error period for the adaptation, establishment and dissemination of the soybean from region to region within China, after the seventh century B.C., proceeded at a very rapid rate. As part of the dissemination process, the soybean was moved back and forth across geographical areas as a consequence of wars, famine, emigration, immigration, and trade.

"The suggested paths of dissemination of the soybean from the eastern half of north China to other regions in Asia are shown in Figure 4 and summarized below:

"1. The soybeans grown in the U.S.S.R. (Asia) came from northeast China.

"2. The soybeans grown in Korea are derived from 2 or 3 possible sources–northeast China, north China and the introduction of soybeans from Japan especially in the southern part of Korea.

"3. The soybeans grown in Japan were derived from the intermingling of 2 possible sources of germ plasm–Korea and central China. Most probably the first points of contact were in Kyushu and then the soybean slowly moved northward to Hokkaido. In addition the soybean moved southward from Kyushu to the Ryukyu Islands where they came in contact with the soybeans moving northward from Taiwan.

"4. The soybeans originally grown in Taiwan came from coastal China.

"5. The germ plasm source for the soybeans grown in southeast Asia is central and south China.

"6. The soybeans grown in the northern half of the Indo-Pakistan subcontinent came from central China.

"7. The soybeans grown in central India were introduced from Japan, south China and southeast Asia." Address: 1. Prof. of Plant Genetics, Dep. of Agronomy, Univ. of Illinois; 2. Assoc. Prof., Faculty of Agriculture, Iwate Univ., Morioka, Iwate, Japan.

1755. **Product Name:** [Seitan, and Seitan Hash].
**Foreign Name:** Seitan, Seitan-Hachee.
**Manufacturer's Name:** Witte Wonder Products.
**Manufacturer's Address:** Piet Heinstraat 80, 2518 CK, Den Haag, Netherlands. Phone: 070-464-5225.
**Date of Introduction:** 1981. April.
**How Stored:** Refrigerated.
**New Product–Documentation:** Letter from Sjon Welters. 1982. April 16. "Witte Wonder is a macrobiotic center and production plant for tofu in Den Haag (The Hague); our competitor." Richard Leviton. 1983. Trip to Europe with American Soybean Assoc. Oct/Nov. Unpublished manuscript. p. 24. Nov. 3. Visited Witte Wonder Products, Piet Heinstraat 80, 2518 CK Den Haag (The Hague). Talked to Nico van Hagen and wife Loes Witteman, the principal tofu makers. They make 900-1,200 kg/week of tofu, plus 500 kg/week of seitan. In 1979 they started their foundation called Stichting Natuurvoeding as a health food shop and in April 1981 began to make 100 kg/week of tofu, plus seitan. Soyfoods Center has labels for Seitan, Seitan-Hachee (both contain soy sauce), and Kikkererwten Pastei made by Witte Wonder.

1756. **Product Name:** [Tofu {Vacuum Packed}].
**Foreign Name:** Tofu.
**Manufacturer's Name:** Witte Wonder Products.
**Manufacturer's Address:** Piet Heinstraat 80, 2518 CK, Den Haag, Netherlands. Phone: 070-464-5225.
**Date of Introduction:** 1981. April.
**Wt/Vol., Packaging, Price:** Vacuum packed 250 gm retails for 1.75 guilder (11/83). Also in 3 kg bulk pails.
**How Stored:** Refrigerated.
**New Product–Documentation:** Letter from Sjon Welters. 1982. April 16. "Witte Wonder is a macrobiotic center and production plant for tofu in Den Haag (The Hague); our competitor." Shurtleff & Aoyagi. 1982. Soyfoods Industry: Directory & Databook. p. 3. Niko van Hagen is contact person. Richard Leviton. 1983. Trip to Europe with American Soybean Assoc. Oct/Nov. Unpublished manuscript. p. 24. Nov. 3. Visited Witte Wonder Products, Piet Heinstraat 80, 2518 CK Den Haag (The Hague). Talked to Nico van Hagen and wife Loes Witteman, the principal

tofu makers. They make 900-1,200 kg/week of tofu, plus 500 kg/week of seitan. They make tofu dips at another shop and will soon consolidate the two operations. In 1979 they started their foundation called Stichting Natuurvoeding as a health food shop and in April 1981 began to make 100 kg/ week of tofu, plus seitan. "They know of 3 big Chinese tofu shops in Den Haag but they are not biological [organic], another 3 in Amsterdam. Holland is probably the best market for tofu in Europe says van Hagen, but Indonesians are already supplying themselves so the market is closed to Witte Wonder. Indonesian products cost less, use calcium sulfate, and regular (non-organic) soybeans."

Interview with Sjon Welters. 1984. Oct. 25. They now make 2,000 lb/day of tofu.

1757. Hansen, Barbara. 1981. Indonesia in the heart of L.A.: Let's eat out. *Los Angeles Times.* May 14. p. L33.
• ***Summary:*** This is a review of the small Indonesian restaurant Dewi (Alpine Plaza, 211 Alpine St No. 4, Los Angeles). It has been open for about four years and is popular with local Indonesians.

Dewi simulates the *rijsttafel* with a combination plate that includes spiced hardcooked egg and "bean curd."

Dewi sometimes serves *nasi gudeg,* a specialty of Yogyakarta in central Java, that includes "bean curd cubes."

*"Tahu ketoprak* is a salad of deep-fried bean curd cubes in a sweet peanut sauce."

If you like the meal, pick up some "sweet Indonesian soy sauce" and coconut milk at Dewi's grocery.

1758. Hildebrand, D.F.; Hymowitz, T. 1981. Two soybean genotypes lacking lipoxygenase-1. *J. of the American Oil Chemists' Society* 58(5):583-86. May. [32 ref]
• ***Summary:*** The USDA soybean germplasm collection was screened for genotypes lacking lipoxygenase-1. Two varieties or plant introductions (PI) were found: 133226 from Indonesia and PI 408251 from Korea.

Lipoxygenase [linoleate: $O_2$ autoreductase, EC 1.13.11.12] is widely considered to be the principal cause of the undesirable flavors in soy products, especially soymilk. Moreover, the lipid hydroperoxides resulting from lipoxygenase action can lead to loss of nutritive value by the destruction of certain vitamins and protein. In addition, lipid hydroperoxides and their breakdown products may have toxic effects.

Soybean seeds contain at least three lipoxygenase isozymes, each having a molecular weight (MW) of about 100,000. With linoleic acid the substrate, lipoxygenase-1 (L-1) has a pH optimum at 9.5, L-2 has a pH optimum at 6.5, and L-3 has a broad pH optimum from 4.5 to 9.0. The isoelectric points of the three isoenzymes are also different. L-1 is the most acidic. L-1 is the most reactive with free linoleic acid, whereas L-2 and L-3 are most reactive with methyllinoleate or trilinolein. On an equal protein basis, L-1 is 2.5 times as active as L-2 at its optimum pH, and L-2 is 2.5 times as active as L-3 or L-3b. L-1 is at least 36 rimes more stable than L-2 at 69ºC. Address: Dep. of Agronomy, Univ. of Illinois at Urbana-Champaign, Urbana, Illinois 61801.

1759. O'Neill, K. 1981. America, God willing, becomes a tempe nation. *Tempo.* June 13. p. 49-50. [1 ref]
• ***Summary:*** Tempeh has started to be sold in Indonesian supermarkets. They are displayed on the stands at Pekan Raya in Jakarta. KOPTI was founded on 11 March 1979. The cooperative split off from a firm which equalized the distribution of soybeans, which are still imported and always in short supply. Indonesia requires 4,300 tons of soybeans a day. Of that total, 3,000 tons is for tempeh and 1,300 tons for tofu. KOPTI, which now has more than 12,000 members from 40 cooperatives, is headed toward mechanization. Address: New York.

1760. Lo, K.S. 1981. Re: More on the early history of Hong Kong Soya Bean Products Co., Ltd., makers of Vitasoy. Letter to William Shurtleff at Soyfoods Center, June 26. 2 p. Typed, with signature on letterhead.
• ***Summary:*** This letter contains Mr. Lo's responses to six questions asked by William Shurtleff in a letter dated 25 April 1981. (1) Mr. Lo does not have a history of his company in English. Having retired from active management of the company, he does not like to dig into past records. (3) "In the year 1936, I was working for the late Mr. EU Tong-Sen, a multi-millionaire from Malaysia. I was in Shanghai on a certain mission on his behalf and spent about six months there. I was then 26 years of age... (4) The sales of my company in 1980 of eight million cases include both bottles and tetrabriks products packed 24 bottles or briks to a case." Address: Chairman, Hong Kong Soya Bean Products Co., Ltd., 41 Heung Yip Rd. Aberdeen, Hong Kong. Phone: 5-528211.

1761. Krieger, Verena. 1981. Die schweizerische Sojaforschung [Soybean research in Switzerland]. Bruchmattstr. 24, CH-6003 Lucerne, Switzerland. 2 p. June. Unpublished manuscript. [Ger]
• ***Summary:*** Most Swiss people would be astonished to hear that there is a Swiss Soybean Growers Assoc. *(Vereinigung schweizerischer Soja-Produzenten; VSSP),* established in Nov. 1973 through the efforts of Dipl. agricultural engineer Edgar W. Schweizer. Following Schweizer's untimely death [on 15 April 1979], most of the practical soybean cultural experiments ceased. But private industry such as Nestlé is now showing active interest. Address: Lucerne, Switzerland.

1762. Smith, Paul. 1981. Re: Pioneering work with debittered full fat soy flour and with soybeans in Australia.

Soybean production in Australia. Letter to William Shurtleff at Soyfoods Center, undated. 2 p. Handwritten. Plus comments on draft of History chapter.

• ***Summary:*** Comments on "History of Soya in Australia" manuscript: Vincent R. Smith was a soyfoods pioneer in Australia. In 1951-52 he began to manufacture Australia's first whole (full-fat) heat-treated (debittered) soy flour. From 1953-54 to 1974-75 V.R. Smith also canned soybeans in tomato sauce or puree. In 1956 he founded Soy Products of Australia Pty. Ltd. Between 1965 and 1974-75 Mr. Smith developed and manufactured two soyabean meat substitutes–Soya Bean Luncheon Loaf, and Savoury Roast–for Bellevue Health Supplies, as part of his product range within F.G. Roberts' Health Foods Proprietary Ltd. This latter company has since been absorbed within Soy Products of Australia Pty. Ltd. Technically and nutritionally these products were excellent, but they were discontinued due to rising labour costs, the small Australian market, and competition from larger, more highly automated companies like Sanitarium and Heinz. At the time, possibly due to the very cheap cost of meat in Australia, there was very little market interest in soyabeans either as a food, meat substitute, and/or extender.

By 1981 Soya Products of Australia Pty. Ltd. was making debittered full-fat soy flour and grits, Soy Crunch (a breakfast cereal containing soy grits), Soy Compound (containing dry soymilk, whole soy flour, malt, and lactose), and several types of Muesli containing soy grits. The company's main role is in supplying high grade, human consumption quality raw (enzyme active) and debittered (heat-treated) soy grits and soy flour to industry [food processors] for a wide variety of uses: cakes, biscuits, bread, bread premixes, pizzas, breakfast cereals and mueslis, hamburgers, smallgoods, baby foods, soy milk, soy ice cream, tofu, and calf- and piglet rations.

Interest in soyfoods is growing in Australia, and will continue to grow fostered by increasing health consciousness and the rising prices of meats of all kinds. After the end of the Vietnam war in 1975, there was a big influx of Vietnamese into Australia, swelling the number to 50,000, of which 30,000 are ethnic Chinese. There are also some 10,000 Indonesians currently residing in Sydney alone.

Letter: "Thank you for your hospitality during my visit to the USA... We are now more than fully occupied running, maintaining, and expanding our soy flour mill and our health food business. In the last two years we have made substantial improvements in our quality control, throughput, and heat-treatment process. We have also been working on improving our bulk unloading and grain cleaning system, and plans for extending and further automating our plant are well in hand... We are actively participating in research and development work on soy flour and its end uses: particularly in the areas of liquid and powdered soymilks and soy ice cream.

"We were amongst the first people in Australia to use soya beans to make products for human consumption, in particular heat-treated or debittered full fat soy flour. We were actively involved with the first commercial crops of soybeans grown in Australia in the early 1950s at Kingaroy; we even had a plot of several varieties of soyabeans growing in our own backyard for several years from about 1953-55. Though the bushes grow, the soybeans never mature properly. We also did some interesting work in canning beans in tomato sauce or purée and in manufacturing soy meat substitutes. In addition to our conventional bakery and small goods outlets, our own specialty products and breakfast cereals, we are now supplying several small manufacturers of tofu, soymilk with soybeans, soy flour (raw), and soy grits (raw) and have recently become involved in tempeh manufacture. The trend here in Australia is definitely following that in the USA and interest seems to have grown dramatically in the last year or so. Soyfoods seem to have taken off... Unless you can afford shiploads, freight to Australia is a killer, so we do our best to avoid importing soybeans.

"I am enclosing a recent newspaper article about a tofu producer. We supply him with soy flour for making his tofu and soymilk."

Concerning soyabean production in Australia: "Soyabeans are widely grown in Australia from just north of Shepparton in Victoria (120 miles north of Melbourne), through the Riverina district of southern New South Wales (NSW), through central, north, and northeastern NSW; the Darling Downs area (around Toowoomba) and Kingaroy districts of Queensland. More recently soyabeans have been grown in Western Australia, near Perth.

"A great deal of work has gone into developing suitable varieties of soyabeans for Australian conditions; much of this has been built on American research and experience. U.S., Chinese and Australian beans, while generally similar, are very different to handle and process, in our experience.

"Initially, soyabeans were grown under natural rainfall but this is now rare as bean size tends to be small and yield poor. Soyabeans are definitely not suited to dryland farming techniques. Nearly all soya beans now grown in Australia are grown under irrigation."

Update (March 1995): Paul Smith joined this family-run company in April 1980. In 1981 he was just starting to learn about its history. By 1986 he had done extensive research and writing (which see) on the company history, which showed that it had much earlier and very interesting origins. Address: Soy Products of Australia Pty. Ltd., 69 Power Road, Bayswater, VIC 3153, Australia. Phone: (03) 729-1738 or 729-3611.

1763. Wien, H.C.; Kueneman, E.A. 1981. Soybean seed deterioration in the tropics. II. Varietal differences and techniques for screening. *Field Crops Research (Amsterdam)* 4(2):123-32. June. [15 ref]

• ***Summary:*** "Prevailing high temperatures and high relative humidities in the lowland humid tropics make the production of soybean seed of good viability and the maintenance of its viability during storage, very difficult. Loss of seed viability and resultant poor stands are major constraints in Ghana, India, and Indonesia, and are receiving major research emphasis in the soybean breeding programs of India."

Fifty soybean lines originating in Southeast Asia or the USA were planted in 4 successive seasons after periods of seed storage ranging from 2-9 months under ambient conditions to identify soybean lines that maintained good germinability after prolonged storage. Some small-seeded lines of Southeast Asian origin maintained more than 50% germinability after 8 months of adverse ambient storage. Address: IITA, P.M.B. 5320, Ibadan, Nigeria.

1764. Bader, Kenneth. 1981. Re: History of the American Soybean Association. Letter to William Shurtleff at Soyfoods Center, July 25–in reply to inquiry. 1 p. Handwritten, without signature.

• ***Summary:*** Dr. Bader and staff answered six questions: (1) In what years were each of the ASA overseas offices opened? Tokyo, Japan 1956. Hamburg, Germany 1969, and again in 1969. Taipei, Taiwan 1970. Brussels, Belgium 1970. Mexico City, Mexico 1971. Vienna, Austria 1974. Madrid, Spain 1976. Seoul, Korea 1979. Singapore 1979.

(2) What is the present size of the ASA overseas staff? 50. St. Louis staff? 110. Total American staff? 134.

(3) What was ASA membership in 1955? 5,400. In 1960? 5,900. In 1970? 12,368. What is present ASA membership? 20,028.

(3) How many soybean growers does the ASA represent in the 24 states having checkoff programs? 510,000.

(4) What is meant by the term "Third Party Services" in your annual budget? It is your main source of income! "It is the value of funds and services in joint projects provided by soybean and related trade organizations, private firms, institutes, and other parties. In other words, if ASA invests $10,000 in a soy oil promotion project and it is matched by $20,000 in the same project by a manufacturer, we count the $20,000 a 'third party funds.'"

(5) When was the Human Nutrition Center opened in Mexico? Early 1980. What are a few of its main activities related to soyfoods? "Identify and introduce acceptable soy food dishes in Latin America. Train nutritionists on soy products. Work with governments and institutions on soy nutrition." Address: CEO, American Soybean Assoc., St. Louis, Missouri.

1765. Rakosky, Joseph, Jr. 1981. Tempeh today: Report from Indonesia. *Soyfoods* No. 5. p. 34-35. Summer.

• ***Summary:*** This year Rakosky traveled to Southeast Asia on behalf of the American Soybean Association (ASA), the Foreign Agricultural Service (FAS), and the USDA. He visited five countries: Philippines, Singapore, Malaysia, Thailand, and Indonesia. The purpose of his trip was to encourage people to use soy protein products in their foods and the report his impressions on the market potential.

In Indonesia he found that soymilk was being made in villages by licensed businesses for use in schools; it was flavored with ginger and contained 8% added sugar and 0.03% salt. Plans were underway to start a special soymilk project in which the beverage would be retorted, then distributed in shelf-stable cans and bottles.

Dr. F.G. Winarno, head of Nutritional Research and Development at the Agricultural Institute of Bogor in Jakarta, is involved in a program to improve the nutritional level of Indonesians living in villages. His group is concerned with the design and construction of equipment suitable for village level food processing.

Dr. Winarno said the biggest change in tempe processing occurred in 1976 when the university showed tempe makers that they could get a better product, faster, by incubating their inoculated soybeans in plastic bags rather than in the traditional banana leaves. "'Twenty years ago the people of Java ate tempe and the Chinese ate tofu,' Dr. Winarno explained. 'Today they are both considered national dishes for the Indonesian people.'" About 70% of the soybeans in Indonesia are used to make tempe, with 20% used to make tofu. The biggest tofu maker in Indonesia uses a little less than 10 metric tons per day.

There follows a detailed description of how tempe and tempe starter are made commercially in a traditional Indonesian shop. "The government requires tempe shops to offer small preparation areas for villagers to use to make their own tempe."

"While the Chinese make up about 4% of the total population, they control about 80% of the wealth; obviously they are the country's businessmen, an imbalance the government is trying to correct."

KOPTI is an cooperative organization of independent tempe and tofu makers, mostly small companies, with a current membership of 2,035. To become a member, a company pays a one-time fee (depending on the size of the company) than a monthly fee of $1.62. Members buy their soybeans from KOPTI, which presently handles 4,800 metric tons a month and uses its large volume to get low prices. KOPTI also helps its members upgrade their products and schools them in sanitary practices.

"Since tempe is so popular in Indonesia, one would expect to find it in local supermarkets, but it cannot be found there." A photo shows a small tempe shop in Jakarta,

with soybeans being soaked in metal barrels. Address: Morton Grove, Illinois.

1766. Tibbott, Seth. 1981. Re: Making tempeh at Turtle Island Soy Dairy. Letter to William Shurtleff at Soyfoods Center, Aug. 21. 1 p. Handwritten.

• ***Summary:*** Seth is surprised and glad to hear that his Five Grain and Tempehroni are now available in the San Francisco Bay Area, California. He doesn't know how they get there, as his current distributor goes only to Red Bluff.

He encloses two labels, some PR material, recipe of the month cards, an article from the Oregonian (which put his company "in touch with a thriving, tempeh-starved community of Indonesians who are buying by the case for home use!), and a cooking class poster.

"We are tempeh specialists making no other products. We're currently selling about 250 pounds a week and project to double this volume in the next month when we plan to take on more accounts and move from our current location. We've derived a lot of help from your books and are grateful for the good publicity generated from your center. Every time we turn around it seems like you're writing articles for another national magazine. It always helps our sales.

"Keep in touch and let us know if we can be of any assistance. Sincerely, Seth Tibbott.

"P.S. By the way, Alexander Lyon is out here working with us now and sends along his greetings."

Note: Though Seth's tempeh shop is in Forest Grove, this letter is written from: Rt. 2, Box 73, Gaston, Oregon 97119. Address: Founder, Turtle Island Soy Dairy, 2017 21st Ave., Forest Grove, Oregon 97031.

1767. Shurtleff, William; Aoyagi, Akiko. 1981. The soybean plant: Botany, nomenclature, taxonomy, domestication, and dissemination history. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 62 p. Aug. 28. Unpublished typescript.

• ***Summary:*** A comprehensive history of the subject. Contents: Botany and plant characteristics. Etymology of the term "soybean" and vernacular names. History of soybean taxonomy and scientific names. Origin, domestication, and dissemination in Asia. Individual country dissemination in Asia. Dissemination to Europe. Dissemination in the U.S. South America and Africa. Address: Lafayette, California. Phone: 415-283-2991.

1768. Shurtleff, William; Aoyagi, Akiko. 1981. Englebert Kaempfer: History of work with soyfoods. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 8 p. Sept. 20. Unpublished typescript.

• ***Summary:*** A comprehensive history of the subject. Contents: Introduction. Early life: Born Sept. 16, 1651, traveled to Sweden, as secretary to Swedish Ambassador traveled to Persia and stayed until 1685, decided not to return to war-torn Germany, traveled to Indonesia, arrived in Japan (island of Deshima) Sept. 1690. Japan: Basic situation, 2 annual trips to Edo (today's Tokyo), return to Europe in 1693. *Amoenitatum Exoticarum:* Background, writings about soybeans and soyfoods, Kaempfer's death in 1716. Kaempfer's history of Japan: Background, section about soybeans and soyfoods, present locations of Kaempfer's original writings. Address: Lafayette, California. Phone: 415-283-2991.

1769. Shurtleff, William; Aoyagi, Akiko. 1981. Dr. Harry W. Miller: History of his work with soyfoods. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 21 p. Sept. 29. Unpublished typescript.

• ***Summary:*** A comprehensive history of the subject. Contents: Introduction. Growing up (1879-1902): Birth, early contact with Dr. J.H. Kellogg, marriage. Early years in China (1903-1911). Washington, DC (1912-1925). Pioneering soymilk in China (1925-1939): Research, development of plant, destruction of plant 13 Aug. 1937, U.S. patent, No. 2,078,962 for soymilk process and equipment, work before return to U.S. Introducing soyfoods to America (1939-1949): In Mt. Vernon, new products, work with AMA, American Soybean Assoc. speaker and lifetime member 1958, Vitasoy. Research and work around the world (1949-1977): Quick visit to Shanghai, death of second wife, sale of International Nutrition Foundation, Taiwan work, Indonesian plant, Trinidad, Libya, Japan, old age and relationship with William Shurtleff, the "Great Man." Address: Lafayette, California. Phone: 415-283-2991.

1770. Shurtleff, William; Aoyagi, Akiko. 1981. History of major U.S. soya research centers. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 24 p. Oct. 12. Unpublished typescript.

• ***Summary:*** A comprehensive history of the subject. Contents: Introduction. University of Illinois and INTSOY: Home Economics Department's work (in the 1930's, 1940-1961, and 1974-1981), Food Science Department (1955-1981), International Soybean Program (INTSOY) founded July 1973, large number of talented faculty made the Univ. of Illinois one of the world's top soy research centers. Iowa State University. Cornell University: First work with soy 1883, first soyfoods work in 1927 (soymilk thesis by Y.T. Chiu), one of leading centers of U.S. soyfoods research during World War II (see chapter on Clive and Jeanette McCay), rebirth of interest in soyfoods in late 1950's, 1960 paper on tempeh, soymilk work 1963-1980, other soyfoods studied, arrival of Dr. Van Veen in 1962 (had studied tempeh since 1932, had lived in Indonesia, and had a lifelong interest in tempeh), renewed program of soybean development and production initiated in New York state in

1964. USDA Northern Regional Research Center (NRRC): Originated with 1929 USDA soybean lab in Ohio, 1936 soybean lab in Urbana, IL, transferred to Peoria, IL, 1942, expanded research on food uses of soybeans and soy oil, fermentation division headed by Langlykke, work on soy sauce, life of Dr. A.K. Smith, at NRRC from 1942-1964, arrival of Drs. Watanabe and Shibasaki, Smith one of first American researchers to realize the potential of tofu, work with miso, 1960 arrival of respected Indonesian microbiologist Ko Swan Djien, work on tempeh, NRRC hosted 2 of first major conferences on soy protein foods in 1961 and 1966, sponsorship of overseas contract work, expansion of research in 1960's, soy flour extrusion, Rackis' work with oligosaccharides (flatulence-causing factor in soybeans), life of Dr. C.W. Hesseltine, 1962 arrival of Dr. H.L. Wang at fermentation lab, Mustakas' studies on soymilk, NRRC's interest in soyfoods steadily growing, legitimizes soyfoods to people in U.S. and around the world. INTSOY: Founding, 5 basic objectives, main accomplishments with soybeans, main accomplishments with soyfoods. Address: Lafayette, California. Phone: 415-283-2991.

1771. Selliers, Francois de. 1981. Soymilk around the world (Interview). Conducted by William Shurtleff of Soyfoods Center, Oct. 21. 1 p. transcript. [Eng]
• ***Summary:*** In Belgium, Van der Moortele makes soymilk near Ghent–3,000 liters/hour. Ralston Purina also makes soymilk somewhere. John Wilson is Alfa-Laval's soymilk specialist. Suspended vs. clarified soymilk is Alfa-Laval's terminology for whole-bean vs. traditional filtered. Alfa-Laval, which has a patent on suspended soymilk, built a new soymilk plant in Malaysia. Kikapoo is a soymilk company in Thailand. De Selliers has the names and addresses (which he will send) of 3-4 soymilk makers in Thailand, 2 in Belgium, and 1 in Malaysia.

Mr. de Selliers, who knows many people at the World Bank, believes it would cost less than $800 million to provide soymilk to all the children in the 60 poorest countries–those with annual per capita income of less than $1,000. In those countries, 70% of the population is in pre-primary school and 11.25% is in primary school; there are 81.7 million children in those two categories. One would need 21.8 liters per child to feed it 250 cc for 195 days a year. The capital cost is about $1,000 million. The World Bank would pay for 30% of the milk initially; the local government would be the basic buyer. The World Bank could pay $50 million easily. Samuel Basta is in the Food and Nutrition Dept. of the World Bank.

The first step for de Selliers is to have the World Bank fund a $1.2 million feasibility study, which would use many consultants. Then he would raise $250 million and establish a soymilk committee. Like so many others he asks "Why has the soy bean and soymilk been so slow to catch on in the West?"

In certain regions of Africa, the soybean has been cultivated for more than 150 years. Soy dishes such as Sumbala, Faros, To, etc. have been introduced.

Thimonnier makes thick plastic packs like Tetra Pack. Other companies whose equipment could be used to package soymilk are DRV and PrePac. Get information on co-extrusion of polyethylene film. In East Asia the enzyme lactase is mixed with cow's milk to get rid of the lactose; they let it stand for 7 days. Address: Chairman, IIDC (International Investment & Development Corp.) Belgium, Belgium S.A., Rond-Point de l'Etoile 3, Boite 8, B-1050 Brussels, Belgium. Phone: (02) 640-68 00.

1772. *SoyaScan Notes.* 1981. What is thua-nao? (Overview). Oct. 23. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** Thua-nao is a fermented soyfood found mostly in northern Thailand, a relative of Japanese natto, it is sold or eaten in either of two forms, as cooked thua-nao paste or as thua-nao chips, both of which are made from raw thua-nao paste. Especially popular in areas where fish are scarce, they are used like fermented fish to add flavor to richly-flavored vegetable soups and chili-hot dishes. In some areas they are used as basic items in the diet rather than merely as seasonings.

To make thua-nao in the traditional way, 2 to 4 pounds of whole dry soybeans are washed then, without presoaking, boiled in excess water for 3 to 4 hours, or until soft enough to be easily crushed between the fingers. They are then drained, transferred to a bamboo basket lined with banana leaves, covered with additional banana leaves, and allowed to undergo natural fermentation (without special inoculation) at room temperature (86ºF or 30ºC) for 3 to 4 days, or until they are soft enough to turn into a thick paste when lightly crushed [between] the fingers. As with natto, the fermentation is activated by strains of ***Bacillus subtilis*** bacteria. The fermented beans or raw thua-nao are considered to be of good quality when they are covered with a sticky, viscous, colorless material accompanied by a pungent odor of ammonia. The moisture level is typically 62%, the pH 8.4, and the number of bacteria per gram of product 5,200 million. Raw thua-nao is then made into raw thua-nao paste by mashing the former lightly to make a paste then grinding in salt and, in most cases, other flavoring agents such as garlic, onion and red chilies.

To make cooked thau-nao paste, small portions of the raw paste are wrapped in banana leaves and steamed at atmospheric pressure or roasted over an open fire for about 30 minutes. Containing an average of 52.5% moisture and 16.9% protein, the cooked paste will keep for 2 to 3 days.

For longer storage, raw thua-nao paste is formed into small balls each 1 to 1½ inches in diameter, which are pressed to form thin chips and then sun-dried. Containing

17.8% moisture and 36.8% protein, thua-nao chips will keep for about 6 months. The spice and low moisture both contribute to the better keeping quality.

Dr. Malee Sundhagul and colleagues at the Applied Scientific Research Corporation in Bangkok, who have done the pioneering study on thua-nao, have also developed a modern method of preparation. Whole soybeans are soaked overnight in water, drained, and steamed at atmospheric pressure for 2 hours or at 15 pounds pressure for 40 minutes. After being allowed to cool to below 122ºF (50ºC), they are inoculated with a 1% water suspension of pure culture *Bacillus subtilis* (10 million bacteria per gram of cooked soybeans) or with 10 to 20% by weight of freshly fermented thua-nao beans. Spread in 2-inch-deep-layers in wooden or metal trays and loosely covered with a sheet of plastic, they are incubated at room temperature (30ºC) for 36 to 40 hours, or at 35ºC for 24 hours, or (as for natto) at 40ºC for 20 hours. Finally the fermented beans, spread in thin layers, can be dried at 65ºC (150ºF) for 24 hours, then ground to make thua-nao powder (also called fermented soy meal) which contains 43.9% protein (one third of which is soluble) and 19.2% fat on a dry weight basis. The production cost of this powder is about one third that of fish meal, Thailand's least expensive animal food protein. The powder has been used to make a low-cost, high-protein food called 'ferm-soy mix' which includes 60% thua-nao powder, 20% fish meal, 6% iodized salt, 4% ground red chilies, 4% garlic powder, and 3% onion powder. The product can be eaten mixed directly into rice or mixed with boiling water to make a sauce or paste.

1773. Storup, Bernard; Ruel, Françoise. 1981. Re: Studying tofu in America and starting work with tofu in France. Letter to William Shurtleff at Soyfoods Center, Oct. 31. 6 p. Plus 4 pages of English-language summary of two French books. [2 ref. Eng]

• ***Summary:*** Bernard and Françoise enjoyed the 8 months they spent studying soyfoods in the USA, and have now been back in France for nearly 10 weeks. "During the time we were in the U.S., we had a rather good survey of the small and medium scale tofu industry, and I think we learned a lot from all the people we met, and very often what not to do.

"I have been really surprised by the quality of the welcome we had all along our way, as well as the spirit prevailing among most of the people involved with soyfoods (we did not visit the big factories). This too has been a good lesson. Another small surprise has been the general lack of technical experience of most of the people working with tofu... They could learn a great deal from the dairy industry–chiefly the small and medium scale cheese-making industry–by using the techniques and the equipment (very often not expensive) employed when curding, putting in pressing boxes by gravity, pressing, etc."

Concerning Li Yu-ying, "we went with Jean de Preneuf to the location of 'La Société Française pour l'exploitation du soja et de ses dérivés,' located at 48 Rue Denis Papin, Les Vallées, Colombes (west of Paris). The buildings had been pulled down about 20 years ago, but were used for other manufacture since at least the beginning of the thirties. We met an old man who has always lived in the neighborhood and remembers that 'some Chinese people were making cakes there before the first world war.' So, it is certain that this address was the one of Li's plant in 1912. We have been to the town hall of Colombes, but nobody was able to help us. We have to come back there at the end of November...

"Since our return to France, we had have, with Jean de Preneuf, a lot of contacts with different people to introduce, at least, the idea of soyfoods. We met people of the medical corps, all having an important role in scientific research (Dr. Sautier, INSERM, Hôpital Bichat, Paris; Dr. Mirouse, Dean of the Faculty of Medicine in Montpellier–the most important in France) working on plant proteins for years (as Dr. Cheftel, Universite de Montpellier, who has been to Japan several times and has worked on soymilk with experimental equipment made by Alfa-Laval) and people from INRA (Institut National de la Recherche Scientifique). All these people knew or at least had heard about tofu, and are ready to help us in their own field (analysis or sometimes technical assistance).

"We also met people from large industry (researchers for Nestlé, and an executive of Prolait) to ask if they had worked on soy products other than T.V.P. and soymilk formulas for infants. They all knew tofu and other soyfoods very well but said that 'the market in Europe is not ready yet for this.' Finally, we met organic soybean producers (and non-organic too); we wanted to know more about the future policy of the Economic European Community on soybeans...

"Actually, 9000 hectares of soya (22,500 acres) are cultivated in France, mostly in the south of France. Soya represents in value the second largest (after oil) national import for the French budget.

"In France, we can find tofu only in very few places, most of the time at a prohibitive price, between $4 and $7 a kilo. Vietnamese shops in all big cities have tofu, but their tofu is rather special with a sandy texture and a strong (sour) taste. We found only one (bad) tempeh producer in Paris. For these reasons, we have thought more and more that it would be a good thing to open a tofu shop and to work at the same time on the informational level. We are now working on a small recipe book (adapted to the French habits) as well as on a technical flyer, a pamphlet and other things...

"We are thinking of starting a Soyfood Center in France but we will tell you about this in the future as soon as we

have found a new place to settle (it should be near Paris). We have already made an application.

"Jean de Preneuf contacted different (good) publishers, and one said *The Book of Tofu* has been found to be very interesting by a committee of readers. We are now waiting for a definitive answer from this publisher (Editions Denoel, one of the best in France, by quality and volume)."

Accompanying the letter are photocopies of books by Li Yu-ying and Grandvoinnet (1912) and Rouest (1921) which Shurtleff had been unable to find in America. Key portions were highlighted in yellow and translated into English.

Note: This is the earliest document seen (Feb. 2003) concerning Société Soy or its founders, Bernard and Françoise. The company's first soy product was launched in June 1982. Address: 48 Rue Bouffard, 33000 Bordeaux, France.

1774. Impoolsup, Attawut; Bhumiratana, Amaret; Flegel, Timothy W. 1981. Isolation of alkaline and neutral proteases from *Aspergillus flavus* var. *columnaris*, a soy sauce koji mold. *Applied and Environmental Microbiology* 42(4):619-28. Oct. [27 ref]

• ***Summary:*** This variety of *Aspergillus* mold was found to produce two major proteases, one alkaline and one neutral; both appeared in the late phase of fungal growth. These results lead to a recommendation that koji (soybeans covered with mold growth) be transferred to the salt brine in 2 days rather than the traditional 4 to 7 days. This more than doubles the amount of koji that can be produced per unit of time. Address: Dep. of Microbiology, Faculty of Science, Mahidol Univ., Rama VI Road, Bangkok 4, Thailand.

1775. Caloussis, Mr. 1981. Nestle's work with soymilk (Interview). *SoyaScan Notes.* Nov. 27. Conducted by William Shurtleff of Soyfoods Center. [Eng]

• ***Summary:*** Nestle is now making and marketing soymilk in Malaysia and Singapore. The Singapore venture started in 1979; it is doing well. Nestle owns the controlling interest, with minority local ownership. They are now test marketing their soymilk in Thailand. Nestle is also test marketing a powdered soymilk to health food markets in the Philippines. Named "Vita," it is made at a pilot plant in Japan. Nutrend is a weaning food product made in the Philippines from locally grown soybeans and wheat.

Thimonnier in Lyons, France, makes Flexi-pouch, but it is more expensive [than aseptic packaging] when you take into consideration the cost to deliver one unit.

Maggi is owned by Nestle; seasonings are their main products. Maggi really grew on its dehydrated soups–an instant food at the start of the industrial revolution. Kempthal is near Zurich, and Maggi is still located there. The original owner was Julius Maggi in Switzerland. This story is told in a book on the history of Nestle, which Mr. Caloussis will send. The man in charge of Nestle public relations is Mr. Edward Fasel in Vevey, Switzerland.

Concerning Nestle and infant formulas: In the late 1900s Mr. Nestle started making infant weaning foods out of cow's milk and cereal. Today each country has its own independent marketing program. The problem for Nestle started in England with a book titled *The Baby Killers.* Then another group in Nestle spoke out against Nestle, and Nestle sued them. This got big, negative press coverage. Infant formulas are only 3-4% of Nestle's business. The company's best-selling products are Nescafe (coffee) and various milk products.

1776. Affandi, Irwin; Mahmud, Mien K.; Hermana, -. 1981. Memanfaatkan khasiat tempe [Making better use of the special virtues of tempeh]. In: S. Josodiwondo, R. Utji, and U. C. Warsa, eds. 1981. Kumpulan Makalah Kongres Nasional Microbiologi III. Perhimpunan Mikrobiologi Indonesia. See p. 445-48. Held 25-28 Nov. 1981 in Jakarta. [4 ref. Ind]

• ***Summary:*** Describes results of a study on the use of tempe in the preservation of fish and in treating gastrointestinal disorders in children under 5 years. It was shown that tempeh was a good preservative but so far no inhibitory effects on microorganisms causing diarrhea were noted.

In other studies, tempeh has been reported to contain antibacterial and antiinfection substances, and may cure dysentery, gastrointestinal diseases, and digestive disorders. Address: Pusat Penelitian dan Pengembangan Gizi, Badan Penelitian dan Pengembangan Kesehatan Departemen Kesehatan R.I., Bogor, Indonesia.

1777. *INTSOY Newsletter (Urbana, Illinois).*1981. Kauffman appointed INTSOY director. No. 27. p. 2. Nov.

• ***Summary:*** "On December 21, 1981, Harold E. Kauffman will join the International Soybean Program as Director. A plant pathologist, he brings to INTSOY many years of international experience. Dr. Kauffman has worked for the International Rice Research Institute (IRRI) in the Philippines since 1967. From 1967 to 1971 he served as IRRI outreach scientist assigned to the All-India Coordinated Rice Research Project. Since 1972 he has coordinated the IRRI international rice testing program.

"Dr. Kauffman's primary philosophy is that 'we can substantially increase food production and the well-being of mankind through international cooperation. We have just begun to tap the potential which exists in food production, especially in the tropics.'

"INTSOY is fortunate to have gained the administrative and technical leadership of Dr. Kauffman. William N. Thompson, who has served as INTSOY director since 1973, will continue as Director of International Agriculture at the University of Illinois at Urbana-Champaign."

1778. Judy, W.H.; Jackobs, J.A.; Engelbrecht-Wiggans, E.A. 1981. International soybean variety experiment: Sixth report of results, 1978. *INTSOY Series* No. 21. Nov. xi + 305 p. (College of Agric., Univ. of Illinois at Urbana-Champaign).

• ***Summary:*** In the ISVEX trials, soybeans were tested in the following regions and countries: Africa: Algeria, Botswana, Cameroon, Egypt, Ethiopia, Gabon, Ghana, Malawi, Morocco, Rwanda, Senegal, Somalia, Sudan, Tanzania, Upper Volta, Zaire, Zambia, Zimbabwe.

Asia: Bangladesh, Taiwan, India, Indonesia, Korea, Malaysia, Nepal, Pakistan, Sri Lanka, Thailand.

Europe: Italy, Poland, Portugal.

Mesoamerica: Costa Rica, Dominican Republic, Guatemala, Honduras.

Middle East: Iran, Iraq, Saudi Arabia, Turkey.

North America: United States.

Oceania: Fiji, Tahiti.

South America: Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, French Guiana, Paraguay, Peru, Venezuela.

Results of the first ISVEX trials in Morocco are reported. Soybeans were grown at three sites: (1) Berkane. Date planted: 22 May 1978. Cooperator: M.A. Yacoubi. Best yield: Harcor 3,724 kg/ha. (2) Gharb. Date planted: 13 May 1978. Cooperator: M.A. Yacoubi. Best yield: Elf 3,046 kg/ha. (3) Tadla. Date planted: 12 June 1978. Cooperator: Nadah Driss. Best yield: Crawford 3,370 kg/ha. Address: Univ. of Illinois, Urbana.

1779. Knoblauch, Mark. 1981. Restaurants: Jade East, Thai Hut: 2 fresh finds on the dining front. *Chicago Tribune.* Dec. 6. p. G5.

• ***Summary:*** Includes a review of the Thai Hut (1509 W. Devon Ave.). "A lot of people who claim they don't like bean curd probably have never tasted deep-fried bean curd. The heat of deep frying removes the liquid from the bean curd, leaving a puffy brown shell with a light, nutty flavor that takes particularly well to a variety of dipping sauces. Thai Hut's version ($2) sauces the bean curd with a thin spicy sauce of Thai fish sauce, chopped peanuts, and red peppers."

1780. Hoang, Van Chi. 1981. Re: Vietnamese soy sauce, xi dau, and nuoc tuong. Questions answered on Soyfoods Center letterhead (dated 9 Dec. 1981) and returned to SC. 1 p. Plus 2 enclosures.

• ***Summary:*** Upon receiving Mr. Hoang's answers by mail, Shurtleff called him on 6 March 6 1982 to ask for clarification on some points. The two sets of answers are merged below.

*Xi dau* (pronounced "si zao") is the Vietnamese term for *siyu* or black soy sauce served mostly in Chinese restaurants in Vietnam. It is made in Vietnam, but only by Chinese, in both North- and South Vietnam. It is exposed to air for many months to make it dark.

*Nuoc Tuong* (pronounced "Nuc Tung"–"Nuoc means "liquid") is the water in which soybeans are soaked, typically for about 9 days, but sometimes as long as 30 days. This soak water (also called "soybean self-autolysis water") is removed because otherwise (many believe) it would lower the quality of the finished Tuong. The soak water contains some soluble soybean nutrients and is pale yellow to clear in color. The Japanese discard this water, but some Vietnamese add salt and use it for pickling eggplants, etc.

There is no filtered soy sauce in Vietnam. Of the soy "sauces" made in Vietnam, about 60% is tuong cuda (ground jiang) and 40% is tuong ban (not ground; made in the village of ban). The origin of these two fermented Vietnamese soy products is unknown, but Mr. Hoang suspects they are of ancient origin. Mahayana Buddhists must be vegetarian. Buddhism went to Vietnam (from India) before it went to China, because Vietnam was an international port, trading with India. In about the 3rd century AD Buddhist monks came to Vietnam and spread Buddhism. They ate tofu and soy sauce.

What percent salt (sodium chloride) exists in your finished tuong? 10% in Tuong Cu Da for Vietnamese consumers. 6% in Bodhi Sauce for those who follow a low-salt diet.

In Vietnam are there any traditional soy sauces that have the liquid separated from the solids like Japanese soy sauce? If so, what are they called? Ans: Yes, Tuong Ban; it is usually used for cooking and is made in the Ban village.

One of the enclosures is from the International Register of Profiles. Born on 1 Oct. 1915 in Thanh-hoa province in Vietnam, Hoang Van Chi descended from a long line of Confucian scholars. He attended the best universities in Vietnam (1928-1940) earning a Baccalaureate in mathematics and another degree in physics, chemistry, and biology. He studied Oriental philosophies with a critical and non-dogmatic mind. Like his father and grandfather, he persistently opposed the French colonial rule. In 1940 he married Le Han Phan. In 1945 he joined the resistance and served the Ho Chi Minh government in many high offices, including Director of the National Mint. In 1948 he won an award for his brilliant work from Ho Chi Minh. But in 1955 he fled Saigon when the regime turned towards a full Communist dictatorship. He went into voluntary exile in Europe, settling in Paris from 1960-65 where he wrote his book "From Colonialism to Communism." Address: Bowie, Maryland.

1781. Wood, Brian J.B. 1981. Re: Dr. Yong Fook-Min in Singapore. Soy sauce in Scotland. Letter to William

Shurtleff at Soyfoods Center, Dec. 14–in reply to inquiry. 2 p.
Address: Centre for Industrial Innovation, Univ. of Strathclyde, 100 Montrose St., Glasgow, G4 G4 0LZ, Scotland. Phone: 041-552 4400.

1782. Bushman, Don H. 1981. Re: Soymilk manufacturers in Southeast Asia. Letter to William Shurtleff at New-Age Foods Study Center, Dec.–in reply to inquiry of Dec. 10. 1 p. Typed, with signature.
• ***Summary:*** Gives the name, address, and phone number of the following companies in Singapore: Carnation Co. (S) Pte Ltd. Fraser & Neave (S) Pte. Food Specialties Singapore (Pte) Ltd. (Affiliate of Nestle). Also Rama Food Products Co. of Bangkok, Thailand. Address: Director, South-East Asia, Room 1501, 15th floor, Liat Towers Orchard Rd., Singapore 0923. Phone: 737-6233.

1783. Hoang, Van Chi. 1981. How to make Tuong (Vietnamese unfiltered, ground soy sauce) (Interview). Conducted by William Shurtleff of Soyfoods Center, Dec. 1 p. transcript.
• ***Summary:*** 1. Prepare soybeans: Dehull 10 lb soybeans with a mill and remove hulls with a seed cleaner. Roast the cotyledons at 450ºF (232ºC) for 15 minutes in any type of roaster. Pressure cook the roasted cotyledons with adequate water at 5 lb pressure for 30 minutes. Transfer the contents of the cooker (beans and water) into a plastic 40 liter (10.6 gallon) container, place in a warm room (80ºF or 26.5ºC) for 10 days; this enables the soybeans to undergo auto-hydrolysis. Each day skim off any surface foam.

2. Make glutinous rice koji: On the 3rd day of the soybean fermentation, soak 10 lb of glutinous rice overnight. Drain and steam at atmospheric pressure for 30 minutes, then cool to body temperature. Mix koji starter *(Aspergillus oryzae* mold spores propagated on glutinous rice) with water, sprinkle over rice, then drain on a perforated tray. Transfer inoculated rice into shallow wooden trays (each 10 by 15 by 4 inches deep) and place them in a warm koji room (80ºF or 26.5ºC) for 6 days. Do not stir during this time. Finally the mold-fermented rice koji *(moc)* will be floating in a glucose syrup. Mix the koji with 7.5 lb salt, grind the mixture in a mill, then transfer ground mixture to a plastic vat and leave for 2 days to stop the fermentation.

3. Combine and ferment: Place the fermented soybeans and their water in a Hobart VCM (Vertical Cutter Mixer) and blend until smooth. Mix in the ground salted koji and allow the mixture to stand at room temperature for 3 days. Bottle and cap without heating. Use as a dipping sauce for fresh or fried tofu, or as a pickling medium. In Vietnam, Tuong is also used as a dipping sauce for roast beef, as a cooking sauce for fish, or as a pickling sauce for pork.

Hoang adds: There are less than 200,000 Vietnamese in the USA, and about the same number in France. Traditionally, soy sauce was made and used mostly in North Vietnam. But for the last 30 years (i.e., since about 1951) there has been no soy sauce in North Vietnam due to two factors: (1) The shortage of soybeans and rice; (2) The fact that those who formerly made it were classified as "landlords" by the Communist regime. Today in Vietnam people try to make it using peanut- or cottonseed presscake instead of soybeans. Address: Bowie, Maryland. Phone: (415) 253-1065.

1784. Ismail Bin Abdul Karim, Mohamed. 1981. Preliminary studies on nutritional qualities of Malaysian tempeh. *Pertanika* 4(2):129-32. Dec. [15 ref. Eng; mal]
• ***Summary:*** Commercial tempe, purchased from small processors and markets at various places in Indonesia, was found to contain 65.08% moisture, 40.22% protein, 21.73% fat, 4.18% ask, and 9.39% crude fiber.

In Malaysia, tempe is incubated and sold wrapped in three types of leaves: (1) Banana *(Musa sapietum).* (2) Rambai *(Baccaurea motlyeyanam).* (3) Ketapang *(Terminalia catappa).* Plastic (polyethylene) bags are also used in place of leaves. Address: Dep. of Food Science and Technology, Faculty of Agriculture, Universiti Pertanian Malaysia, Serdang, Selangor, Malaysia.

1785. Java Murni. 1981. Reserve now for Java Murni's Vegetarian X-mas dinner. 4509 Adams St., Carlsbad, California.
• ***Summary:*** The dinner will we held on Dec. 26 and 27 from 5-7 or 7:15 to 10 p.m. The menu is given: Soup: Soto (mild) or Laksa (spicy). Appetizers: Gulung rebung (bamboo shoots wrapped in crispy tofu). Tofu kembang (tofu flowers). Salad: Gado-gado (with peanut dressing). Urap (with coconut dressing).

Entree: Tempeh treat (tempeh braised in Indonesian soy and safflower oil). Tofu-saus-richa (tofu in sweet-and-sour spicy sauce). Sambal goreng boontjis (green beans in savoury sauce). Sayur lodeh (vegetables in coconut milk). Chah tempeh (mixed tempeh & vegetables). Keringan tempeh (sweet-piquant tempeh). Satay tempeh (barbecue tempeh). Beehun goreng (rice noodles). Soyex malakka (soy cubes in malakka sauce). Nasi kuning (yellow rice).

Dessert: Onde-onde (mung beans wrapped in glutinous rice and sesame). Pisang goreng (coated fried banana).

Dinner includes all the above: Per person $12.95.

A map shows the way to the restaurant. Illustrations: A bamboo border. A large Javanese shadow puppet on the left border, looking right. Address: Carlsbad, California. Phone: 434-4131.

1786. Kiang, Y.T. 1981. Inheritance and variation of amylase in cultivated and wild soybeans and their wild

relatives. *J. of Heredity* 72(6):382-86. Nov/Dec. [17 ref]
• ***Summary:*** The cultivated soybean is *Glycine max* and the wild soybean is *Glycine soja.* Eleven wild relatives include *Neonotonia wightii,* which is a perennial with long climbing vines. It is widely distributed in Africa, Southeastern Asia, and Taiwan, and is commonly called the perennial wild soybean. Seed of *Neonotonia wightii* showed no amylase activity except in two accessions from South Africa. Some enzymes of cultivated soybeans have been studied electrophoretically, but there is only one brief report of isozyme analysis of the wild soybean *(Glycine soja).* Address: Assoc. Prof. of Plant Science and Genetics, Univ. of New Hampshire, Durham, NH 03824.

1787. Marking, Syl. 1981. Checkoff: An export builder? Part II. *Soybean Digest.* Dec. p. 37, 40, 42.
• ***Summary:*** "U.S. farmers now export more soybeans–worth a whopping $8.6 in 1980–than they grew in 1965." Export expansion statistics for many countries are given: Japan–The Japanese paid $1 billion for U.S. soybeans in 1980. In 1956 about 20 million bushels of U.S. soybeans were used in Japan, compared with about 160 million in 1980–an 8-fold increase in 24 years. Some 95% of the soybeans consumed in Japan are U.S. soybeans. The Japanese presently use more than 36.7 million bushels of U.S. soybeans for direct human consumption.

North Europe: In 1960, about 40 million bushels of U.S. soybeans were exported to this 6-nation region–mostly to Germany. That figure as jumped to about 170 million bushels in 1980. Soy oil consumption has risen from 367,000 metric tons in 1977 to 550,000 in 1980–a 50% increase.

Mexico: In 1980, Mexico imported about 55 million bushels of U.S. soybeans. Oilseed crushers predict that Mexico will be crushing 3 million metric tons of soybeans (120 million bushels) by 1985.

Soutbeast Asia: Just before 1975, when U.S. soybean market development started here, Southeast Asia imported about 16 million bushels a year. In 1981 that figure will rise to about 55 million bushels.

Taiwan: Since 1969, annual U.S. soybean exports have grown by 14%. In 1985 Taiwan is expected to import 60 million bushels of U.S. soybeans.

Every checkoff dollar invested by U.S. soybean farmers is matched by at least two dollars from other sources.

1788. **Product Name:** Dixon (Bottled Soymilk).
**Manufacturer's Name:** Amoy Canning Corp. (Singapore) Ltd.
**Manufacturer's Address:** 254 Bukit Timah Rd, 13 km, Singapore.
**Date of Introduction:** 1981.
**Wt/Vol., Packaging, Price:** Bottle.
**New Product–Documentation:** Soya Bluebook. 1981. p. 61. "Soy beverage." Color photo sent by Anders Lindner of STS. 1987. Nov. 14. 285 ml bottle. Red letters on white background.

1789. Anas, Juliar. 1981. Fermentasi kedele oleh cendawan *Rhizopus* Sp. pada pembuatan tempe [Fermentation of soybeans with *Rhizopus* species to make tempeh]. Pandang: Fakultas Pertanian Universitas Andalas. [Ind]*

1790. **Product Name:** Soy Beverage.
**Manufacturer's Name:** Carnation Company (M) Sdn. Berhad.
**Manufacturer's Address:** 27, Jalan Telawi Tiga, Bungsar Baru, Kuala Lumpur, Malaysia.
**Date of Introduction:** 1981.
**New Product–Documentation:** Soya Bluebook. 1981. p. 61.

1791. **Product Name:** Soy Beverage.
**Manufacturer's Name:** Carnation Company (Singapore) Pte Ltd. Subsidiary of Carnation International, Los Angeles.
**Date of Introduction:** 1981.
**New Product–Documentation:** Soya Bluebook. 1981. p. 61.

1792. Darmosuwito, -; Suhadi, -; Jutono, -; St. Margino, -. 1981. Study on the effect of physical treatment of soybean and selected *Rhizopus* strain on tempe quality. Yogyakarta: Departemen Mikrobiologi, Fakultas Pertanian Universitas Gadjah Mada. 12 p. Research report. [Eng]*

1793. **Product Name:** Soy Beverage.
**Manufacturer's Name:** Food Specialties Singapore (Pte) Ltd. Affiliate of Nestlé Companies.
**Manufacturer's Address:** Singapore.
**Date of Introduction:** 1981.
**New Product–Documentation:** Soya Bluebook. 1981. p. 61.

1794. **Product Name:** F&N (Soymilk).
**Manufacturer's Name:** Fraser & Neave (Singapore) Pte, Ltd., Food Div.
**Manufacturer's Address:** 253, Pandan Loop, Singapore 0512, Singapore.
**Date of Introduction:** 1981.
**Wt/Vol., Packaging, Price:** Glass bottle.
**New Product–Documentation:** Soya Bluebook. 1981. p. 61. No brand name given. Address: Singapore 1024. Color Photo from STS. 1987. 285 ml glass bottle with red lettering on white circles.

1795. **Product Name:** Fortune Tofu.

**Manufacturer's Name:** Fraser & Neave Pte., Ltd., Food Div.
**Manufacturer's Address:** 253, Pandan Loop, Singapore 0512, Singapore.
**Date of Introduction:** 1981.
**New Product–Documentation:** Letter from Melvin Wee, Mgr. 1985.

1796. Hermana, -. 1981. Pengaruh pemberian bahan makanan campuran dengan kedele dan kedele yang difermentasi terhadap keadaan gizi kurang kalori protein [The effects of addition of foods made of a mixture of soybeans and fermented soybeans in the situation of calorie and protein deficiencies]. Bogor: Pusat Penelitian dan Pengembangan Gizi. 11 p. Research report. [Ind]* Address: Bogor, Indonesia.

1797. Hoang, Van Chi. 1981. The Vietnamese and their favorite sauces. 7 p. Unpublished manuscript.
• ***Summary:*** Fish too small to be sold were made into a sauce called *nuoc mam.* Since the climate is much warmer in South Vietnam, fish were more abundant there than in the North. Also, because the *nuoc mam* manufacturing process is the action of an enzyme that exists in the stomach of the fish and the efficiency of that enzymic action depends on the average night temperature, *nuoc mam* produced in the South was of better quality. Unfortunately, neither *nuoc mam* nor soy sauce is produced in either parts of Vietnam. There is no more *nuoc mam* because there are no more fish.

The Vietnamese brand of soy sauce is called *tuong. Tuong* production bas always been a cottage industry practiced in a few villages. Making koji, or *moc* in Vietnamese was the most difficult and tedious part of the soy sauce manufacturing process. *Tuong* disappeared from existence in North Vietnam after 1955 and in South Vietnam after 1975 due to 3 factors: 1. Shortage of food. 2. Shortage of rice. Since soybeans are considered a luxury because "they do not fill the stomach," peanut or cottonseed presscakes are suggested instead. 3. Manufacturing was limited to a few villages. The professional tuong-makers were better off than other villagers. Since manufacturing required a large courtyard, scores of porcelain jars and enough capital to store soybeans and sweet rice for many months, they were classified as exploiters and their houses and belongings were confiscated. Address: Bowie, Maryland.

1798. Holazo, M.A.F.; Punzalan, E.J.; Gonzales, O.N. 1981. Development of instant soy tokua: Effect of freezing and chemical treatments. *Nutrisyon (Philippines)* 6(1):48. *

1799. **Product Name:** Java Murni Kecap Manis (Sweet Indonesian Soy Sauce).
**Manufacturer's Name:** Indocon. Div. of Indofoods, Inc.
**Manufacturer's Address:** Carlsbad, California.
**Date of Introduction:** 1981.
**Ingredients:** Fermented soy extract, water, molasses, salt, sesame seed, traditional blend of delicate spices.
**Wt/Vol., Packaging, Price:** I pint (16 fluid oz) bottle.
**How Stored:** Shelf stable.
**New Product–Documentation:** Label. 1981, undated. Black on white. "Made for Java Murni Ricetable Ingredients. No preservatives added. Serving suggestions."

1800. **Product Name:** Java Murni Tempeh Schnitzstick (Seasoned and Breaded Fried Tempeh).
**Manufacturer's Name:** Indocon. Div. of Indofoods, Inc.
**Manufacturer's Address:** Carlsbad, California.
**Date of Introduction:** 1981.
**Ingredients:** Organic soybeans, organic unhulled sesame seeds, onions, soy sauce, garlic, vinegar, Rhizopus oligosporus, water, wheat flour, corn flake crumbs, soy oil.
**Wt/Vol., Packaging, Price:** 6 oz.
**How Stored:** Refrigerated.
**Nutrition:** Calories 72, protein 9 gm, carbohydrates 4.6 gm, fat 3.2 gm.
**New Product–Documentation:** Label. 1981, undated. Black on white.

1801. **Product Name:** Java Murni Tempeh Burger.
**Manufacturer's Name:** Indocon. Div. of Indofoods, Inc.
**Manufacturer's Address:** Carlsbad, California.
**Date of Introduction:** 1981.
**Ingredients:** Organic soybeans, organic unhulled sesame seed, garlic, vinegar, onions, salt, Rhizopus oligosporus, safflower oil margarine, water.
**Wt/Vol., Packaging, Price:** 10 oz.
**How Stored:** Refrigerated.
**Nutrition:** The tempeh part: Calories 102, protein 12.3 gm, carbohydrates 6.4 gm, fat 4.5 gm, calcium 92 mg, iron 3.2 mg.
**New Product–Documentation:** Label. 1981, undated. Black on white.

1802. **Product Name:** Java Murni Tempeh.
**Manufacturer's Name:** Java Murni.
**Manufacturer's Address:** 4509 Adams Ave., Carlsbad, CA 92008. Phone: 714-434-4131.
**Date of Introduction:** 1981.
**Ingredients:** Dehulled and cracked organic soybeans, water, vinegar, Rhizopus oligosporus.
**Wt/Vol., Packaging, Price:** 10 oz.
**How Stored:** Frozen or refrigerated.
**Nutrition:** Per 100 gm: Calories 179, protein 17 gm, carbohydrates 12 gm, fat 7 gm, calcium 103 mg, iron 3.7 mg.
**New Product–Documentation:** Soyfoods Center Computerized Mailing List. 1981. Jan. 22. By July 1982 the

owners are Max S.T. Tan and Bob I.K. Sih. Label. 1981, undated. Black on white. "Made with loving care and knowledge for Java Murni Ricetable Ingredients. Try tempeh at Java Murni Restaurant, 4509 Adams Street, Carlsbad." Recipes.

1803. Java Murni. 1981. Vegetarian Menu. 4509 Adams St., Carlsbad, California.
• ***Summary:*** Includes many interesting tempeh and tofu dishes. Dec. 1981 ranking of best-sellers: 1. Tempeh treat (Tempeh braised in Indonesian soy and safflower oil). 2. Keringan tempeh. 3. Satay tempeh. 4. Tempeh kechap. 5. Tempeh malakka. 6. Sambal goreng tempeh. Address: Carlsbad, California. Phone: 434-4131.

1804. **Product Name:** Textured Soy Protein.
**Manufacturer's Name:** Rama Food Product Co., Ltd.
**Manufacturer's Address:** Bangkok, Thailand.
**Date of Introduction:** 1981.
**New Product–Documentation:** Soya Bluebook. 1981. p. 60.

1805. Santiago, C.B.; Banes-Aldaa, M.; Laron, M.A. 1981. Effect of varying crude protein levels on spawning frequency and growth of *Sarotherodon niloticus* breeders. *Quarterly Research Report, Aquaculture Dep., Southeast Asian Fisheries Development Center (Philippines)* 5(4):5-10. *
• ***Summary:*** Soybean oil meal was fed to 4-month-old breeders.

1806. Sudarmadji, Slamet. 1981. Asam phitat dan phitase dalam fermentasi tempe kedele [Phytic acid and phytase in soy tempeh fermentation]. *Agritech* 2(1):49-57. [Ind]*

1807. Suharni, Th. Tri; Sutarningsih, A. Edang; Sidemen, I.G.P. Badjra; Nastini, Sri Juni. 1981. Pembentukan growth factor oleh kelompok protista (bakteri dan khamir) dari inokulum tempe [Formation of a growth factor by the Protista group (bacteria and yeasts) from tempeh inoculum]. Yogyakarta: Fakultas Biologi Universitas Gadjah Mada. 16 p. Research report. [Ind]*
Address: Yogyakarta, Indonesia.

1808. Sukarni, Mariyati; Nasoetion, Amini; Rihati, Sri. 1981. Nilai gizi makanan hasil olah tempe kedele [Nutritional value of food made from soy tempeh]. *Media Gizi Keluarga (Family Nutritional Media)* 5(1):12-17. [Ind]*
• ***Summary:*** Includes a calculation of the nutritional value of 37 tempeh recipes.

1809. Tanuwidjaja, Lindajati. 1981. Pengaruh substrat terhadap daya tahan simpan inokulum tempe [Effect of substrates on the keep quality of tempeh inoculum]. In: Kumuplan Makalah Kongres Nasional Mikrobiologi ke III. See p. 425-429. [Ind]*
Address: 1. National Inst. for Chemistry, Indonesian Inst. of Sciences, Bandung, Indonesia.

1810. Universitas Brawidjaja. 1981. Tinjauan jasad renik pada tempe kedelai dan tempe kacang di daerah Malang [Microbiological survey on soy tempeh and peanut tempeh in the Malang region]. Malang: Departemen Biologi UNBRAW. 21 p. Research report. [Ind]*

1811. **Product Name:** Yeo's Soy Beverage.
**Manufacturer's Name:** Yeo Hiap Seng (Malaysia) Berhad. Affiliate of Yeo Hiap Seng, Singapore.
**Manufacturer's Address:** No. 7, Jalan Tandang, P.O. Box 229, Petaling Jaya, Selangor, Malaysia.
**Date of Introduction:** 1981.
**New Product–Documentation:** Soya Bluebook. 1981. p. 61; 1986. p. 103. Soya Bluebook Plus. 1997. p. 156. Yeo Hiap Seng (M) BHD is still located at 7 Jalan Tandang, Petaling Jaya 46050, Selangor, Malaysia. Phone: +60 03 571-3733. Fax: +60 03 791-3509.

1812. Aterrado, Verona R. ed. 1981. Winged bean: an annotated bibliography. 2nd ed. Laguna, Philippines: International Documentation Center for the Winged Bean. vi + 189 p. Author index. Geographical index. Keyword index. 26 cm [420* ref]
• ***Summary:*** The references are sorted by subject under 28 main subjects. "The present edition is computer-generated, and, as in the first one, it follows the AIBA / AGRIS (Agricultural Information Bank for Asia / International Information System for the Agricultural Sciences and Technology) format of bibliographic entry to achieve compatibility with AIBA's in-house data bases. Storage and retrieval of information would then be greatly facilitated using the same software as that used for the other data bases." Includes 5 references that mention soybeans. Address: Information Specialist and Coordinator, Winged Bean Project, International Documentation Center for the Winged Bean, AIBA/SEARCA, College, Laguna 3720, Philippines.

1813. Buchari, Syafrial. 1981. Mempelajari pengaruh jenis bahan penambahan antioxidan terhadap mutu tepung tempe selama penyimpanan [Study of the effects of different types of antioxidants on the quality of tempeh flour during storage]. Thesis (Skripsi), Fakultas Mekanisasi dan Teknologi Hasil Pertanian Institut Pertanian, Bogor, Indonesia (College of Agricultural Mechanization and Technology, Bogor Institute of Agriculture). 118 p. [Ind]*
Address: Bogor, Indonesia.

1814. Committee on Legumes. 1981. State of the art synthesis: Soybean research. Los Banos, Philippines: Crops Research Division, Philippine Council for Agriculture and Resources Research and Development (PCARRD). 24 leaves. Crops Series No. I. With 8 tables. [55 ref. Eng]
• ***Summary:*** Contents: Committee on Legumes. Foreword (by Dely P. Gapasin, Director, Crops Research Div.). Industry situation. Problem areas attended to. Problem areas and recommended research activities. References. Appendixes.

The Committee on Legumes is composed of 12 people, including F. Quebral, R. Lantican, B. Mercado, E. Paterno, F. Ballon, and L. Ragus. Federico Ballon, MSc, is Technical Director, National Soybean Development Program, Ministry of Natural Resources, Diliman, Quezon City, Philippines.

"The state-of-the-art for soybean on which this synthesis was based was prepared by the Committee on Legumes headed by Dr. Florendo Quebral, Associate Dean and Professor of the College of Agriculture, University of the Philippines at Los Baños.

"The Philippine soybean industry is developing fast without solid technological base for the crop... The area planted to soybean covered 11,250 hectares in 1976 with a total production of 8,396 tons valued at 29.4 million pesos... To meet the national demand of 193,099 metric tons, the country in 1978 imported 176,000 metric tons valued at $30.8 million...

"The national soybean-production program was started in 1969 when the DANR (now MNR and MA) harnessed 900 hectares for soybean and sorghum plantings to meet the requirements of the local livestock and poultry industry...

"The earliest known cultivated soybean variety in the country was the small-seeded, late-maturing Ami variety (Panganiban, 1980). In 1930, the Bureau of Plant Industry [BPI] started screening several introduced varieties which resulted in the isolation of four promising varieties (Mis 28 EB Strain 3910, Mis 38 Dixi, Yellow Biloxi, Dunfield) with limited adaptability. Their average yield ranged from 0.75-1.25 t/ha (Manas y Cruz, 1952). Before World War II, the introduced varieties Mis 28 EB Strain 3910, Mis 38 Dixi, Yellow Biloxi, Macoupin, and Head Green were released for commercial planting. In 1939, improvement of promising varieties through hybridization was initiated by the BPI with the use of introduced varieties: Dunfield, Yellow Biloxi, Bilomi 1 & 3 (Ami x Yellow Biloxi) and Bilofield (Yellow Biloxi x Dunfield). The first two hybrids had superior protein and oil contents (Solpico, 1956). Bilofield was promising in terms of yield (0.75-1.0 t/ha), qualities of green pods (Solpico, 1952). Varietal work was revived in 1955, after it ceased in 1941. Years of painstaking selections and field testing resulted in the release of two Seed-board varieties: B-256 and C-399... In 1961, the legume-breeding program at the Department of Agronomy of UPLB was initiated through an NSDB grant, expanded through an NFAC grant of the MA, and then integrated with the Institute of Plant Breeding." Address: Los Baños, Laguna, Philippines.

1815. Dianti, Merry. 1981. Pembuatan dan pengujian bahan makanan campuran sorgum kedele dan sorgum tempe [Preparation and testing of foods made from a soybeans-and-sorghum mixture, and a sorghum-and-tempeh mixture]. Thesis (Skripsi), Akademi Gizi, Jakarta, Indonesia. [Ind]*
• ***Summary:*** Discusses Vitempo, a tempeh formula. Address: Akademi Gizi, Jakarta, Indonesia.

1816. Djurtoft, R. 1981. Studies related to tempe production. I. Tempe production from soybeans and cowpeas. Unpublished typed manuscript. 9 p. Plus 9 pages of 32 color photos, each with a caption. Unpublished manuscript. 30 cm. [1 ref]
• ***Summary:*** Contents: Oeben Sjarim factory culture. Usar leaves from "Nga Beans". Usar leaves from "Tempe Giling Murni". Old usar cultures from Jogjakarta. Tempe served as snacks. Address: Dep. of Biochemistry & Nutrition, Technical Univ. of Denmark, DK-2800 Lyngby, Denmark.

1817. Djurtoft, Robert. 1981. Studies related to tempe production. II. Two types of microorganisms on usar leaves (Rhizopus molds, Bacilli). Unpublished typed manuscript. 37 p. Including 13 color photos. Unpublished manuscript. 30 cm.
• ***Summary:*** Contents: Introduction. Determination of the number of viable organisms. Isolation and identification of molds and bacteria. Identification of molds from usar leaves: Two *Rhizopus* species from Nga usar, one *Rhizopus* species from GM4 usar. Identification of bacteria on usar leaves: Classification in genera, differential classification. Address: Dep. of Biochemistry & Nutrition, Technical Univ. of Denmark, DK-2800 Lyngby, Denmark.

1818. Djurtoft, Robert; Nielsen, Jens Peter. 1981. Studies related to tempe production. III. Nutritional value of [soy and cowpea] tempeh in relation to B-vitamins, including B-12. Unpublished typed manuscript. 10 p. Including 5 pages of color graphs. Unpublished manuscript. 30 cm.
• ***Summary:*** Contents: Introduction. Experimental. Conclusions. Address: Dep. of Biochemistry & Nutrition, Technical Univ. of Denmark, DK-2800 Lyngby, Denmark.

1819. Food and Agricultural Organization of the United Nations. 1981. Soybeans: Area harvested, yield, and production. *FAO Production Yearbook (Rome, Italy)* 35:126.
• ***Summary:*** The following nations are listed for the first time as soybean producers in the *FAO Production Yearbook*. F = FAO estimate. Ivory Coast: Harvested 2,000F ha in 1979, 4,000 ha in 1980, and 15,000F ha in 1981.

Madagascar: Achieved yields of 1,222 kg/ha in 1979, 1,167 kg/ha in 1980, and 1,154 in 1981.

The 1982 issue of this Yearbook states that Lao was renamed Laos.

1820. Gandjar, I. 1981. Soybean fermentation in Indonesia. *Advances in Biotechnology* 2:531-34. [9 ref]
• ***Summary:*** Discusses various kinds of tempeh, taoco (Indonesian miso), kecap (Indonesian soy sauce), tempe gembus (okara tempeh; sold in every market and village in Central and Eastern Java), oncom tahu (okara onchom), and traditional fermentation processes. Address: Dep. of Biology, Faculty of Mathematics and Natural Sciences, Univ. of Indonesia, Jakarta, Indonesia.

1821. International Rice Research Institute. 1981. Annual report for 1980. Los Banos, Laguna, Philippines. Soybeans: p. 364-67, 382-99. *
Address: Los Baños, Laguna, Philippines.

1822. Jaffrey, Madhur. 1981. Madhur Jaffrey's World-of-the-East vegetarian cookery. New York, NY: Alfred A. Knopf, Inc. 461 p. Illust. by Susan Gaber. Index. 20 x 20 cm. A second edition was published in 1983 in London by J. Cape.
• ***Summary:*** The Indian woman author of this creative book presents 21 recipes for bean curd (tofu), 7 for tempeh, and some for yuba and miso. Green soy beans with sauce (p. 7). Cabbage with miso (p. 15). Eggplant slices with white miso (p. 22-23). Fresh soy beans, steamed (p. 57). Spinach with fermented bean curd (p. 59). Stuffed yellow squash (with yuba, p. 62-64). Pecel (Vegetable salad with spicy peanut sauce, plus tofu and tempeh; p. 73-74). Tempura (with tofu; p. 75-77). Soy bean sprouts (how to grow; p. 100). Soy-bean and mung-bean sprouts seasoned with sesame oil (p. 105). Tempeh, Fried tempeh, Fried, preseasoned tempeh, Sambal goreng tempeh kering (Sweet and sour tempeh), Tempeh cooked in coconut milk (p. 108-110). Thai fried rice (with red fermented tofu; p. 150-51).

One chapter (p. 160-89) is titled "Soy milk, bean curd, and wheat gluten." Making your own soy milk. Making your own bean curd. Udofu *(Yudofu,* simmering bean curd with seasonings). Bean curd with watercress. Korean-style bean curd in a hot water bath. *Hiya-yakko* (Chilled bean curd). Bean curd with Chinese parsley. Bean curd with broccoli. Cabbage cooked with bean curd. Bean curd with a deliciously spicy sauce. Carrots and beans with bean curd dressing. Bean curd, mushrooms, and peanuts in hoisin sauce. Sautéed bean curd. Tofu dengaku (Toasted bean curd with a miso topping). Fried bean curd cubes, soy-bean sprouts sautéed with fried bean curd. Fried bean curd with a sweet-and-sour sauce. Fried bean curd cakes with a mustard surprise. Inari-zushi ("Bags" of fried bean curd stuffed with sushi rice). Pressed bean curd with cabbage. Salad of pressed bean curd, mung-bean sprouts, and agar-agar. How to make fried and baked wheat gluten balls (plus 5 gluten recipes). Buddha's delight (with yuba and fried bean curd).

Chawanmushi (Steamed savory custards, with tofu; p. 192-94). Omelette with bean curd (p. 198-99). Soy sauce eggs (p. 209). Paneer (milk cheese; p. 237-40). Hot or cold noodles with a soy-sauce dressing (p. 248). Noodles with a hot-and-sour bean sauce (p. 250). Vegetarian mee krob (Crisp noodles with pressed bean curd and eggs, from Thailand, p. 255-56). Noodles with quail eggs, mushrooms, spinach, and yuba (Japan; p. 256-57). Hoppers (yeast pancakes from Sri Lanka). Roti (Flat whole-wheat bread). Delicious stock made with soy-bean sprouts. Clear soup with enok mushrooms, bean curd skins [yuba], and spinach (p. 297). Clear soup with soft bean curd and celery cabbage (p. 298). Miso soup with bean curd (p. 307). Miso soup with carrots and mushrooms (p. 308). Fried, munchable soy beans [soynuts] (p. 321-22). Potato and tempeh patties (p. 339). Dipping sauces (with soy sauce; p. 357-59). Kombu relish (with soy sauce, p. 374). Shoyu daikon (White radish pickled in soy sauce). Ginger quick-pickled soy sauce (p. 375). Aomidaikon (Quick pickled small white radishes, with slightly sweet yellow miso; p. 377-78). Chinese-style jellied bean-curd sweetmeat with a peanut topping (p. 399-400).

General information (p. 418-36; lots on soyfoods, see: bean curd [regular, fried, fermented, pressed, pressed seasoned], kochu chang [jang], miso, soy-, tempeh, yuba). Sources (of ingredients; p. 437-40). Address: New York City, NY.

1823. Marks, Copeland; Soeharjo, Mintari. 1981. The Indonesian kitchen. New York, NY: Atheneum. 278 p. Illust. Index. 22 cm. [2 ref]
• ***Summary:*** "'This is to my mind, the best and most easily followed of all the books on Indonesian cooking. And I would certainly rank Indonesian cooking among the greatest on earth.' Craig Claiborne, Food Editor, The New York Times" (rear cover).

Soy related: Spices–"Sweet soy sauce, which you can make at home (see p. 237-38)" (p. 13). Barbecued chicken in sweet soy sauce (Ayam Panggang kecap, Tuban, Java, p. 86-87. "Sweet soy sauce [kecap manis], reconstituted from a dark Chinese soy sauce with caramelized sugar and various spices added, must be considered the most popular and universally accepted of Indonesian flavorings"). Beef stew with sweet soy sauce (Karangmenanci, Java, p. 98-99).

Vegetarian recipes: Stuffed soybean cake (Tahu isi, Jakarta, Java, with "4 Chinese soybean cakes" [tofu], p. 120-21). Eggplant in sweet soy sauce (Semur terong, Java, p. 155). Happy heart (Suki hati, Java, with 3 Chinese-style soybean cakes [tofu], p. 160-61). Bean cake in mixed spice sauce (Bumbu rudjak tahu, Wonosobo, Central Java, with tofu, p. 161-62). Soy bean cake fry (Tahu kering, East Java, with "4 Chinese soybean cakes" [tofu], p. 163-64). Fried

soybean cake with peanut dressing (Tahu goreng, Kediri, East Java, with "4 Chinese soybean cakes," p. 164-65). Fresh vegetable salad with soybean cake (Asinan, Jakarta, Java, with "2 Chinese soybean cakes [tofu], boiled in water for ten minutes and drained, p. 197-98).

Beef and soybean cake fritters (Perkedel tahu, Java, with "2 Chinese soybean cakes [tofu], mashed, p. 215-16).

Bean cake fritters (Tahu perkedel, Java, with "2 Chinese soybean cakes [tofu], mashed, p. 218-19). Soybean cake omelet (Tahu telor, Java, with "2 Chinese soybean cakes [tofu], cut into 1-inch cubes," p. 235).

Sweet soy sauce (Kecap manis, all Indonesia, p. 237-38. "The homemade sauce based on this recipe is infinitely superior to the store-bought brands found in Chinese and Southeast Asian food shops." Ingredients: 2½ cups sugar, 2.75 cups Chinese dark soy sauce, 3 cloves garlic, ½ teaspoon star anise pods, 2 salam leaves, 2 pieces laos, ½ cup water. Do not strain sauce after cooking since all ingredients continue to provide flavor. Makes about 2.75 cups. Keeps for several months refrigerated). Rijsttafel (with sweet soy sauce, p. 256-59). Address: 1. Textile importer, Brooklyn Heights, New York; 2. Central Java, Indonesia.

1824. Raven, Peter H.; Polhill, R.M. 1981. Biogeography of the leguminosae. In: R.M. Polhill and P.H. Raven, eds. 1981. Advances in Legume Systematics. Royal Botanic Gardens, Kew, Richmond, Surrey TW9 3AR, England. xvi + 1049 p. 2 parts. See p. 27-34. Part I. [14 ref]

• ***Summary:*** "The legumes of Australasia are of particular biogeographical interest. New Guinea has a relatively rich flora of legumes consisting of 80 native genera and about 370 species (about 180 endemic), with a strong development of species in genera such as *Archidendron, Maniltoa* and *Mucuna*, but no endemic genera (Verdcourt, 1979). Its legume flora is largely derived from tropical Asia. Southern New Guinea shares 34 species with tropical Australia, mostly ruderal herbs, but a few forest trees and lianes of widespread genera, and a few elements clearly derived from Australia: *Vandasia* (monotypic, also Queensland), *Gompholobium nitidum* (1 of 25 species, also known from Queensland), and seven species of phylodic *Acacia* (all common to Australia, out of a total of some 800 species there). The entire legume flora of New Guinea probably entered from the Miocene onward, following the collision of the Australian Plate with Asia some 15 m.y. BP [million years before the present] (Raven & Axelrod, 1974). The very few legumes of Australian derivation in New Guinea, on the other hand, probably arrived there during or after the Pleistocene, when direct overland connections existed."

Note: *Webster's Dictionary* defines ruderal (an adjective derived from the New Latin *ruderalis*, which is from the Latin *ruder- rudus* = rubble), a word first used in about 1858, as "growing where the natural vegetational cover has been disturbed by man (ruderal weeds of old fields and roadsides)." Address: 1. Missouri Botanical Garden, St. Louis, Missouri, USA; 2. Royal Botanic Gardens, Kew, Richmond, England; 2. Missouri Botanical Garden, St. Louis, Missouri, USA.

1825. Sayekti, S.; Tien, -. 1981. Usaha-usaha untuk memperpanjang daya simpan tempe kedele [Methods for extending the durability (shelf-life) of soy tempeh]. Thesis (Skripsi), Fakultas Teknologi Pertanian Universitas Gadjah Mada, Yogyakarta, Indonesia. 31 p. [Ind]*
Address: Yogyakarta, Indonesia.

1826. Shurtleff, William. 1981. Questions about the history of soy nuggets (tou-ch'ih or hamanatto). Sent to people who offered to edit "16. Soy Nuggets" chapter. 4 p. Unpublished typescript. Typed, on letterhead.

• ***Summary:*** There are 72 numbered questions. People were asked to answer them by number. Many have a person's name or a place (such as China, Malaysia) in the column to the left of the question. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549. Phone: 415-283-2991.

1827. Sing, Phia. 1981. Traditional recipes of Laos: Being the manuscript recipe books of the late Phia Sing, from the Royal Palace at Luang Prabang, reproduced in facsimile and furnished with an English translation, by Phouangphet Vannithone and Boon Song Klausner. London: Prospect Books. Distributed by the University Press of Virginia (Charlottesvile). 318 p. See p. 23. Illust. by Thao Soun Vannithone. Map. Index. 24 cm. [30* ref]

• ***Summary:*** The section titled "Fish sauce and *padek"* states (p. 23): *"Nam pa,* fish sauce, is an ingredient found in almost every recipe [in this cookbook]. Every South-East Asian country has its own fish sauce; *nuoc mam* in Vietnam, *tuk trey* in Cambodia, *nam pla* in Thailand, *ngan-pya-ye* in Burma, and so on. Fish sauce plays the same role in this region as soy sauce in China and Japan. It is prepared by steeping fish in brine for a long time..."

Soy is not mentioned in this book–not even soy sauce (except in the passage quoted above). The illustrations are superb. Phia Sing lived ca. 1898-1967. Address: Laos.

1828. Soetrisno, Uken S.S. 1981. The effect of heating time of soybean on vitamin B-6 and folacin retention, trypsin activity, and microstructure change. MSc thesis, Oregon State University, Corvallis, Oregon. 54 p. *
Address: Corvallis, Oregon.

1829. Stobart, Tom; Owen, Millie. 1981. The cook's encyclopedia: Ingredients and processes. New York, NY: Harper & Row, Publishers, Inc. xii + 547 p. Illust. 25 cm. [20 ref]

• ***Summary:*** Soy related entries include: Bean curd (incl. tofu). Bean-curd cheese [fermented tofu]. Bean paste and bean sauce (incl. Red bean paste) is sweet and made from adzuki beans. Yellow bean paste is made from soybeans and is salty and pungent. "Fermented salted black beans" is made from a black variety of soybeans; these salted black beans can be used to make "black bean sauce" which can be used as a flavoring in fish, lobster, chicken, and pork dishes.

Soybean (incl. soya bean, soja bean, flour {"pork soya links" used in Britain during World War II}, sprouts, soy oil, soy sauce, soymilk, vegetable yogurt [soy yogurt], vegetable cheese [soy cheese], tempeh, bean curd skin [yuba], miso, tamari, soy sauce, soy protein isolate, soy granules or grits, textured plant protein [textured soy protein]). The name in four European languages is given.

Soy sauce or shoyu (It "is said to be one of the ingredients of Worcestershire sauce." Incl. the "very heavy Indonesian *ketjap {ketjap manis or ketjap benteng},* which is a type of soy sauce,..."). The name in four European languages is given.

Textured plant protein (a high-protein foodstuff manufactured from plants (soybeans, peanuts, wheat, cottonseed, etc.). "Originally it was aimed at the vegetarian market." Also called "textured vegetable protein" in the USA. Incl. textured soy flour, textured soy protein gel and fibers).

Worcestershire sauce: Begins with a history (starting in 1837) based on the fanciful story so widely known. "Thus was born what is probably the world's best-known and most ubiquitous bottled sauce, one which has become a standard ingredient." Note: How about soy sauce? "The exact formula is secret. Although it is much imitated, nobody seems to be able to get quite the taste of the original."

Also contains entries for adzuki, ketchup ("Javanese katjap [ketjap], for example, is a very sweet soy sauce"), peanut (groundut or monkey nut), pulses, seaweed, sesame seed, tahini.

Note: Millie Owen prepared the American edition of this book. Address: 1. Hassocks, Sussex, England; 2. Northfield, Vermont.

1830. Wedhastri, Sri. 1981. Daya proteolytik beberapa strain *Rhizopus Sp.* dalam usar pada substrat campuran kedelai dan kacang tolo [Proteolytic activity of the enzymes from various strains of *Rhizopus* molds on a mixed soybean and *tolo* bean substrate]. Thesis (Skripsi), Fakultas Pertanian Universitas Gadjah Mada, Yogyakarta, Indonesia. 42 p. [Ind]*
Address: Yogyakarta, Indonesia.

1831. Yeo Hiap Seng Ltd. 1981. Annual report. Singapore. 32 p. [Eng]
Address: Singapore.

1832. [Japan miso export statistics]. 1981. In: Okura-sho Yushutsu Tsukan Tokei-hyo. Tokyo, Japan.
• ***Summary:*** Gives miso export statistics for 15 countries. For each country gives: 1980 weight and 1981 weight (in kg). Percentage increase. 1980 and 1981 price in yen. Percentage price increase. The top countries, in descending order of amount exported are (with the 1981 weight in kg for each): USA 834,303. Singapore 94,988. Netherlands 67,767. Canada 46,178. England 40,371. West Germany 39,966. Australia 39,432. Iraq 34,509. Indonesia 30,620. Hong Kong 28,940. France 27,959. Belgium 26,625. Taiwan 25,238. Italy 18,755. Saudi Arabia 18,627. Total for all miso exports to all countries 1,524,008. Address: Tokyo, Japan.

1833. Hamlin, Suzanne. 1982. Tempeh: "New" food for the 80s. *Daily News (New York).* Jan. 6. Good Living section. p. 1, 3, 7. Wednesday.
• ***Summary:*** The article begins: "A super soy food from Indonesia is what tempeh has been dubbed, although Westerners tend to look at it askance, bewildered by its homely looks and uncompromisingly firm shape. In truth, it is not a pretty thing... It might be said to resemble a piece of moldy stucco wall or a remnant of an old sponge. Or it might be likened to a flattened piece of overripe brie cheese." Includes photos of Farm Foods Tempeh Kit, plus many recipes including: Tempeh dip and dressing. Seasoned crisp tempeh. Tempeh fries. Crispy tempeh bits. Broiled tempeh. Winter tempeh salad. Sesame and tempeh salad. Tempeh lasagne. Stir-fried tempeh and cabbage. Tempeh slices in hot sauce.

1834. Selliers, Francois de. 1982. Re: Three new soymilk manufacturers in Asia. Letter to William Shurtleff at New-Age Foods Study Center, Jan. 27–in reply to inquiry of Dec. 22. 1 p. Typed, with signature. [Eng]
• ***Summary:*** They are: Kickapoo Co. Ltd. in Thailand, makers of Lactasoy. United Milk Co. Ltd. in Thailand; part of the Nestlé Group, they make Bonus brand soymilk. Dr. Chung's Foods Co. Ltd. of Korea. Address: Chairman, IIDC (International Investment & Development Corp.) Belgium, Belgium S.A., Rond-Point de l'Etoile 3, Boite 8, B-1050 Brussels, Belgium. Phone: (02) 640-68 00.

1835. Wood, Brian J.B. 1982. Soy sauce and miso. *Economic Microbiology* 7:39-86. Jan. A.H. Rose, ed. Fermented Foods. [50 ref]
• ***Summary:*** Contents: 1. Introduction. 2. The preparation of soy sauce: Introduction, preparation of raw materials (the beans, wheat), mixing, koji, moromi. 3. Of beans, microbes, and miso: Beans, microbes, miso. 4. Trade in soy sauce: Introduction, statistics. Table 1 (p. 64-66) shows exports of soy sauce in 1978, in tonnes (metric tons) from Hong Kong, Korean Republic, Singapore, Japan, and total, to almost

every country in the world (with each country's population in millions), grouped by region as follows:

1. North America: Canada, USA (#1)–Regional total imports: 6,052.3 tonnes.

2. South and Central America [and Caribbean]: Argentina (#3 in region), Bolivia, Brazil, Chile, Costa Rica, Ecuador, El Salvador, Guatemala, Guyana, Honduras, Mexico (#2), Nicaragua, Panama, Paraguay, Surinam, Venezuela (#1), Granada, Jamaica, Trinidad and Tobago, total. Former Dutch West Indies–Regional total imports: 1,046.4 tonnes.

3. Europe: Austria, Belgium, Czechoslovakia, Denmark, Finland, France (#4 in region), Germany (West #3), Greece, Italy, Netherlands (#2), Norway, Portugal, Spain, Sweden, Switzerland, UK (#1), USSR–Regional total imports: 3,017.7 tonnes.

4. Near and Middle East: Bahrain (#3), Egypt, India, Iran (#2), Iraq, Jordan, Kuwait, Oman, Qatar, Saudi Arabia (#1), United Arab Emirates, Yemen Arab Republic–Regional total imports: 1,193.5 tonnes.

5. Far East and Western Pacific: Brunei, Hong Kong (#3 in region), Indonesia, Japan, Korea (South), Macao, Malaysia (#2), Philippines, Sabah (#1; A state of Malaysia from 1963; Formerly British North Borneo), Sarawak (A state of Malaysia from 1963), Singapore, Taiwan, Thailand–Regional total imports: 3,139.4.

6. Pacific and Australasia: Australia (#1 in region), Cook Islands, Christmas Islands, Fiji, Guam (#2), Nauru, New Caledonia, New Hebrides, New Zealand, Oceania n.e.s. (#3), Papua New Guinea, Portuguese Timor, Samoa and Tonga, Solomon Islands, Tuvalu (Ellis Island), U.S. Oceania–Regional total imports: 1,647.5 tonnes.

Note: This is the earliest document seen (March 2010) concerning soybean products (soy sauce) in Kiribati (Christmas Islands), in Nauru, in Qatar, in Portuguese Timor (later renamed Timor-Leste [East Timor]) or in Tuvalu. This document contains the earliest date seen for soybean products in Kiribati (Christmas Islands), in Nauru, in Qatar, Portuguese Timor, or in Tuvalu (1978); soybeans as such have not yet been reported.

7. Africa: Algeria, Canary Islands, Ethiopia, Gambia, Ghana, Kenya, Libya, Malagasy, Malawi, Mauritius (#2 in region), Nigeria, South Africa (Republic of, #1), Sudan, Réunion Islands (#3), Tanzania, Zaire. Other African countries–Regional total imports: 365.7 tonnes. World total imports: 15,731.5 tonnes, of which 6,192.8 tonnes from Hong Kong, 1,233.5 tonnes from South Korea, 1,713.6 tonnes from Singapore, 6,591.6 tonnes from Japan. The value in pounds sterling and in pounds sterling per tons of soy sauce is given for each exporter.

Other tables show: (2) Soy sauce exports (in tonnes and value) each year from 1976 to 1976 from Hong Kong, South Korea, Singapore, and Japan. A large percentage of Hong Kong's exports are re-exports (probably from China). (3) Total soy sauce exports from Japan, 1976-1978, by container type, with amount and value. (4) Soy sauce and miso production in Japan every 5 years from 1965 to 1978 (in tonnes). (5) Soy sauce and miso production in Japan for export in 1976, 1977, and 1978. Miso production (in tonnes) averaged about 40% of soy sauce production, and miso exports (in tonnes) averaged about 13% of soy sauce exports. (6) Imports of soy sauce into Hong Kong, Singapore, and the USA from exporting countries in 1978 (with figures for exports from China in 1976 and 1977). (7) Re-exports of soy sauce (made in China) from Hong Kong and Singapore in 1978 to major importing countries worldwide, by region, by country. Small countries that are the destination of this soy sauce include: Honduras, Nicaragua, Panama, Venezuela, Trinidad and Tobago, Former Dutch West Indies [also called Netherlands Antilles; they are part of the Lesser Antilles and consist of two groups of islands in the Caribbean Sea: Curaçao and Bonaire, just off the Venezuelan coast, and Sint Eustatius, Saba and Sint Maarten, located southeast of the Virgin Islands. The islands form an autonomous part of the Kingdom of the Netherlands], Pakistan, Saudi Arabia, United Arab Emirates, Brunei, Sabah, Sarawak, Fiji, Nauru, Oceanea (non-U.S.), Oceanea (U.S.), Papua, Samoa and Tonga, Solomon Islands, Ghana, Malagasy Republic, Togo. Total from Hong Kong: 2,945.3 tonnes, and from Singapore 109.5 tonnes.

(8) Exports of miso (in tonnes) from South Korea and Japan in 1978 to major importing countries worldwide, by region, by country. The leading importers are: USA (622), Saudi Arabia (353), Singapore (66), Bahrain (64), Netherlands (38), Iran (29), Iraq (29) France (28), German Federal Republic (23), Smaller importers include: Chile, Guyana, Surinam, Bangladesh, Iran, Iraq, Jordan, Kuwait, Quatar, Saudi Arabia, United Arab Emirates, Yemen Arab Republic, Sabah, Fiji, Guam, New Hebrides, Papua New Guinea, Samoa, Solomon Islands, Algeria, Canary Islands, Ghana, Kenya, Libya, Mozambique, South Africa Republic, Zaire.

Note: This is the earliest document seen (June 2007) concerning soybean products (miso) in Quatar. This document contains the earliest date seen for soybean products in Quatar (1978); soybeans as such have not yet been reported.

(9) Exports of miso from South Korea and Japan in 1976, 1977, and 1978 (quantity and value each year; no importing country names are given).

5. Tour of South East Asia: Technical and scientific aspects, trade aspects. 6. Acknowledgments. References

The chapter on Trade states: Soy sauce and soy paste (miso) are traded between all countries of South East Asia. The Korean Republic's exports nearly quadrupled in tonnage. The Kikkoman Company's production facility in Wisconsin produced 21,6000 tonnes of soy sauce in 1978.

This was equal to 3 times the total exports from Japan in the same year. Japan's total share of the world soy sauce market remains very healthy. Miso exports are still small in comparison with soy sauce. On a rising market Japan's exports still only represent 0.2% of its annual miso production; "clearly there is considerable room for expansion here."

Miso is of greater relative importance to Korea than it is to Japan. Among the European countries, Belgium and Holland import the greatest amount of miso on a per capita basis. Spain imports a fair amount of miso. The U.S.A. and Canada had total miso imports totaling about 10% of their soy sauce imports.

"In Thailand, there are about 50 soy sauce factories, the majority of which are small, producing less than 100 kilolitres per year, although it should be noted that most of them also produce soybean paste and soybean cheese [probably tofu]. The total annual consumption of soy sauce in Thailand is estimated at about 6,000 kilolitres (about 7,200 tonnes).

"In Malaysia, there are about 140 soy sauce factories producing in total an estimated 5.5 million gallons of soy sauce per year according to the proprietor of a leading brewery in Kuala Lumpur. This is about 21,000 tonnes per annum" (p. 84). Address: Dep. of Applied Microbiology, Univ., of Strathclyde, Glasgow [Scotland], U.K.

1836. Clemente, R.H.G.; Ocurio, R.A. 1982. Adaptation of soybeans to pre- and post-rice environment. Presented at IRRI Saturday Seminar. Held Feb. 27 at Los Banos, Laguna. *

1837. Leviton, Richard. 1982. Traditional soy sauce ferments in Maryland. *Soyfoods.* Winter. p. 68-69.
• ***Summary:*** About Hoang Van Chi and his company Vietnam Food and Drink, founded in June 1979 in Maryland. They make Bodhi Sauce and Tuong Cu-Da. Photos by Leviton show 6 steps in the process of making this Vietnamese soy sauce, including one of Phan and Van Chi Hoang. Address: 100 Heath Rd., Colrain, Massachusetts 01340. Phone: 413-624-5591.

1838. Nyiakura, Orban. 1982. Soyabean production in Nigeria–prospects and problems. In: A.M. Emechebe and U.R. Pals, eds. 1982. Proceedings of the Second National Meeting of the Nigerian Soybean Scientists. 95 p. See p. 12-18. Held at the Institute for Agricultural Research, Ahmadu Bello Univ., Zaria [Nigeria] 19-20 Feb. 1982. Publication No. II.
• ***Summary:*** "Soyabeans were introduced into Nigeria by the explorers and missionaries. The most popular variety in Benue State (Nigeria) is the Malayan. The work on soyabean in the northern states of Nigeria dates back to 1930 when three varieties were introduced to Samaru from the United States of America. These varieties were later found to be low yielding and ill adapted to the environment of Samaru and were soon discarded. The next introduction of soyabean was made by the Botanist of the then Regional Research Station, Samaru, in 1937 when [varieties named] Malayan, Benares, and Trinidad were brought from Malaya, India and Trinidad, respectively.

"Further introductions continued in the 1940s from East Africa, Sudan, U.S.A., South Africa, Ceylon, the Far-East, Eastern Europe and Australia. These introductions were grown in various observation plots at Samaru and at the Farm Centres throughout the Northern Provinces during the 1950s."

Nigeria is the leading soybean producing country in Africa, and Benue State is the major producer of soyabeans in Nigeria, accounting for over two-thirds of the country's production. In Benue State, soyabean production is concentrated in the Gboko, Kwande, Katsina-Ala, Gwer, and Makurdi areas. Soybean yields are very low compared to other major producing countries; in 1979 they were 385 kg/ha compared with 3,060 kg/ha in Brazil, 2,162 kg/ha in the USA, and 904 kg/ha in China.

Major factors responsible for the decline of the crop in Benue State include marketing, utilization, production, competition from other crops, and international competition. To correct this the Benue State government has initiated an ambitious project for production and processing of soyabeans, rice and maize, which will cost over 100 million naira. The technical partners, Hawaiian Agronomics Company (International) of the USA, have started work on the project already. Address: Hon. Commissioner for Agriculture, Benue State.

1839. Ontario Soya-Bean Growers' Marketing Board. 1982. Canadian soybean mission to Japan, Korea, Singapore, Hong Kong, Malaysia. Chatham, Ontario, Canada. 12 p. Feb. 24 x 11 cm. [Eng; jap; kor]
• ***Summary:*** Small portrait photos (p. 2) show mission members: P. Epp, B. Calhoun, A. Ford, O. McGregor, Michael Loh, Dr. R. Buzzell, M. Pennell. The first four men are from the Ontario Soya-Bean Growers' Marketing Board. Address: P.O. Box 1199, Chatham, ONT N7M 5L8, Canada. Phone: 519-352-7730.

1840. Ontario Soya-Bean Growers' Marketing Board. 1982. Canadian soyabean mission, South East Asia, Feb. 12th–27th, 1982: Mission member reports. Chatham, Ontario: Ontario Soya-Bean Growers' Marketing Board. 12 p. Feb. 24 x 11 cm. [Eng]
• ***Summary:*** Contents: Comments, by Peter H. Epp, Chairman. Japan: Home Shokuhin Tofu Manufacturing Co., Komatsuya Shokuhin (natto mfg. plant), Nihon Miso (manufacturing plant), Japan Miso Assoc., Japan Tofu Assoc., Federation of Japan Natto Manufacturers'

Cooperative Society, Wako Shokuryo Co. (makes natto; Jacob Hartz in Arkansas supplies them with "936X" variety small-sized natto soybeans; Wako also supplies Nihon Miso Mfg. Plant), X-Can Far East Ltd. Korea: Seoul meeting at embassy, Chung's Food Ltd., Agriculture and Fisheries Development Corp., Korean Soybean Curd Cooperative Manufacturing Assoc. Singapore: Okura & Company Ltd., Eng Huat Pte. Ltd., Intraco. Malaysia: Yeo Hiap Seng Co. Ltd. (the largest manufacturer of soymilk in Malaysia and Singapore). Follow-up. Conclusion.

Each of the following members of the mission wrote a chapter in this book, discussing each visit mentioned in the contents: Peter H. Epp, Bernard Calhoun, Otis McGregor, Richard I. Buzzell, M.D. Pennell (General Manager, R&D, H.J. Heinz Company of Canada Ltd.), Michael Loh (Export Development Specialist, Ontario Ministry of Agriculture and Food).

Details are given on the soybean characteristics desired for each type of soyfood product, especially in the chapter by Dr. Buzzell. Popular soybean varieties include: For Miso: Enlei [Enrei], Fujimejiro, Harcor. For natto: Jizuka, Suzuhime, Nattawa. For tofu: Amsoy, Coles, Harcor.

Letter from Fred Brandenburg of OSGMB. 1994. Nov. 9. "Regarding export promotion before 1982, any activities would have been part of larger government sponsored trade missions. For example, in 1979 Otis McGregor participated in a mission to Asia which was co-ordinated by Michael Loh. It included a number of marketing boards and associations from Canada."

Note: This is the earliest document seen (Dec. 1998) that (apparently) mentions the soybean variety Enrei. Address: P.O. Box 1199, Chatham, ONT N7M 5L8, Canada. Phone: 519-352-7730.

1841. Shurtleff, William. 1982. Otten's Indonesian Foods. *Soyfoods.* Winter. p. 28.
• ***Summary:*** This company is run by Mary and Irene (mother and daughter) Otten, of Indonesian descent. "Mary Otten started the earliest known U.S. tempeh shop in 1961 in Albany, California, where she produced it in a basement and sold it to friends and catered parties." Mary and Irene moved to Oakland, then to 322 Key Blvd. in Richmond, California, where in 1976 they started Otten's in a small plant behind their home. In addition to tempeh they make a line of ready-to-eat tempeh dishes: Sambal Bali Tempeh, Tumis Tempeh, Oblok-Oblok Tempeh, Sayur Lodeh Tempeh, Sweet & Sour Tempeh, Sambal Goreng Tempeh, Terik Tempeh, and Sambal Goreng Udang dan Tempeh. A photo shows Mary and Irene. Address: Lafayette, California.

1842. Hamlin, Suzanne. 1982. Tempeh: Super soy food from Indonesia. *Chicago Tribune.* March 11. p. S_A15.
• ***Summary:*** This syndicated article first appeared in the *Daily News* (New York). Jan. 6. Good Living section. p. 1, 3, 7. Wed.

1843. Gregg, B.R. 1982. Soybean seed quality and practical storage. *INTSOY Series* No. 22. p. 52-56. J.B. Sinclair and J.A. Jackobs, eds. Soybean Seed Quality and Stand Establishment (College of Agric., Univ. of Illinois at Urbana-Champaign). [16 ref]
• ***Summary:*** Contents: Introduction. Literature review: Longevity of soybean seed in storage, causes of deterioration (preharvest field conditions, maturity at harvest, high moisture, high temperature, moisture-temperature interaction, mechanical injury, seed treatment, storage fungi and disease organisms, insects, pests, fumigation). Present situation: Storage, providing safe storage (shorter storage periods, vaporproof packages, bulk storage). Resolving production constraints. Address: Seed Technology Specialist, Mississippi State Univ./DOAE Seed Div., Bangkok, Thailand.

1844. *INTSOY Series.* 1982. Conference participants. No. 22. p. ix-xiii. J.B. Sinclair and J.A. Jackobs, eds. Soybean Seed Quality and Stand Establishment (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** The following number of participants came from the following countries: Austria (1; Gretzmacher of Inst. for Agronomy and Plant Breeding). Bangladesh (2; Auch of Mennonite Central Committee, Khaleque of BARC). China and Taiwan (2 each). Ecuador (1). Egypt (2). India (4); Italy (1; Al-Jibouri of FAO). Malaysia (5). Mozambique (1). Nepal (1). Nigeria (3). Pakistan (2). Panama (1). The Philippines (3). Puerto Rico (1). Senegal (1; Larcher of IRAT, Institute Senegalais de Recherches Agricoles). Sri Lanka (22). Tanzania (2). Thailand (7). Uganda (2). United States of America (13). Uruguay (1). Venezuela (2). Zambia (3; Javaheri).

1845. Jalani, B.S.; Zakri, A.H.; Aziz, F.; Ng, K.F.; Mak, C. 1982. [Soybeans in] Malaysia. *INTSOY Series* No. 22. p. 149-56. J.B. Sinclair and J.A. Jackobs, eds. Soybean Seed Quality and Stand Establishment (College of Agric., Univ. of Illinois at Urbana-Champaign). [15 ref]
• ***Summary:*** Contents: Introduction. Historical background of soybean cultivation in Malaysia. Mardi soybean breeding and evaluation program: Germplasm collection, varietal evaluation. Brim soybean breeding and varietal evaluation program: Screening of introduced cultivars, mutation breeding. UKM soybean mutation breeding program: Effects of gamma rays on growth parameters in soybeans, effects of EMS concentrations and postwashing periods on soybean growth parameters. UM soybean breeding and quantitative genetics program: Varietal evaluation, genotype-environment interaction studies, hybridization

program, genetic and environmental control of soybean seed protein. UPM breeding, quantitative genetics, and evaluation program: Performance of segregating lines. Conclusion. Acknowledgment.

"It has been estimated that the local consumption of soybeans per capita per year averaged 5.3 kg for the years 1941 through 1973... In spite of their importance, soybeans have been grown in Malaysia only on a trial basis. One of the main problems of growing soybeans is the lack of locally adapted high-yielding cultivars with desirable grain quality...

"Almost all soybeans and their products now in use are imported... The potential for soybean growing in Malaysia has been shown in trials conducted on introduced cultivars by the Malaysian Agricultural Research and Development Institute (MARDI), the Rubber Research Institute of Malaysia (RRIM), and the Universiti Malaya...

"Records of organized soybean research in Malaysia are relatively scant. F.G. Spring reported in 1924 that there were no records of any soybean cultivation." Address: 1. Personal Secretary, Joint Soybean Breeding Project, Dep. of Genetics, Univ. Kebangsaan Malaysia, Kuala Lumpur, Malaysia.

1846. Kueneman, Eric A. 1982. Genetic differences in soybean seed quality: Screening methods for cultivar improvement. *INTSOY Series* No. 22. p. 31-41. J.B. Sinclair and J.A. Jackobs, eds. Soybean Seed Quality and Stand Establishment (College of Agric., Univ. of Illinois at Urbana-Champaign). [47 ref]

• ***Summary:*** Contents: Introduction. Causes of seed deterioration. Screening methods and assessment of seed vigor. Kinds of stress proposed for seed vigor assessment: Seed storage (aging seeds), accelerated aging stress, cold stress, hot water pregermination stress, osmotic stress, thermostress during germination, methanol stress. Methods of evaluating seed or seedling vigor following stress: Laboratory germination test, field emergence test, tetrazolium (TZ) test, seedling growth rates, characteristics of seed leachate. Seed storability: Cultivar differences in storability, inheritance of seed storability. Field weathering–field deterioration: Resistance to seedborne pathogens involved in field weathering–purple seed stain, resistance to weathering associated with hardseededness (seed coat impermeability), heritability-resistance to field weathering (unspecified mechanism). Tolerance to high soil temperature. Conclusion. Discussion.

"Most resistant lines identified at IITA are from Indonesia. Soybeans evolved in the temperate regions but have been grown successfully for a very long time in Indonesia, which is located in a subtropical region with a rather adverse environment (warm and humid) for quality seed production. Indonesian farmers must have selected varieties resistant to weathering stress. Not all varieties from Indonesia, however, have high levels of resistance to weathering...

"We have noted that a high percentage of the varieties identified as having resistance to field weathering and superior storability are brown- or black-seeded. However, not all blackseeded lines have good storability." Address: Soybean breeder, Grain Legume Program, International Inst. of Tropical Agriculture, P.M.B. 5320, Ibadan, Nigeria.

1847. Na Lampang, Arwooth. 1982. Factors affecting the sowing of soybeans: Cropping methods. *INTSOY Series* No. 22. p. 116-20. J.B. Sinclair and J.A. Jackobs, eds. Soybean Seed Quality and Stand Establishment (College of Agric., Univ. of Illinois at Urbana-Champaign). [7 ref]

• ***Summary:*** Contents: Introduction. Literature review. Current research and development. Relay–Intercropping: Optimum plant density, row widths, row number. Crop stand: Skips and compensation. Effect on seed quality. Constraints on efficient production. Acknowledgment. Discussion.

"Due to their short growth duration (100 ± 10 days), their adaptability to short spells of moisture deficiency and excess, their high yield potential, and their soil-improving capacity, soybeans have been a preferred component in traditional cropping systems widely practiced by Thai farmers. The first program to promote the growing of soybeans in Thailand, initiated about 1930, sought the acceptance of soybeans as a sequence crop to follow the main rice crop in the north. The idea was well received wherever irrigation facilities were available during the dry season." Address: Director, Field Crops Div., Dep. of Agriculture, Bangkhen, Bangkok, Thailand.

1848. Quebral, Florenco C. 1982. [Soybeans in] The Philippines. *INTSOY Series* No. 22. p. 166-71. J.B. Sinclair and J.A. Jackobs, eds. Soybean Seed Quality and Stand Establishment (College of Agric., Univ. of Illinois at Urbana-Champaign).

• ***Summary:*** Contents: Introduction. Cultivar improvement. Planting. Inoculation and fertilization. Pests and diseases. Intensive cropping. Utilization. Costs and returns. Marketing. Marketing program. Areas that need attention. Cooperating agencies.

"The domestic supply of soybeans has never been sufficient to meet national demands for food, feed, and industrial uses. Total domestic soybean production in 1978 was reported to be 7,099 metric tons. Approximately 176,000 metric tons of soybeans, costing $30.8 million, were imported.

"To boost domestic production, the government has launched projects like Masaganang Maisan, the white corn and feed grains program, and the National Soybean Development Program...

"Researchers at the University of the Philippines at Los Baños have produced bottled soymilk (Philsoy) using the hot water grind technique... Fermented soybean products, such as soy sauce, soy cheese (tokwa [tofu]), soy paste (miso), soy curds (tahuri [tofu in brine]), and canned salted beans (tausi) are the most common soybean products used as ingredients in traditional Filipino dishes. A cheese-like product served with sugar syrup (taho) is sold by ambulant peddlers in urban centers." Address: Prof. of Plant Pathology, College of Agriculture, the Univ. of the Philippines at Los Baños.

1849. Sinclair, J.B.; Jackobs, J.A. eds. 1982. Soybean seed quality and stand establishment. *INTSOY Series* No. 22. xiii + 206 p. March. Proceedings of a conference for scientists of Asia. Held 25-31 Jan. 1981 at Colombo, Sri Lanka. (College of Agric., Univ. of Illinois at Urbana-Champaign). [150+ ref]

• ***Summary:*** This conference was sponsored by: The Sri Lanka Ministry of Agricultural Development and Research, The Seed Technology Laboratory, Mississippi State University, and the International Soybean Program (INTSOY); In collaboration with: The Food and Agricultural Organization of the United Nations (FAO), the United States Agency for International Development (USAID).

The Proceedings are divided into 6 parts: Conference participants (directory of 85 people from 23 countries). Inaugural addresses. Invited Papers. Country Reports. Abstracts of contributed papers. Report of the working committees: Production, Crop Protection, Storage and Mechanization.

In the Foreword, W.N. Thompson, Director of INTSOY, notes: "Part of the rationale for the conference came from the experience in the INTSOY variety trials program, particularly in the International Soybean Variety Experiment (ISVEX), which indicated that high quality soybean seeds can be produced in tropical and subtropical environments...

"It is especially relevant to present production problems in countries where high ambient temperatures and humidity prevail at harvest and during storage, and where high soil temperature and moisture prevail at planting time.

"The objectives of this conference relate directly to the overall INTSOY goals of gathering, distilling, and disseminating the best current knowledge of problems facing small farmers." Address: Univ. of Illinois, Urbana.

1850. Tongdee, Amnuay. 1982. [Soybeans in] Thailand. *INTSOY Series* No. 22. p. 176-79. J.B. Sinclair and J.A. Jackobs, eds. Soybean Seed Quality and Stand Establishment (College of Agric., Univ. of Illinois at Urbana-Champaign).

• ***Summary:*** Contents: Introduction. Area and production. Production technology: Cropping patterns, pests and diseases. Seed production program: Constraints. Organization. Discussion.

"Soybeans are one of the most important economic crops of Thailand. They are grown mostly in the northern region, with the largest area in Sukhothai and Chiang Mai Provinces... Nearly 70 percent of the total area under soybeans in Thailand is in the Sukhothai area." Address: Deputy Director, Field Crops Div., Dep. of Agriculture, Bangkhen, Bangkok, Thailand.

1851. Shurtleff, William; Aoyagi, Akiko. 1982. History of soymilk and dairylike soymilk products. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 53 p. April 4. Unpublished typescript.

• ***Summary:*** A comprehensive history of the subject. Contents: Introduction. Etymology. Four stages of growth. Part I: History in Chinese-speaking Asia. Origin and early development. Roots of East Asia's soymilk renaissance. Hong Kong and Vitasoy. Singapore. Taiwan. Part II: History in non-Chinese speaking Asia. Japan. India. Philippines. Vietnam. Indonesia. Thailand. Malaysia. Korea. Sri Lanka. Part III: History in Europe. The early years (1739-1919). 1920-1939. 1940-1959. 1960-1980. Part IV: History in the United States. The early years (1898-1919). 1920-1939. 1940-1959. 1960-1980. Part V: History in Latin America and Africa. Part VI: Soymilk overview and future. Part VII: Dairylike soymilk products (nonfermented). Soymilk ice cream, 1918. Soymilk cream and whipped cream, 1932. Soymilk custards and puddings, 1935. Soymilk mayonnaise, 1936. Soymilk shakes, 1944. Soy nog, 1944. Nonfermented soymilk cheese, 1973. Other.

Note: This is the earliest English-language document seen (Dec. 2003) that contains the term "soymilk shakes" (or "soymilk shake"). Address: Lafayette, California. Phone: 415-283-2991.

1852. Shurtleff, William; Aoyagi, Akiko. 1982. History of tofu. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 119 p. April 21. Unpublished typescript.

• ***Summary:*** A comprehensive history of the subject. Contents: Introduction. Etymology. Part I: History of tofu in China. Origin and developments to 960 A.D. Sung dynasty, 960-1279. Yuan (Mongol) dynasty, 1279-1368. Ming dynasty, 1368-1662. Ching dynasty, 1662-1912. Developments from 1912-1948. The People's Republic of China, 1949-1980's. Part II: History of tofu in Japan. Introduction and early development (to 1185). Kamakura period, 1185-1333. Ashikaga/Muromachi, 1338-1600. Edo/Tokugawa period, 1600-1868. The Meiji period, 1868-1912. Development from 1912-1939. The war and postwar period, 1940-1959. The modern period, 1960-1982. Part III: History of tofu in South and Southeast Asia. Korea. Taiwan.

Malaysia and Indonesia. Vietnam. Philippines. Thailand, Sri Lanka, and India. Part IV: History of tofu in Europe, 1613-1982. Part V: History of tofu in the United States. The early years, 1896-1919. 1920-1939. 1940-1959. 1960-1975. 1976–the awakening of American interest in tofu. Rise of the new American tofu industry. New England Soy Dairy = Tomsun Foods, Inc. from April 1984. Tofu innovation in America. Tofu in foodservice institutions. Growth of the tofu industry. Future of the U.S. tofu industry. Part VI: History of tofu in Latin American and Africa. Part VII: History of frozen and dried-frozen tofu. Frozen tofu. Dried-frozen tofu in Japan. Dried-frozen tofu in the West. Part VIII: History of other special types of tofu. Firm tofu. Pressed tofu. Smoked tofu. Deep-fried tofu. Grilled tofu. Silken tofu. Lactone silken tofu. Address: Lafayette, California. Phone: 415-283-2991.

1853. Leviton, Richard. 1982. A new soy sauce from an old culture. *East West Journal.* April. p. 42-44.
• ***Summary:*** Hoang Van Chi, a native of Vietnam, makes Bodhi Sauce or tuong cu-da in Bowie, Maryland. Photos show: (1) Phan and Hoang Van Chi with bottles of both the sauces they make. (2) Hoang checking glutinous rice that has been steaming overnight. (3) Phan and Hoang involved in four steps in the preparation of sweet rice koji. Address: 100 Heath Rd., Colrain, Massachusetts 01340.

1854. Hamlin, Suzanne. 1982. Indonesian soy food could hardly be any healthier or homelier. *Chicago Tribune.* May 6. p. N_A13A. [1 ref]
• ***Summary:*** This syndicated article first appeared in the *Daily News* (New York). Jan. 6. Good Living section. p. 1, 3, 7. Wed.

1855. Danish Turnkey Dairies Ltd. 1982. Annual report 1981/82. 2 Europaplads, P.O. Box 146, DK-8100 Aarhus C, Denmark. 8 p. 30 cm.
• ***Summary:*** The section titled "The DTD group of companies" (inside front cover) shows that "Foreign subsidiaries" include Integrated Processing Technologies in the USA and Soya Technology Systems Ltd. in Hong Kong [Singapore?]. A diagram shows that "STS" is a "non-milk" company. No further details concerning STS are given. Address: Aarhus, Denmark. Phone: +45 6 12 4155.

1856. Fitzpatrick, Brian. 1982. Soya milk in Asia. In: Theng Chye Yam, W-L Kwik, and C-Y Fong, eds. 1982. Proceedings of Food Conference 1982. viii + 382 p. See p. 261-62. Held 16-20 May 1982 in Singapore. Publ: Singapore Inst. of Food Science & Technology.
• ***Summary:*** Contents: History. Consumption of soymilk. Nutrition. Soymilk- the product. Unprocessed raw materials suitability. Clarified and suspended products. Packaging. Yields for clarified and suspended. Product mix (yogurt, tofu, ice cream). Present market.

Recent introductions of commercial soymilk products include: Green Spot Bangkok (1960), Coca Cola test market of SACI in Brazil (1969), Singapore Cold Storage (1969), Kibun, Japan (1976), and Ace Canning (1980). Address: Alfa-Laval South East Asia, Singapore.

1857. Magarinos, Hélène. 1982. Le Tempeh: "Usine" à protéines et vitamines. En provenance d'Indonésie [Tempeh: A protein and vitamin factory from Indonesia]. *Compas (Le) (France)* No. 21. p. 23-29. Spring. Illust. 27 cm. [1 ref. Fre]
• ***Summary:*** Following a description of tempeh and its benefits (including its content of vitamin B-12), the author explains how to make tempeh at home, with 8 photos. She then gives 3 tempeh recipes: Fried tempeh. Tempeh stew with mushrooms. Tempeh fritters with coconut. Pages 28-29 describe the characteristics of good homemade tempeh, and give troubleshooting advice if your tempeh did not turn out properly. Much of this material is excerpted from *The Book of Tempeh,* by Shurtleff & Aoyagi, a favorable review of which appears on p. 29. Photos show: A hand holding a cake of freshly-made tempeh. Five steps in the process of making tempeh at home. Fried tempeh slices on a plate.

1858. Shurtleff, William; Aoyagi, Akiko. 1982. History of soy nuggets (shih or chi, douchi, hamanatto). Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 27 p. June 4. Unpublished typescript.
• ***Summary:*** A comprehensive history of the subject. Contents: Introduction. Etymology. How soy nuggets are made. Part I: History of soy nuggets in China. Early developments; Han Dynasty (206 B.C.-229 A.D.). Developments from the third to the 16th century. The *P'en-tsao Kang-mu* (1578). 17th to 20th century.

Part II: History of soy nuggets in Japan. Early developments (746-1700's). Daitokuji soy nuggets in Kyoto *(Daitokuji natto).* Savory soy nuggets in Hamamatsu *(hamanatto).* Modern developments with soy nuggets (1900-1982).

Part III: History of soy nuggets in Southeast Asia. Philippines *(tausi* or *tao-si).* Malaysia *(tao si).*

Part IV: History of soy nuggets in the West. Europe. United States.

Note: This is the earliest English-language document seen (Oct. 2008) that uses the word *douchi* or the term "Daitokuji soy nuggets" to refer to different types of soy nuggets. Address: Lafayette, California. Phone: 415-283-2991.

1859. Van Gessel, Ike. 1982. History of Van Dappern Tempeh Co. in the Netherlands (Interview). Conducted by

William Shurtleff of Soyfoods Center, June 19. 2 p. transcript.
• ***Summary:*** The company started in Rotterdam in 1969. They learned how to make tempeh from a Dutch-Indonesian sailor, who had started to make tempeh in the Netherlands in 1949. He made it for family and friends, but did not sell it commercially. Address: 2272 Santa Anita Rd., Norco (near Los Angeles), California 91760. Phone: 714-734-2034.

1860. *Food Engineering International (Chilton's).*1982. Phil-Asia's soy oil plant: Various soya products processed will boost the economy, cut imports. 6(6):48-51, 53. June.
• ***Summary:*** In 1979 the EMI Corporation of Des Plaines, Illinois, was awarded the contract by Phil-Asia Foods Corp to build this plant near Tabangao, a fishing village in Batangas province adjacent to a deepwater port. Initially the plant will process 500 tonnes/day of soybeans, but eventually will double that. "At the present time, soybean meal is being imported at the rate of 24,000 tons per month by the country's feed mills. Eventually, Phil-Asia's plant will produce 22,500 metric tons per month for a direct substitution of the imported meal." A key part of the plant will be the EMI Flash Desolventizing System, originally developed in the late 1950s by the USDA. The plant is eventually expected to produce textured vegetable protein that is tailor-made for local taste preferences. A photo shows that plant as it nears completion.

1861. U.S. Department of Agriculture. 1982. The annual report on activities carried out under Public Law 480, 83d Congress, as amended, during the period October 1, 1979 through September 30, 1980. Washington, DC: U.S. Government Printing Office. 32 + [40] p. See table 18. 27 cm.
• ***Summary:*** Contents: Summary and highlights: Sales programs, food for development, use of foreign currencies, foreign donations, world food program. Title I sales program: Agreements signed in fiscal year 1980, accounting for Title I costs, self-help provisions, food for development, use and administration of Title I foreign currencies. Title II foreign donations: Program highlights, world food program, the food aid convention of the international wheat agreement. Appendix–statistical tables.

Table 18 is titled "Title II, Public Law 480, total commodities shipped by program sponsor, fiscal year 1980." The main program sponsors and distributing agencies, listed alphabetically, are AJJDC (American-Jewish Joint Distribution Committee), CARE, CRS (Catholic Relief Service), CWS (Church World Service), LWR (Lutheran World Relief), SAWS (Seventh-day Adventist World Service), UNICEF, UNRWA (United Nations Relief and Works Agency), and WRC (World Relief Commission). All of these are Private Voluntary Organizations (PVO/PVOs), registered with USAID. The following foods containing soy protein were distributed: CSM (corn soya mix), WSB (wheat soya blend), and small amounts of soya flour. The vegetable oil which was shipped to many countries was soybean oil; it is not recorded here.

Foods containing soy protein were distributed to the following countries or areas: Near East: Egypt, Gaza, Jordan, Morocco, Tunisia. Latin America: Bolivia, Chile, Costa Rica, Dominican Republic, Ecuador, El Salvador, Guatemala, Haiti, Honduras, Nicaragua, Panama, Paraguay, Peru, St. Lucia.

Africa: Angola, Benin, Botswana, Cape Verde Islands, Comoro Islands, Ethiopia, Gambia, Ghana, Guinea-Bissau, Ivory Coast, Kenya, Lesotho, Liberia, Malawi, Mauritania, Mauritius, Mozambique, Senegal, Sierra Leone, Somalia Republic, Swaziland, Tanzania, Togo, Upper Volta, Zambia.

Asia: Bhutan, India, Indonesia, Kampuchea, Nepal, Philippines, Sri Lanka. Address: Washington, DC. Phone: 703-875-4901 (1991).

1862. Ko Swan Djien. 1982. Re: History of his work with tempeh, and why so few Indonesians studied tempeh before World War II and during the two decades thereafter. Letter to William Shurtleff at Soyfoods Center, July 1. 2 p. [2 ref]
• ***Summary:*** Ko studied at the University of Wisconsin at Madison from August 1959, then did research at the Northern Regional Research Center (NRRC, Peoria, Illinois), from February to Aug. 1960. Thereafter he returned to the Bandung Institute of Technology, where his Laboratory for Microbiology began doing cooperative research on tempeh with the Cornell University (New York) and NRRC groups. Ko's first article, co-authored with Dr. Hesseltine in 1961, was titled "Indonesian Fermented Foods." With this article, Ko became the second Indonesian to publish scientific research about tempeh.

It is curious to note that, despite the fact that tempeh has long been a very important and widely used Indonesian food, all of the scientific studies on tempeh from 1895 to 1960 (and virtually all of the references in any language) were done by Europeans living in Indonesia. There are several reasons for this. First, while Indonesia was a Dutch colony, very few Indonesians were able to attend a university or do scientific research of any type. There were very few Indonesian food scientists or microbiologists and these were not encouraged to study indigenous foods. Second, During Dutch colonial rule, public opinion was strongly influenced by the Dutch emphasis on Western values and lifestyles, and the devaluation of indigenous values and lifestyles. Consequently a food such as tempeh, which was unknown in the West, and which was a low-priced food of the common people, acquired the image of an inferior, lower-class, or even poor-people's food, even though it was consumed by Indonesians of all classes. No Indonesian scientists felt it was worthy of their attention or

research. Unfortunately, this attitude persisted even after independence.

"The enclosed photocopy of Indonesian newspaper articles (from Sept. 1965) illustrates the feeling of amazement at that time, when a reporter discovered that I studied tempeh at the university. Headings like 'Tempe Naik Tahta' (Tempeh steps to a higher throne) in large letters decorated their reports." Address: Dep. of Food Science, Agricultural Univ., Wageningen, Netherlands. Phone: (08370) 84162/82888.

1863. Shurtleff, William; Aoyagi, Akiko. 1982. History of natto and its relatives. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 39 p. July 17. Unpublished typescript.
• ***Summary:*** A comprehensive history of the subject. Contents: Introduction. Etymology. Part I: History of natto in Japan. Sources of information. Theories of origin. Heian period (794-1185). Kamakura period (1185-1333). Muromachi period (1338-1600). Edo (Tokugawa) period (1600-1868). Meiji period (1868-1911). Taisho period (1912-1925). Showa period (1926-1981 and beyond). Popular types of Japanese natto. Natto in the prefectures. Pictures of natto containers. Part II: History of relatives of natto in East Asia. Unsalted / bland soy nuggets in China. Joenkuk-jang in Korea. Thua-nao in Thailand. Kinema in Nepal. Sere in Bali, Indonesia. Part III: History of natto in Europe. Part IV: History of natto in the United States. Address: Lafayette, California. Phone: 415-283-2991.

1864. Shurtleff, William; Aoyagi, Akiko. 1982. History of other fermented soyfoods. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 7 p. July 18. Unpublished typescript.
• ***Summary:*** A comprehensive history of the subject. Contents: Introduction. Soy wine, 321 A.D. Cantonese wine starter *(kiu-tsee),* 1878. Soy fermentation pellicle *(tou-huang),* 1911. Meitauza *(Mucor*-fermented okara), 1937. Okara onchom, 1901. Soy onchom, 1965. Soy idli, dosa (or dosai), and dhokla, 1976. Soy-ogi, 1966. Sere or seredele (Bali) discussed in chapter on whole dry soybeans. Address: Lafayette, California. Phone: 415-283-2991.

1865. Tally, Gene. 1982. The Coca-Cola Company's work with soymilk in Asia (Interview). Conducted by William Shurtleff of Soyfoods Center, July 29. 1 p. transcript. Address: Coca-Cola Co., Atlanta, Georgia.

1866. *Energy Bulletin.* 1982. Thai pedal-powered soy grinder produces milk. July. p. 13.

1867. Ablett, G.R. 1982. An introduction to soybeans. *Notes on Agriculture (Guelph, Ontario)* 18(1):9-10. Aug.
• ***Summary:*** Soybeans are presently one of the most important cultivated crops. The can be grown from the equator to latitudes of 50º or more (around Winnipeg in Manitoba, Canada). In 1978 some 80.450 million metric tons (tonnes) of soybeans were produced on over 50 million hectares of land.

Tables show: (1) The world's leading soybean producing countries in 1968 and 1978. In 1978 they were (in million tonnes): USA 50.9 (60% of the world total). China 10.5. Brazil 10.5. Argentina 3.8. USSR 0.640. Indonesia 0.523. Canada 0.520. South Korea 0.319. World total 80.450. Source: *Commodity Year Book 1980,* by Commodity Research Bureau, Inc.

(2) Soybean hectarage, yield and production, 1941-1980 in five year averages in Ontario. Source: *Agricultural Statistics for Ontario,* OMAF, Publication 20. Address: Ridgetown College of Agricultural Technology, Ridgetown, ONT, Canada.

1868. Ohta, Teruo. 1982. Tenpe wa kôtanpaku shokuhin [Tempeh is a high-protein food]. *Zenkoku Shokuhin Shinbun (National Food News)* No. 433. Sept. 21. [Jap]
• ***Summary:*** The oil in tempeh becomes rancid more slowly than most oils. Tempeh starter culture is sold at supermarkets in Indonesia. The author is planning to use electrical engineering *(denshi kôgaku)* to help make tempeh starter culture. Address: Nosuisho Shokuryo Sogo Kenkyujo, Oyo Biseibutsu Bucho: National Food Research Inst. (Shokuhin Sogo Kenkyujo), Kannon-dai 2-1-2, Yatabe-machi, Tsukuba-gun, Ibaraki-ken 305, Japan.

1869. **Product Name:** [Tofu].
**Manufacturer's Name:** Soy-Lin or F.M. Lin.
**Manufacturer's Address:** Burgemeester Huydecoperweg 18, 3615 AD Westbroek, The Netherlands. Phone: 034-69-1996.
**Date of Introduction:** 1982. September.
**New Product–Documentation:** Soyfoods Center Computerized Mailing List. 1982. Sept. 17. Owner: Mr. F.M. Lin.

Proceedings of the First European Soyfoods Workshop. 1984. Sept. 27-28. Mr. F.M. Lin, owner of a company named F.M. Lin, at the address shown above, was in attendance at the Workshop.

Talk with Sjon Welters. 1990. March 30. Lin Tahoe (Soy Lin) is a traditional Indonesian tofu company that makes an estimated 1,000 kg/week of calcium chloride tofu.

Talk with Sjon Welters. 1990. Sept. 9. He talked with his co-worker Bernard Faber in Holland who is trying to find out more about Soy Lin. He called them but could get any information. "The Chinese and Indonesian business people in Holland are so secretive. They hide everything behind different brand names, small companies here and there, so its very hard to find out what is happening. Even if you know the address and go there, you might not find anything there but an empty storefront."

Talk with Bernd Drosihn. 1991. Aug. 25. He thinks Vanka Kawat is a brand of Soy Lin.

1870. *Foreign Agriculture.* 1982. Indonesia: Imports of U.S. soybeans to climb in 1982. Oct. p. 12.

• ***Summary:*** Imports of U.S. soybeans for food use reached 361,000 tonnes in 1981, and could exceed 400,000 tons in 1982. Indonesian soybean output has increased very slowly in the last few years, so today local beans make up only 60% of the more than 1 million tons consumed in traditional food products annually. Poultry feeding is the major outlet for soybean meal in Indonesia. Aquaculture (a major industry in Indonesia) also represents a promising area for soybean meal market development efforts in the future. Soybean meal purchases totaled 170,000 tons in 1981, and will be higher this year. The government took over all soybean meal trade in February 1982, and meal purchases are now being directed to the U.S. and away from Brazil.

1871. *Foreign Agriculture.* 1982. Malaysia: New outlet opens for U.S. soybeans. Oct. p. 13.

• ***Summary:*** The advent of soybean crushing in Malaysia last year has created a new market for U.S. soybean farmers. In 1981, soybeans became the leading U.S. agricultural export to Malaysia–about 89,000 tonnes–roughly three-fifths of Malaysia's total imports. However, Malaysia imports virtually no soybean meal from the U.S. because of China's price advantage and a combination of price and ocean transportation factors favoring Brazilian meal.

1872. Newell, C.A.; Hymowitz, T. 1982. Successful wide hybridization between the soybean and a wild perennial relative, *G. tomentella* Hayata. *Crop Science* 22(5):1062-65. Sept/Oct. [22 ref]

• ***Summary:*** "Hybrids between the soybean *[Glycine max* (L.) Merr.] and a wild perennial relative, *G. tomentella* Hayata, were obtained for the first time through in vitro ovule culture. The F-1 plants were vegetatively vigorous and resembled the wild male parent morphologically. The chromosome numbers were consistent with a hybrid origin. The plants flowered profusely but were sterile." The use of wild perennial *Glycine* species might become feasible for broadening the germplasm base of the soybean.

"The genus *Glycine* Willd. as currently delimited is divided into two subgenera, *Glycine* and *Soja* (Moench) F.J. Herm." Within the subgenus *Glycine,* five species are found only in Australia: *G. canescens, G. clandestina, G. falcata, G. latifolia,* and *G. latrobeana. G. tabacina* is found in Australia, South China, Taiwan, the Ryukyu Islands, Mariana Islands, and other South Pacific Islands. *G. tomentella* is found in Australia, South China, Taiwan, Philippines, and Papua New Guinea.

Note: This is the earliest document seen (May 2001) describing wide hybridization and the successful transfer of genes from one species of *Glycine* to another, i.e., between the cultivated soybean *(Glycine max)* and its wild perennial relative. Address: Dep. of Agronomy, Univ. of Illinois, Urbana.

1873. Pulver, E.L.; Brockman, F.; Wien, H.C. 1982. Nodulation of soybean cultivars with *Rhizobium* spp. and their response to inoculation with *R. japonicum. Crop Science* 22(5):1065-70. Sept/Oct. [17 ref]

• ***Summary:*** "The effect of inoculation with *Rhizobium japonicum* on nodulation, plant growth, and yield of various soybean cultivars was studied in Nigeria and Tanzania. Experiments were conducted on soils on which soybeans had not previously been grown. Local cultivars from Nigeria and Indonesia nodulated with indigenous *Rhizobium* species at two sites in Nigeria. Inoculation of the local cultivars with several strains of *R. japonicum* occasionally increased nodule mass, but seldom increased plant growth or yield. In contrast, U.S. bred cultivars nodulated poorly without inoculation. However large increases in growth and yield were obtained when the U.S. cultivars were inoculated.

"The local cultivars have low yield potentials due to poor agronomic characters. In contrast the cultivars of U.S. origin are agronomically superior but require inoculation with *R. japonicum* to realize their yield potential. A breeding program based upon transferring the promiscuous character of some local cultivars to improved U.S. material could produce varieties that do not require inoculation with *R. japonicum* and still produce high yield." Address: Grain Legume Improvement Program, IITA, Ibadan, Nigeria.

1874. Claiborne, Craig. 1982. Q&A. *New York Times.* Dec. 15. p. C16.

• ***Summary:*** "Q. I am curious to know the exact origin of the word catchup, which is sometimes spelled ketchup, and sometimes catsup. Which spelling do you prefer, and can you tell me the origin?

A. *The New York Times* prefers to spell it ketchup, but the other two spellings are generally accepted. The name is ascribed to various origins by various authors.

"Theodora FitzGibbon in her book 'The Food of the Western World' (Times Books) states that the word may come from the Chinese koe-chiap or ke-tsiap 'which means the brine of pickled fish.'

'The Cook's Encyclopedia,' by the late Tom Stobart (Harper & Row, 1980) states that the word came into English 'from the Orient, perhaps from the Malay or Chinese.'

Stobart also wrote: "You find ketjap benteng or ketjap manis in Indonesian recipes and that is a form of sweet soy sauce."

"'Cookbooks of the last century about with recipes–oyster ketchup (oysters with white wine, brandy, sherry,

shallots and spices), mussel ketchup (mussels and cider), pontac or pontack ketchup (elderberries), Windermere ketchup (mushrooms and horseradish), wolfram ketchup (beer, anchovies and mushrooms).'"

"There are also ketchups made with walnuts, cucumbers, and many other items that caught some cook's imagination."

Note 1. This is the earliest document seen (Nov. 2009) in which this interesting and important question is asked.

Note 2. The Indonesian word for "soy sauce" is ketjap / kecap–pronounced exactly like the Western word "ketchup." We have much evidence showing that Western word was derived from the Indonesian word, however the Indonesian word may have been derived from a Chinese word–the influence of immigrants to Indonesia from southern China's coastal provinces.

1875. Shurtleff, William; Aoyagi, Akiko. 1982. History of soya in Third World countries to which they have recently been introduced: Latin America, Indian Subcontinent, Africa, and the Middle East. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 5 p. Dec. Unpublished typescript.

• ***Summary:*** A comprehensive history of the subject. Contents: Introduction: Third World countries in which soy is "new." History and potential in "new" Third World countries: When introduced to each region, active history started in 1960 (protein gap) and 1970's: International Soybean Program (INTSOY), American Soybean Association (ASA), high prices, international conferences, call for further research, the potential: population and hunger. Basic approaches to introducing soybeans and soyfoods: Can't introduce like rice or wheat, need utilization training, how to get it, whole dry soybeans in Brazil and India, the traditional trickle-down approach (Japan–all village centered, Korea, Indonesia), the national integrated approach (examples of it–Sri Lanka, basic components: Cooperative funding, training center, well educated and inspired teachers, a publication, farm extension workers and farmers, soyfoods extension workers and resident students, soyfoods users–food industry and institutional, the people/villagers), the single enterprise integrated approach (examples of it, Soya Production and Research Association, Uganda, CARE in Costa Rica, teach farmers, guarantee crop, make food, advertise it), the commune village integrated approach (examples–the Farm, teach farmers, establish communal business, all use the food), the free market-government aid/extension/research approach (examples–Egypt, Brazil, oil mills and exports), the soyfoods missionary/mass movement approach or village uplift (examples–Blanca Dominguez, soyfoods movement in America, show others, they teach others, encourage starting of small businesses, broad-based, teach all over via books, programs, later start schools). Soyfoods applications: Oil, flour, textured soy flour (TSF), as is, traditional vs. new countries. Production and marketing approaches: Soybean crushing plant (oil and defatted meal, meal to fortify or TSF), middle level low-cost extrusion or soy dairy, small decentralized village and cottage industries, all traditional countries took this approach. Address: Lafayette, California. Phone: 415-283-2991.

1876. Tsuchiya, Kanji. 1982. Tônyû. Shinban [Soymilk. 2nd ed.]. Tokyo: Shoku no Joho-sha. 223 p. First edition was published in 1980. Illust. 17 cm. [Jap]

• ***Summary:*** Continued. Pages 31-32. In the literature of Japan's Muromachi period it is written that after eating confections *(tenshin* such as okashi, oyatsu) they ate light and simple food *(tanpaku na tabemono).* One of the latter was called *tofu no uwamono,* which means yuba.

A flow diagram (p. 35-36) gives Chinese names of soymilk, yuba, fermented tofu, etc.

Part III (p. 39-64) titled "Soymilk around the world," has chapters on the USA, Korea, Hong Kong, China, Taiwan, Southeast Asia, and Europe. Soymilk in America (p. 47-52) includes a 1975 table showing major manufacturers of soymilk and soy-based infant formula, their location, and the names of their products. Soymilk in Korea (p. 53-54): In 1968 the Keijo Shison Shokuhin Kenkyujo made soymilk using the regular tofu making equipment adjusted to make a product as similar as possible to dairy milk, then bottled it in cider bottles, pasteurized it, and sold it. They made 500 to 800 bottles a day and sold it nationwide. It was brownish in color and tasted like soybean cooking liquid; there was no comparison between that and today's soymilk in quality. The head of this research lab was Dr. Son Zaien, who also ran the children's hospital and was a professor of pediatrics at Seoul Medical University. As a pediatrician his concern was that the soymilk promote the growth and health of children; he was not concerned about its acceptance among adults. The children accepted it within 2-3 days. Later, in May 1982, Tsuchiya visited Korea again. They had developed their own method of making soymilk and the soymilk plant had been expanded. Now they produced 500,000 bottles a day (180 cc each, retort sterilized); they call it Vegemil / Vegemeal. It contains added fat and sugar to make it closer to dairy milk., but the sugar content is 10%, which is sweeter than Japanese soymilk. The plant is built on a lot of 4-5,000 tsubo and has 24 retort sterilizers; each machine has 2,500 bottles capacity. Tôhô Yuryô, as part of a Korean technical joint venture with Kibun in Japan, is going to make 120-130,000 Tetra Brik cartons (each 200 cc). Also other dairy milk makers (Sojû and Sangan) are going to have some sort of equipment to start making soymilk. Also, I head that Tôa Shokuhin (K.K.), a pharmaceutical company, is planning a joint venture with Meiji in Japan to make soymilk.

Also, Lotte Chilsung Beverage Co. is planning to use Marusan's (Japan) technology to make soymilk. They are constructing a plant to start to making soymilk in Feb. 1983.–The population of Korea is about 40 million and the GNP 24,000 million won (unit of currency) a year; it is the largest in Asia. But it is a tough war for market share among these fine companies.

Soymilk in Taiwan (p. 57-61): People who were born in Taiwan [the former Japanese colony of Formosa (1895-1945)] have Japanese food habits and don't like soymilk as much as the Chinese. Also, Taiwanese young people don't like soymilk much. In mainland China people only drink water that has been boiled and cooled–just as they do with tea. The same with soymilk. They boil soymilk in a flat pan *(hira-nabe)* for 20-30 minutes before selling it. The buyers don't buy it without seeing that it has been properly boiled. If you cook soymilk in a flat pan for a long time, you can eliminate much of the beany smell and flavor, the antidigestion substances, and harmful bacteria. They don't care about a little burned flavor, bitterness, or beany flavor. But this is ancient wisdom. There they continue to drink soymilk up to this day and it is still very popular. It is said that the annual sale of soymilk in Taiwan is about 5,000 million yen.

In China, sellers of ice candy (like ice Popsicles) call out loudly *kaishui bingo. Kaishui* means boiled and cooled water. *Bingo* means Popsicle.

In the Philippines, about 10 years ago, the University of the Philippines developed soymilk and a blend of soymilk and coconut milk for American children. It was test marketed among the students and teachers of elementary schools, junior and senior high schools, and universities. It was acceptable only to comparatively well educated people. A 200 ml bottle (about 7 ounces) sold for 15 cents, making it more expensive than most other drinks. The taste was plain but the bean smell was not completely removed. In October 1982 Dr. William G. Padorina and other economically influential people came to Japan at the request of President Ferdinand Marcos and studied Marusan's soymilk plant. They are planning a Food Development Symposium in Feb. 1983 and they would like to have nutritious soy products that contain coconut oil (they account for 70% of the world's production). They have asked Marusan to cooperate in the effort.

In Denmark, a company named Starna [Nutana?] makes various soyfoods such as textured soy flour *(daizu nikku),* defatted soymilk, and soymilk. They are selling these products in Denmark and neighboring countries. *The Book of Tofu* by Shurtleff and Aoyagi is mentioned on pages 46 and 117.

Okazaki Marusan makes a soy yogurt named *Tôgurt / Tôguruto* in Japanese. The character *tô,* which means bean, is also the first character in the word *tôfu* (p. 71). Address: Technical consultant, Okazaki Marusan, Japan.

1877. Abdul Kirom, Moh. Nainy; Kresnaningsih, -; Djauhari, Aman. 1982. Usaha tani kedelai Kabupaten Kuningan [Soybean farming in Kuningan district]. Bogor, Indonesia: Balai Penelitian Tanaman Pangan. 46 p. [Ind]*
Address: Indonesia.

1878. Balai Penelitian dan Pengembangan Industri Surabaya (Office of Industrial Research and Development in Surabaya). 1982. Pemgaruh berbagai pembungkus terhadap pertumbuhan jamur pada tempe kedelai [Effects of various wrappers on the growth of fungi in soy tempeh]. Surabaya: BPPIS. [Ind]*
Address: Surabaya, Indonesia.

1879. FAO. 1982. Soybean production development in Vietnam. Rome, Italy: Food and Agricultural Organization of the United Nations. *

1880. Kirom, M.; Abdul, Nainy; Kresnaningsih, -; Djauhari, Aman. 1982. Usahatani kedelai Kabupaten Kuningan [Soybean farming in Kuningan regency]. Bogor, Indonesia: Kelompok Peneliti Agro Ekonomi, Balittan Bogor (Bogor Research Institute for Food Crops). 64 p. [Ind]*
Address: Indonesia.

1881. Lie Goan Hong. 1982. Peranan makanan fermentasi tradisional dalam usaha memperbaiki gizi masyarakat [The role of traditional fermented foods in efforts to improve community nutrition]. *Kesehatan Masyarakat (Community Health)* 11(27):10-14. [Ind]*

1882. Mahmud, Mien K.; Affandi, Erwin. 1982. Pengujian aktifitas antibakterial pada tempe terhadap bakteri penyebab diare [Tests of the antibacterial activity of tempeh against bacteria causing diarrhea]. Bogor: Pusat Penelitian dan Pengembangan Gizi. 12 p. Research report. [Ind]*
Address: Nutrition Research and Development Center, Bogor, Indonesia.

1883. Mangkuwidjojo, Soesanto; et al. 1982. Pengaruh tempe dalam ransum makanan terhadap kadar kholesterol dalam serum darah tikus [The effect of tempeh in food rations on the blood cholesterol level in mice]. Yogyakarta: Fakultas Kedokteran Hewan (Veterinary College), Universitas Gadjah Mada. 14 p. Research report. [Ind]
Address: Yogyakarta, Indonesia.

1884. Purnomowati, -; Sulistyani, -. 1982. Cendawan yang terdapat pada tempe gembus di daerah Purbalingga [Fungi that are found on okara tempeh in the regions of Purbalingga, Klampok, and Banjarnegara (Indonesia)]. Purwokerto: Fakultas Biologi Universitas Jenderal Sudirman. 14 p. Research report. [Ind]*

Address: Purwokerto, Indonesia.

1885. Song, Puju; Wishnok, J.S.; Tannenbaum, S.R. 1982. [Determination of volatile nitrosamines in soy sauce]. *Zhonghua Yufangyixue Zazhi (Chung-hua Yu Fang I Hsueh Tsa Chih; Chinese J. of Preventive Medicine)* 16(3):147-49. (Chem. Abst. 97:108644e). [Chi]*

• ***Summary:*** Nine commercial soy sauces, purchased at U.S. retail stores, and including representative samples from Hong Kong, China, Thailand, Japan, and Korea, were examined for the possible presence of volatile N-nitroso compounds. All samples contained substances which gave positive responses on a nitrosamine-selective detector (Thermal Energy Analyzer; TEA). These signals, in addition, disappeared or were reduced following ultraviolet irradiation; this behavior is characteristic of nitrosamines. Two of the TEA-positive substances had gas chromatogram retention times and gas-chromatogram-mass spectrometer behavior suggestive of *N-nitrosodimethylamine* and *N-nitrosomorpholine,* respectively. Address: Beijing Medical College, Beijing, China.

1886. **Product Name:** Soy Sauce.
**Manufacturer's Name:** Thai Theparos Factory R.O.P.
**Manufacturer's Address:** 206 M006, Taiban Rd., Samutpragarn, Thailand.
**Date of Introduction:** 1982.
**New Product–Documentation:** Soya Bluebook. 1982. p. 76.

1887. **Product Name:** Jack 'n Jill Soybean Milk [Regular, or Almond].
**Manufacturer's Name:** Universal Robina Corporation (CFC).
**Manufacturer's Address:** E. Rodriguez Ave., Bagong Ilog Pasig, Metro Manila, Philippines.
**Date of Introduction:** 1982.
**Ingredients:** Extracts from soybean, milk solids, cane sugar, vegetable fat, approved emulsifier & stabilizer, and flavour. Enriched with vitamins A, B-1, B-2, B-6, C, D, and Niacin.
**New Product–Documentation:** Soya Bluebook. 1982. p. 63. Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 107. Soya Bluebook. 1986. p. 104. Color photo says "Manufactured for HK Peggy Foods Co. Ltd. by CFC Corporation, Philippines." Anders Lindner writes, "Made by Peggy Foods Philippines for sale in Hong Kong." Photocopy of Label sent by Anders Lindner. 1989. Illustration on the front panel shows a single almond. "Almond flavour soybean milk." Product name and ingredients also written in Chinese.

1888. **Product Name:** Lecithin.
**Manufacturer's Name:** Universal Robina Corporation (CFC).
**Manufacturer's Address:** E. Rodrigues Ave., Bagong Ilog, Pasign, Metro Manila, Philippines.
**Date of Introduction:** 1982.
**New Product–Documentation:** Soya Bluebook. 1982. p. 59.

1889. **Product Name:** Yeo's Soy Sauce.
**Manufacturer's Name:** Yeo Hiap Seng (Malaysia) Berhad. Affiliate of Yeo Hiap Seng, Petaling Jaya.
**Manufacturer's Address:** 7 Jalan Tandang, P.O. Box 229, Petaling Jaya, Selangor, Malaysia.
**Date of Introduction:** 1982.
**New Product–Documentation:** Soya Bluebook. 1982. p. 76; 1986. p. 105.

1890. Badruddoza, Kazi M. 1982. Bibliography of socio-economic studies on CGPRT crops including nutrition and utilization aspects in selected ESCAP countries. 2 vols. Bangkok, Thailand: ESCAP. *

• ***Summary:*** ESCAP stands for "Economic and Social Commission for Asia and the Pacific." CGPRT stands for "Coarse Grains, Pulses, Roots and Tuber." Address: Thailand.

1891. Baharsjah, J.S. 1982. Report on the status of grain legumes production in Indonesia. In: Grain Legumes Production in Asia. Tokyo: Asian Productivity Organization. 550 p. See p. 357-84. *

1892. Ballon, F.B. 1982. Report on the status of grain legumes production in Philippines. In: Grain Legumes Production in Asia. Tokyo: Asian Productivity Organization. 550 p. See p. 491-518. *
Address: Bureau of Plant Industry, Manila, Philippines.

1893. Beets, Willem C. 1982. Multiple cropping and tropical farming systems. Boulder, Colorado: Westview Press. 156 p. [143 ref]

• ***Summary:*** Soya beans are discussed on p. 104-06. The multiple cropping index (MCI) is a measure of land-use intensity which is calculated by dividing total crop area by total cultivated land area, and multiplying by 100. The higher the MCI, the more crops are planted and harvested from the same piece of land during one year. This implies that both land and labor are intensively utilized.

Table 8.1 (p. 105) shows "Grain yield of maize and soya beans grown together at different populations and spatial arrangements in monocultures." Fig. 8.3 (p. 106) graphs the "Relation between maize and soya beans in seven multiple cropping systems." Address: The Asian Development Bank, Manila.

1894. Deschates, S. 1982. Economic aspects of grain legumes production and marketing. In: Grain Legumes Production in Asia. Tokyo: Asian Productivity Organization. 550 p. See p. 261-71. *

1895. Grain legumes production in Asia. 1982. Tokyo: Asian Productivity Organization. 550 p. [10+ ref] Address: Tokyo, Japan.

1896. Hedger, J.N. 1982. Production of tempe, an Indonesian fermented food. In: S.B. Primrose and A.C. Wardlaw, eds. 1982. Sourcebook of Experiments for the Teaching of Microbiology. New York and London: Academic Press. xvii + 766 p. See p. 597-602. 25 cm. [4 ref]

• ***Summary:*** In part 8 of this book, titled "Micro-organism Meets Plant," this chapter describes how to make tempeh (using 500 gm soybeans) and tempeh starter as an educational project for college undergraduates. Address: Dep. of Botany and Microbiology, University College of Wales, Aberystwyth, Dyfed, Wales.

1897. Herarti, Rina. 1982. Tinjauan pemanfaatan jamur sebagai sumber zat gizi [Survey on using fungi as a source of nutrients]. Thesis (Skripsi), Akademi Gizi, Jakarta. [Ind]* Address: Jakarta, Indonesia.

1898. Ismariasi, K. 1982. Aspek gizi tempe dan perubahan nitrogen terlarut pada tepung tempe [Nutritional aspects of tempeh and nitrogen solubility changes in tempeh flour]. Thesis (Skripsi), Fakultas Teknologi Pertanian Universitas Gadjah Mada, Yogyakarta, Indonesia. 39 p. [Ind]* Address: Yogyakarta, Indonesia.

1899. Kheiri, M.S.A. 1982. A survey of Indian and Pakistani vanaspati products. Kuala Lumpur, Malaysia: Palm Oil Research Institute of Malaysia. ii + 35 p. Illust. (some color). 25 cm. * Address: Kuala Lumpur, Malaysia.

1900. Ko Swan Djien. 1982. Indigenous fermented foods. *Economic Microbiology* 7:15-38. A.H. Rose, ed. Fermented Foods. [67 ref]

• ***Summary:*** Contents: 1. Introduction. 2. Foods fermented by moulds: Roles of the moulds. 3. Foods fermented by bacteria: Fermented vegetable products, fermented fish products, fermented seeds (natto, thua-nao, dagé), fermented starch-rich raw materials (fermented maize products, fermented rice products, fermented cassava), fermented plant juice.

4. Foods fermented by a mixture of moulds and yeasts: Ragi, micro-organisms, fermented starch-rich raw materials.

5. Foods firstly fermented by moulds [as in making koji], followed by a fermentation with a mixture of bacteria and yeasts (the salt-tolerant yeasts are species of *Saccharomyces* and *Torulopsis;* the bacteria are species of *Pediococcus* and *Streptococcus):* Tane koji, soy sauce, other fermented soybean products (tauco {porridge or dry consistency}, miso, hamanatto {which is soft and his a high moisture content}, tou-shih {which has a much lower water content than hamanatto and is therefore not so soft}. These "fermented soybean products are also used as flavouring agents in cooking as well as table condiments or as a side dish").

6. Specific aspects of fermented foods: Mould species, lactic-acid bacteria, yeasts, salt. 7. Acknowledgement. References.

Concerning soy sauce (p. 30-31): "Japanese *shoyu* is made from equal amounts of soybeans and wheat." The "raw materials are inoculated with tane koji which contains spores of selected strains of *Aspergillus oryzae* and *A. soyae.* In less sophisticated soysauce factories throughout South East Asia, mould species grow spontaneously on the soybeans by natural contamination from the air and from the bamboo trays on which soybeans of former batches were incubated (Bhumiratana et al., 1980). The moulds involved are species of *Aspergillus, Rhizopus,* or *Mucor.* Some Indonesian *kecap* manufacturers inoculated the cooked soybeans with tempe [tempeh] inoculum which contains spores of *Rhizopus oligosporus."*

Tables: (1) Conferences discussing aspects of indigenous fermented foods (1977-1981, chronological). (a) Symposium / Workshop on Indigenous Fermented Foods, Nov. 21-26, 1977, Bangkok, Thailand. (b) World Conference on Vegetable Food Proteins, Oct. 29–Nov. 3, 1978, Amsterdam, The Netherlands, (c) Symposium on Fermented Foods, Nov. 22, 1978, London, England. (d) International Symposium on Oriental Fermented Foods, Dec. 10-14, 1979, Taipei, Taiwan. (e) United Nations University Workshop on Research and Development Needs in the Field of Fermented Foods, Dec. 14-15, 1979, Bogor, Indonesia. (f) VIth International Fermentation Symposium, July 20-25, 1980, London, Ontario, Canada. (g) Eighth Conference of Association for Science Cooperation in Asia (ASCA), Feb. 9-15, 1981, Medan, Indonesia.

(2) Origins of various fish sauces. (3) Origins of various fish pastes. (4) Names given in various countries to an inoculum used to manufacture food products. (5) Names given in various countries to fermented glutinous rice *(Oryza sativa glutinosa).* (6) Names given in various countries to rice wine. (7) Names given to soy sauce in different countries *(Chiang-yu* in China, *Kan jang* in Korea, *Kecap* in Indonesia, *Shoyu* in Japan). (8) Soybean foods produced by a two-stage fermentation *(Hamanatto and miso* in Japan, Soy sauce in the Orient, *Taoco* in Indonesia, *Tao-si* in the Philippines, and *Tou-shih* in China). Address: Dep. of Food Science, Agricultural Univ., Wageningen, Netherlands.

1901. Ko Swan Djien. 1982. Safety aspects of food fermentation. In: S. Saono, F.G. Winarno, and D. Karjadi, eds. 1982. Traditional Food Fermentation as Industrial Resources in ASCA Countries. xvii + 259 p. See p. 131-44. Proceedings of a technical seminar, held 9-11 Feb. 1981 at Medan, Indonesia. [44 ref]
• ***Summary:*** Discusses tempe bongkrek, and the inhibition of its toxin production. Address: Dep. of Food Science, Agricultural Univ., Wageningen, The Netherlands.

1902. Lie Goan Hong. 1982. Nutritional aspects of fermented foods in Indonesia: An overview. In: S. Saono, F.G. Winarno, and D. Karjadi, eds. 1982. Traditional Food Fermentation as Industrial Resources in ASCA Countries. xvii + 259 p. See p. 115-30. Proceedings of a technical seminar, held 9-11 Feb. 1981 at Medan, Indonesia. [23 ref]
• ***Summary:*** Discusses the preparation of tempe, oncom, tauco, kecap, tempe bongkrek (an bongkrek poisoning), tempe gembus (okara tempeh), oncom ampas tahu (okara onchom), soysauce (kecap), and fermented fish products. Tempeh is a good source of vitamin B-12 and of certain antibacterial agents. Certain minor legumes should also be used in preparing these traditional foods.

Table I shows the most important traditional fermented foods in Indonesia, with the name and type of product, organism used, substrate, nature of product (sold, liquid), and area of production and consumption. Address: Nutrition Unit Diponegoro, National Inst. for Health Research and Development, Ministry of Health, Jakarta, Indonesia.

1903. Reed, Gerald. ed. 1982. Prescott & Dunn's industrial microbiology. 4th ed. Westport, Connecticut: AVI Publishing Co. xii + 884 p. Illust. Index. 23 cm.
• ***Summary:*** Chapter 12 (p. 492-538; 129 refs.), by H.L. Wang and C.W. Hesseltine, is titled "Oriental Fermented Foods." It discusses: Soy sauce, miso, tempeh, ontjom, hamanatto (known as tou-shih in China, tao-si in the Philippines, and tao-tjo in the East Indies [No! Tao-tjo is Indonesian-style miso]), sufu (also called Chinese cheese or bean cake), natto, idli, ang-kak, fermented fish products (incl. nuoc-mam), absence of mycotoxin in fermented foods, summary. Address: Vice president, Amber Labs, Milwaukee, Wisconsin.

1904. Saono, Jenny K.D.; Baba, T.; Matsuyama, A. 1982. Problems to be assessed for further development of traditional food fermentation in Indonesia. In: S. Saono, F.G. Winarno, and D. Karjadi, eds. 1982. Traditional Food Fermentation as Industrial Resources in ASCA Countries. xvii + 259 p. See p. 189-99. Proceedings of a technical seminar, held 9-11 Feb. 1981 at Medan, Indonesia. [6 ref. Eng]
• ***Summary:*** Contents: Introduction. Tape. Brem wine. Brem cake. Palm wine and vinegar. Oncom. Tauco and kecap. Tempe bongkrek (which can cause fatal food poisoning). Concluding remarks.

Unconventional substrates for tempe, oncom, and kecap include winged beans, mungbeans, cowpeas, leucaena beans, faba beans, jack beans, sesban beans, and string beans. Address: Agricultural Products Processing Pilot Plant Project, JICA-FATEMETA, IPB, Bogor, Indonesia.

1905. Saono, S.; Winarno, F.G.; Karjadi, D. eds. 1982. Traditional food fermentation as industrial resources in ASCA countries. Jakarta, Indonesia: Indonesian Institute of Sciences (LIPI). xix + 259 p. Proceedings of a technical seminar, held 9-11 Feb. 1981 at Medan, Indonesia. No index. 28 cm.
• ***Summary:*** ASCA, the Association for Scientific Cooperation in Asia, was established in 1970. Each of the many interesting papers from this symposium that relates to soya is cited separately. Address: Indonesia.

1906. Sarwono, B. 1982. Membuat tempe dan oncom [Preparation of tempeh and onchom]. Jakarta: Penebar Swadaya. 23 p. [Ind]*
Address: Jakarta, Indonesia.

1907. Shanmugasundaram, S. 1982. Role of AVRDC in soybean and mungbean improvement [for the developing tropical countries]. In: Grain Legumes Production in Asia. Tokyo: Asian Productivity Organization. Hong Kong: Nordica International Limited. 550 p. See p. 137-50. [28 ref]
• ***Summary:*** Contents: Introduction. Soybean. Importance of soybean in the Asian region. Important changes in agronomic practices. Breakthroughs in varietal development.

Tables: (1) Soybean area, production, yield, imports and exports for selected Asian countries: Taiwan (ROC; 19,000 ha; 1,644 kg/ha), India, Indonesia (755,000 ha; 795 kg/ha), Iran (70,000 ha; 150,000 metric tons; 2,143 kg/ha), Japan (100,000 ha; 2,000 kg/ha), Korea (Rep. of = South; 260,000; 1,350 kg/ha), Nepal (19,000; 650 kg/ha), Philippines, Sri Lanka, Thailand (160,000 ha; 783 kg/ha), China (PRC; 14,430,000 ha; 925 kg/ha) [1979 & 1980]. (2) Yield response of post-rice soybean crop to irrigation and tillage. (3) Effects of different soybean sowing methods on plant stand and yield. (4) Soybean responses to *Rhizobium japonicum* inoculum. (5) Effect of fungicide seed treatment on soybean plant stand when grown in rice stubble culture with excessive soil moisture after sowing. (6) Soybean germplasm collections available in Asian countries. (7) Soybean varieties and their characteristics identified as moderately resistant to soybean rust. (8) Soybean varieties immune to soybean mosaic virus. (9) Soybean varieties

susceptible to soybean mosaic virus but are symptomless. (10) Wild soybean, (G. soya Sieb and Zucc.) accessions least affected by beanflies, *(Melanagromyza sojae* and *Ophiomyia centrocematis)* at AVRDC. (11) Soybean varieties less affected by pod borer, *Etiella zinckenella* at AVRDC. (12) Major soybean varieties grown by farmers in different countries until 1972. (13) Major soybean varieties developed after 1972 and grown by farmers until 1980. (14) Performance of AVRDC selection compared to local cultivars in Indonesia. (15) Yield of six soybean cultivars in four locations during summer in a district trial experiment. Address: AVRDC, Shanhua, Taiwan.

1908. Sihombing, G. Nainggolan. 1982. Malpractice of colouring soy tempe with non-edible metanil yellow. In: S. Saono, F.G. Winarno, and D. Karjadi, eds. 1982. Traditional Food Fermentation as Industrial Resources in ASCA Countries. xvii + 259 p. See p. 227-29. Proceedings of a technical seminar, held 9-11 Feb. 1981 at Medan, Indonesia. [3 ref]

• ***Summary:*** "The Indonesians in general like to have their foods coloured. For that purpose they usually utilize natural colouring agents. At present synthetic colouring agents, due to their convenience in use and wide availability in the markets, have also found wide application. Not all of these synthetic colouring agents are suitable for colouring foods and drinks, a fact that the public in general is not aware of.

"A number of soy Tempe sold in some Jakarta markets are coloured yellow with a certain colouring agent. The reasons for this practice are not clearly known, but is probably to improve the appearance and the shelf life (as claimed by some Tempe producers) of the product. It is suspected that the colouring agent used for this purpose is one of the non-edible synthetic ones which were reported to be used for colouring snacks and drinks. To verify if this is in fact the case, the present investigation was carried out." Address: Nutrition Unit Diponegoro, National Inst. for Health Research and Development, Ministry of Health, Jakarta, Indonesia.

1909. Sriplung, S. 1982. Government participation and support in grain legumes production. In: Grain Legumes Production in Asia. Tokyo: Asian Productivity Organization. i + 550 p. See p. 273-80. *

1910. Steinkraus, Keith H. 1982. Traditional food fermentations as industrial resources. In: S. Saono, F.G. Winarno, and D. Karjadi, eds. 1982. Traditional Food Fermentation as Industrial Resources in ASCA Countries. xvii + 259 p. See p. 3-16. Proceedings of a technical seminar, held 9-11 Feb. 1981 at Medan, Indonesia. [30 ref]

• ***Summary:*** Contents: Introduction. Production of meat-like flavours from vegetable proteins. Soysauce (Japanese Shoyu) and miso fermentation. Fish/shrimp sauces and pastes. The koji principle. Meat substitutes (analogues). Indonesian tempe kedele: Traditional tempe fermentation, industrial production of tempe. A process for raising the protein content of high starch substrate. Leavened bread-like foods without the use of wheat or rye. Coconut protein as an industrial resource. Summary. Address: Prof. of Microbiology, Inst. of Food Science, Cornell Univ., Geneva, New York 14456.

1911. STS–Soya Technology Systems Ltd. 1982. Soymilk. 11 Dhoby Ghaut #11-06, Cathay Building, Singapore 0922. 31 p. Illust. 21 cm. 2nd ed. 1984. [10 ref]

• ***Summary:*** Contents: Soybeans, a few basic facts. Soybeans, a historical background. Soymilk. Soymilk Flavor. The word soy. Principles of soymilk production. Dairylike soymilk. Basic soymilk production methods. Soymilk nutritional aspects. References. On the white cover is the green STS logo with a gold soybean in the lower right corner.

Note: This is the earliest document seen (Aug. 2002) concerning Soya Technology Systems (STS). Address: Singapore.

1912. STS–Soya Technology Systems Ltd. 1982. Dounai [Soymilk]. 11 Dhoby Ghaut #11-06, Cathay Building, Singapore 0922. 30 p. 21 cm. [Chi]

• ***Summary:*** A Chinese-language translation of the English-language booklet having this same title also published in 1982. Address: Singapore.

1913. STS–Soya Technology Systems Ltd. 1982. Dounai [Soymilk]. 11 Dhoby Ghaut #12-05, Cathay Building, Singapore 0922. 29 p. Illust. 21 cm. [10 ref. Eng; chi]

• ***Summary:*** Contents: Soybeans, a few basic facts. Soybeans, a historical background. Soymilk. Soymilk Flavor. The word soy. Principles of soymilk production. Dairylike soymilk. Basic soymilk production methods. Soymilk nutritional aspects. References.

Note: This is the earliest Chinese-language document seen (Nov. 2003) that uses the term "dounai" ("bean milk") to refer to soymilk. The word is rarely used in Chinese. Address: Singapore.

1914. Tjahjadi, -. 1982. Usar, populasi mikrobia dan peranannya pada pembutan tempe [Usar (tempeh inoculum), its microbial population and role in tempeh processing]. Thesis (Skripsi), Fakultas Pertanian Universitas Gadjah Mada, Yogyakarta, Indonesia. 29 p. [Ind]* Address: Yogyakarta, Indonesia.

1915. Virakul, P. 1982. Present situation and problems. In: Grain Legumes Production in Asia. Tokyo: Asian Productivity Organization. Hong Kong: Nordica International Limited. 550 p. See p. 213-46. *

1916. Winarno, F.G. 1982. The nutritional potential of fermented foods in Indonesia. In: S. Saono, F.G. Winarno, and D. Karjadi, eds. 1982. Traditional Food Fermentation as Industrial Resources in ASCA Countries. xvii + 259 p. See p. 31-40. Proceedings of a technical seminar, held 9-11 Feb. 1981 at Medan, Indonesia. [5 ref]

• ***Summary:*** Discusses tempe, tempe fish rice (TFR), oncom (onchom), tempe bongkrek (from coconut presscake), tempeh gembus (from okara), and tauco. Indonesian tempeh may contain 30 nanograms of vitamin B-12 per gm of tempe. If average daily consumption were 60 gm per person, tempeh would provide 60% of the daily requirement of B-12. In 1978, estimated annual tempe production in Indonesia was about 75,600 tons.

"Tauco is a very popular fermented food in Indonesia particularly for people who live in West Java. So far Tauco is utilized mainly as a seasoning and is used in vegetable soups, fish and meat, to enhance their flavour...

"A study on the development of a 'New Tauco Product' is now being conducted at the Food Technology Development Centre, Bogor, to make Tauco a mass consumption product, by experimenting with different soup recipes to meet the Indonesian taste, both in the urban and rural population." Address: Food Technology Development Centre, FATEMETA-IPB, Bogor, Indonesia.

1917. Yokotsuka, Tamotsu. 1982. Industrial application of proteinous fermented foods. In: S. Saono, F.G. Winarno, and D. Karjadi, eds. 1982. Traditional Food Fermentation as Industrial Resources in ASCA Countries. xvii + 259 p. See p. 145-80. Proceedings of a technical seminar, held 9-11 Feb. 1981 at Medan, Indonesia. [130 ref]

• ***Summary:*** Contents: Introduction. Japanese shoyu: Koikuchi, usukuchi, tamari, shiro, saishikomi, fish-soy, JAS grades. The soysauce produced in other Oriental countries (Korea, Taiwan, Singapore, southern China; Inyu, tamari-style). Miso. Manufacture: Koikuchi shoyu (treatment of raw materials, koji making, mash making and aging, pressing of the mash, refining), tamari shoyu, miso. Some recent research and technological progress in shoyu and miso manufacturing: Whole and defatted soybeans as raw materials, treatment of raw materials, koji molds, koji making, control of mash, refining (pressing of the mash, pasteurization), product (colour, flavour, flavour components).

Tables: (1) Annual production of 5 different kinds of shoyu in Japan, and total, 1979. (2) Typical composition of 6 different kinds of shoyu (analyzed by Kikkoman Shoyu Co., Ltd., 1978). For each gives: Be (Baume), NaCl, total nitrogen, formol nitrogen, reducing sugars, alcohol %, and pH. (3) Composition of 7 types of typical Japanese miso (Ebine, 1980). (4) NK cooking method of soybeans as compared to the conventional method (Tateno and Umeda, 1955). (5) Chemical analyses of shoyu fermented from soybeans denatured by methanol and by conventional cooking (Yamaguchi, 1954). (6) Analysis of liquid part of shoyu mash after 40 days prepared from defatted soybean meal denatured by ethanol, isopropanol, or NK cooking (Fukushima and Mogi, 1955, 1957). (7) Effect of cooking conditions of soybeans on the enzymatic digestibility of protein (Yokotsuka et al., 1966). (8) Cooling speed and digestibility of protein. (9) Fraction of proteases produced by *Aspergillus sojae* through Sephadex G-100 (Nakadai, 1977). (10) Changes of viable counts of yeast in shoyu mash (Mogi Keitaro et al., 1968).

Figures: (1) Flow sheet–Koikuchi shoyu fermentation. (2) Flow sheet–Miso fermentation. (3) Cross-sectional illustration–Continuous soybean cooker: Screw type and net conveyor type. (4) Temperature change of materials during koji cultivation by the conventional method using wooden trays (Shibuya, 1969). (5) Koji cultivation at 25°C (Haga et al., 1967). (6) Preferable temperature change of the materials during 3-day koji cultivation (Haga et al., 1967). (7) Temperature change of the materials during mechanical koji cultivation with a through-flow system of aeration during 3 days (Shibuya, 1969). (8) Temperature change of the materials during mechanical koji cultivation with a through-flow system of aeration during 4 days (Shibuya, 1969). (9) Koji culturing machines with a through-flow system of aeration: Rectangular type, circular type (batch), circular type (continuous). Address: Kikkoman Corp., Noda-shi, Chiba-ken, Japan.

1918. **Product Name:** Diet Tofu.
**Manufacturer's Name:** Lucky Bean Cake.
**Manufacturer's Address:** 1060 W. 39th St., Norfolk, VA 23508. Phone: 804-489-1493.
**Date of Introduction:** 1982?
**Ingredients:** Organically grown soybean, purified water, calcium sulphate.
**Wt/Vol., Packaging, Price:** 16 oz packed in water in molded plastic tray with heat-sealed, peel-off plastic film lid.
**How Stored:** Refrigerated.
**New Product–Documentation:** Label (undated) from about 1982 sent by Bruce Rose of Rosewood Products. 2000. Oct. 15. Red, black, and white on yellow, printed on clear film. Note: The company name is not clear. Contains four serving suggestions.

1919. Miyashita, Masa. 1983. Re: Soy sauce in Europe. Letter to William Shurtleff at Soyfoods Center, Feb. 21–in reply to inquiry. 2 p. [Eng]

• ***Summary:*** There are presently no manufacturers of fermented soy sauce in Europe. The following is an estimate of the amounts and types of soy sauce are consumed in Europe: Japanese fermented 1,800,000 liters; Chinese

fermented 1,500,000 to 2,000,000 liters. Indonesian style 1,000,000 to 1,500,000. Chemically made (HVP) or mixed 600,000 liters.

Per capita consumption of all types is about 17 ml/year, and about 5 ml/year for Japanese-style soy sauce. Both figures are far below their corresponding U.S. figures. The main markets are the UK and the Netherlands. Kikkoman's share of the Japanese soy sauce market in Europe is about 70%. Kikkoman's sales in terms of volume are growing at about 6% a year. Kikkoman has no immediate plans to build a shoyu manufacturing plant in Europe. The main emphasis now is on broadly promoting interest in Japanese culture, and more narrowly on Japanese food culture. Address: Kikkoman Trading Europe GmbH, Duisburger Strasse 3, D-4040 Neuss, West Germany. Phone: (02101) 2 20 89.

1920. Shurtleff, William; Aoyagi, Akiko. 1983. History of miso and soybean jiang. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 82 p. Feb. 21. Unpublished typescript.
• ***Summary:*** A comprehensive history of the subject. Contents: Introduction. Etymology. Part I: History of soybean jiang in China. Early Chinese non-soybean jiang. Early Chinese soybean jiang (100 B.C. to 599 A.D.). 600 to 1899. The Twentieth Century. Part II: History of soybean jiang/jang in Korea and Southeast Asia. Dissemination of jiang from China. Korea. Indonesia. Vietnam. Malaysia. Part III: History of miso in Japan. Introduction; origins not clear. Early non-soybean hishios (before 700 A.D.). The Nara period (710-784 A.D.); Ganjin 754. The Heian period (794-1160 A.D.). The Kamakura period (1185-1333). The Muromachi period (1336-1568). The Edo or Tokugawa period (1603-1867). The Meiji and pre-war periods (1867-1940). The postwar period, modern times (1941-1982). Part IV: History of miso in Europe. Early European references (1597-1899). 1900-1949. 1950-1982. Part V: History of miso in the United States and Canada. Early developments (1896-1929). 1930-1959. Growth of interest in miso (1960-1982). Part VI: History of miso in other countries. India. Israel. Latin America. Address: Lafayette, California. Phone: 415-283-2991.

1921. Wiedermann, L.H. 1983. Changes in commercial fat and oil products by the year 2000. *J. of the American Oil Chemists' Society* 60(2):400A-404A. Feb. [12 ref]
• ***Summary:*** A photo shows Lars Wiedermann. Address: American Soybean Assoc., Liat Towers, Singapore 0923, Singapore.

1922. *Washington Post*.1983. Media heavies ante up at the Brady brunch: Press Corps lets its money do the talking. March 21. p. B1.
• ***Summary:*** Jim and Sarah Brady hosted a lunch at Germaine's restaurant. There was an auction with Art Buchwald as auctioneer. "Brunch was a feast of Southeast Asian dishes such as glazed chicken, fish with black bean and ginger sauce,... four kinds of saté,..."

Note: Brady was a former Assistant to the President and White House Press Secretary under President Ronald Reagan. After nearly being killed and becoming permanently disabled as a result of an assassination attempt on Reagan by John Hinkley, Jr., on 30 March 1981, Brady became an ardent supporter of gun control. The auction was to raise money for a foundation he had established.

1923. Sunset international vegetarian cook book. 1983. Menlo Park, California: Lane Publishing Co. 96 p. April. Illust. 28 cm. Retitled Vegetarian Favorites in 1987.
• ***Summary:*** This book is by the editors of Sunset books and Sunset magazine; the supervising editor is Maureen Williams Zimmerman. A table titled "Choosing nutritiously" (p. 5) shows that soybeans are a good source of thiamin (B-1), niacin, vitamin B-6, folic acid, calcium, and iron. Another table titled "Protein partnerships" (p. 7) states that soybeans and soyfoods (soybean curd/tofu, soy flour, soy milk, and tempeh), like dairy products and eggs, have no limiting amino acid. Soy-related recipes include: Miso grilled mushrooms (p. 14; Japan). Golden tofu cauliflower soup (p. 34; Thailand). Greens & tofu in peanut sauce (p. 48; Thailand). Stir-fried tofu & vegetables (p. 50; Vietnam). Whole wheat & soy pasta (p. 52). Mandarin pancakes with spicy tofu filling (p. 70; China). Address: Menlo Park. Phone: 415-321-3600.

1924. **Product Name:** Soyalite (Premium Soya Cooking Oil).
**Manufacturer's Name:** Unknown.
**Manufacturer's Address:** Singapore?
**Date of Introduction:** 1983. April.
**Wt/Vol., Packaging, Price:** 2 kg bottle.
**New Product–Documentation:** Letter from Sabrine Khoo, Technical Director–Human Nutrition, American Soybean Assoc., Singapore. 1983. Sept. 6. "Soyalite was officially launched in the Singapore market in April 1983. It is now available in many supermarkets and grocery stores. Since then there has been an active campaign for soy oil. Advertisements on T.V. and in newspapers moved the product into the market. Soyalite is sold as a premium cooking oil–comparable to corn oil. The price (S$5.80 per 2 kg bottle) is still cheaper than corn oil. Many housewives now recognize this brand."

1925. Balsley, Betsy. 1983. Barbecue season in upon us–Light a fire under the chef. Easy-fix recipes are increasingly popular. *Los Angeles Times.* May 26. p. N1, N20, N32.
• ***Summary:*** A recipe for Indonesian-style sate calls for "3/4 cup ketjap (sweet Indonesian soy sauce)." The accompanying recipe for Peanut sauce (which is spooned

over the sates) calls for "4 teaspoons ketjap." Address: Times food editor.

1926. Fardiaz, Dedi. 1983. Aspek pengolahan kedelai [Aspects of soybean processing]. Presented at Konsultasi Teknis Pengembangan Industri Pengolahan Jagung, Kedelai dan Ubi kayu (Technical Consultation on Industrial Development of Corn, Soybean, and Cassava Processing). Held 30-31 May 1983 at Kampus Darmaga, Bogor, Indonesia. [Ind]*

1927. IITA. 1983. Soybean improvement at the International Institute of Tropical Agriculture: A position paper. Ibadan, Nigeria: IITA. iii + 26 p. May. 28 cm. [9 ref]
• ***Summary:*** This paper, also titled "IITA's Soybean Improvement Program," was written by E.A. Kueneman, W.R. Root, D. Shannon, and K. Dashiell, although their names do not appear on the title page.

Contents: Introduction. The potential and importance of expanding soybean production in Africa: General comments, country activities. Biological constraints to production and research undertaken to minimize constraints: Seed longevity and establishment, nitrogen fixation in soybeans, soybean agronomy research and soil fertility studies, entomology. Cooperation with national programs.

The current expansion of soybeans in Nigeria has been founded on years of research. In the mid-1960s the Institute for Agricultural Research (IAR) initiated a soybean breeding program and in 1983 released two lines from a cross between Malayan and Clemson Non-shattering. Address: Ibadan, Nigeria.

1928. Iwaki, Mitsuro; Thongmeearkom, Pornpod; Honda, Y.; Deema, N. 1983. Soybean crinkle leaf: A new whitefly-borne disease of soybean. *Plant Disease* 67(5):546-48. May. [9 ref]
• ***Summary:*** Soybean crinkle leaf virus (SCLV), transmitted by the whitefly *(Bemisia tabaci)* in a persistent manner is a new disease reported from Thailand. Address: 1&3. Inst. for Plant Virus Research, Tsukuba Science City, Yatabe, Ibaraki, 305 Japan; 2&4. Div. of Plant Pathology and Microbiology, Dep. of Agriculture, Bangkhen, Bangkok 9, Thailand.

1929. Steinkraus, Keith H.; Cullen, R.E.; Pederson, C.S.; Nellis, L.F.; Gavitt, B.K. eds. 1983. Handbook of indigenous fermented foods. New York, NY: Marcel Dekker. ix + 671 p. May. Illust. Index. 26 cm. Microbiology Series, Vol. 9. [200+ ref]
• ***Summary:*** Contents: Foreword by E.J. Da Silva. Preface. 1. Indonesian tempeh and related fermentations: Protein-rich vegetarian meat substitutes. 2. Indigenous fermented foods involving an acid fermentation: Preserving and enhancing organoleptic and nutritional qualities of fresh foods.

3. Indigenous fermented foods in which ethanol is a major product: Types and nutritional significance of primitive wines and beers and related alcoholic foods.

4. Indigenous fermented amino acid / peptide sauces and pastes with meatlike flavors (p. 433-571): Introduction.

(A) Soy sauces: Japanese shoyu: Koikuchi, usukuchi, and tamari; Chinese chiang-yu, by Yokotsuka (p. 437-51). Taiwanese soy sauce, by Liu (p. 451-56). Malaysian soy sauce: Kicap, by Ong, Mercian, Poesponegoro and Tanuwidja (p. 456-61). Indonesian soy sauce: Kecap, by Saono, Poesponegoro and Tanuwidja (p. 461-65). Korean soy sauce, by Chang (incl. homemade kanjang and meju, p. 465-66). Taiwanese black bean sauce: Inyu, by Jan et al. (p. 466-67). Philippine taosi, by Steinkraus (p. 467).

(B) Fermented soybean pastes: Japanese miso, by Ebine, Shurtleff and Aoyagi (p. 468-79). Indonesian tauco, by Saono et al. and Winarno (p. 479-82). Korean Doenjang and kochujang, by Chang, Shurtleff and Aoyagi (p. 482-87).

(C) Fermented fish-shrimp sauces and pastes (p. 487-526).

(D) Fish-soy sauce and fish-soy paste, by Ismail (p. 526-30).

(E) Miscellaneous Oriental fermentations. Japanese natto (itohiki natto), by Hayashi and Ota (p. 530-45). Japanese Hama-natto (hamanatto) and related products (incl. yukiwari natto, p. 545-47). Chinese red rice: Anka (Ang-kah), by Lin, Su and Wang, Sooksan and Gongsakdi, and Pichyangkura (p. 547-53). Chinese sufu, by Su and L.-P. Lin (incl. nyufu, p. 553-61). Note: Chapter 4 contains about 195 references.

5. Mushrooms: Producing single cell (microbial) protein on ligno-cellulosic or other food and agricultural wastes.

6. General papers related to indigenous fermented foods: Contributions of the western world to knowledge of indigenous fermented foods of the orient, the importance of microbial genetics in indigenous food fermentations, new uses for traditional food fermentations, mycotoxin problems in indigenous fermented foods and new methods for mycotoxin analysis.

Less widely known fermented foods include: Idli, dosa/dosai, dhokla (with soy, 131-35), enjera (162), tef/teff (164), wot (165), hopper (173), kishra (175), lambic (179), ogi (with soy, 189-98), mahewu (203), gari (208), dahi (249-57), srikhand and lassi (256-57), laban rayeb, laban zeer, yogurt (257-59; cultured soy yogurt is mentioned on p. 616), liban, mast, mass, taw (260), tairu (with soy, 260-65), kishk or kushuk (267), Metchnikoff (266), trahanas or tarhanas (271-76), rabdi, jalebi (275), koumiss (276), kefir (277-80).

Alcoholic beverages and foods: Honey wine, mead, metheglin (305), tej (306), sugar cane wines, basi, bubod,

binubudan (307), palm wine or toddy (315-28), pulque (328-37), kaffir (344), tesguino (352), bouza (357), pito (358), busaa (365) sake (373-79), yakju and takju (379), tape = tapeh (381-400), ragi (381), tapuy (400), lao-chao (402), madhu (406), brem (408), tropical vinegar (410-14), nata (414-20), tea fungus (421), nuoc-mam (516-21).

Reviewed in Scientific American (Nov. 1983, p. 37), and in Bio/Technology (1984. p. 364). Address: Inst. of Food Science, Cornell Univ., Geneva, New York.

1930. *Vegetarian Times.* 1983. Would you put a soybean in your tank? May. p. 8.
• ***Summary:*** Volkswagen of Brazil has just completed successful road tests on four 13-ton diesel trucks that ran on 100% soybean oil. The tests showed that soy oil burns cleanly, is as rich in energy as diesel fuel, and gives off only an innocuous smell rather like that of hot oil sizzling in a frying pan. The idea of using vegetable oils as fuel substitutes is not new. Some 5% of auto fuel in the Philippines, for example, comes from coconut oil.

1931. *Soybean Update.* 1983. Demand focus–Where the big bean markets are (Special feature). June 13. p. 3-6.

1932. Wiedermann, Lars H. 1983. The inside story on hydrogenation and *trans* fatty acids (Interview). Conducted by William Shurtleff of Soyfoods Center (in Singapore), June 16.
• ***Summary:*** Fred Kummerow is a real charlatan. Much of his work related to hydrogenation and *trans* fatty acids has been discredited because of sloppy methodology. Lars and Tom Applewhite used to follow him around to most of his lectures, sit in the front row, then ask him questions that revealed his methodological sloppiness. He got very upset. Lars feels that *trans* fatty acids do not represent any threat to human health. Researchers that Lars especially admires in the field of hydrogenation safety are Drs. Applewhite, Perkins, K.K. Carroll, and David Kritchevsky. Address: American Soybean Assoc., Liat Towers, Singapore 0923, Singapore.

1933. **Product Name:** Tofu.
**Manufacturer's Name:** Cherry Food Industry.
**Manufacturer's Address:** 74 Speaker Perez, Quezon City, Philippines. Phone: 613-424.
**Date of Introduction:** 1983. June.
**New Product–Documentation:** Soyfoods Center Computerized Mailing List. 1983. June 20.

1934. **Product Name:** Tofu.
**Manufacturer's Name:** Chinese Tofu.
**Manufacturer's Address:** 25 Mauban St., Caloocan, Metro Manila, Philippines. Phone: 269-761.
**Date of Introduction:** 1983. June.
**New Product–Documentation:** Soyfoods Center Computerized Mailing List. 1983. June 20.

1935. **Product Name:** [Tofu, and Soymilk].
**Manufacturer's Name:** Ets. Co-Lu.
**Manufacturer's Address:** 38 Rue Chateaubriand, 13007 Marseilles, France. Phone: 913-144-14.
**Date of Introduction:** 1983. June.
**New Product–Documentation:** Soyfoods Center Computerized Mailing List. 1983. June 20. Owner: Andrew Moody. Leviton. 1988. Oct. 16. Trip to Europe with American Soybean Assoc. This traditional Vietnamese-run company makes about 700 kg/week of tofu for the local Asian market. Also makes soymilk.

1936. **Product Name:** Tofu.
**Manufacturer's Name:** Feliciano Laiz Tofu.
**Manufacturer's Address:** 1518 Sande St., Tondo, Manila, Philippines. Phone: 269-761.
**Date of Introduction:** 1983. June.
**New Product–Documentation:** Soyfoods Center Computerized Mailing List. 1983. June 20.

1937. *Zenkoku Shokuhin Shinbun (National Food News).* 1983. Shisatsu Haken-in kikoku hôkoku Zennôren Tenpe kenkyû-kai [The Japan Natto Association's Tempeh research group presents its homecoming report after being sent to study tempeh]. No. 456. July 11. p. 6. [Jap]
• ***Summary:*** On 18 June 1983 the group had a regular meeting and listened to the report of the tempeh study group that has just returned from Indonesia. Mr. Ose, the chair, told the members that it is unfortunate that the mass media are doing stories on tempeh before it is firmly established in and adapted to Japanese culture. He asked members of the group to please refrain from publicizing tempeh before it is ready.

1938. *Illinois Agri-News (La Salle, Illinois).* 1983. Soybean shortening fries chicken cheaper. July 15.
• ***Summary:*** Lars Wiedermann is technical director for soybean oil in Southeast Asia for the American Soybean Association. Kentucky Fried Chicken, a major restaurant chain in Malaysia and Singapore, may soon be using shortening made primarily from soybean oil to fry the nine million chickens it sells annually. By using the heavy-duty soy oil frying shortening, instead of the 100% palm oil shortening it now uses, Wiedermann believes the chain could reduce its shortening use by two-thirds and cut shortening costs by at least 55%. Lam Soon, a manufacturer in Kuala Lumpur, is making the shortening and will test it soon.

1939. Hymowitz, Theodore. 1983. Germplasm collection, management, and evaluation: The subgenus *Glycine*.

*INTSOY Series* No. 25. p. 69-70. B.J. Irwin, J.B. Sinclair, and Wang Jin-ling, eds. Soybean Research in China and the United States (College of Agric., Univ. of Illinois at Urbana-Champaign).

• ***Summary:*** "The genus *Glycine* Willd. is composed of two subgenera, *Glycine* and *Soja* (Moench) F.J. Herm. The soybean, *G. max* (L.) Merr., and its wild progenitor *G. soja* Sieb. and Zucc., together make up the subgenus *Soja*. Both species are annual and diploid with 2n=40, and hybridization between them can be readily effected. Together they form the primary gene pool of the cultivated soybean.

"The subgenus *Glycine* comprises seven wild perennial species: *Glycine canescens* F.J. Herm., *G. clandestina* Wendl., *G. falcata* Benth., *G. latifolia* (Benth.) Newell and Hymowitz, and *G. latrobeana* (Meissn.) Benth. are diploids (2n=40) native to Australia; *G. tabacina* (Labill) Benth. is predominantly tetraploid (2n=80) with occasional diploids, and distributed in Australia, Taiwan, and the Ryukyu Islands [Japan], as well as several countries in the South Pacific; and *G. tomentella* Hayata represented by tetraploid (2n=80) forms in China (Taiwan), the south coast of China and northern Philippines, and diploid, tetraploid, and aneuploid (2n=38, 40, 78, 80) forms in Australia. From a taxonomic standpoint the members of the subgenus *Glycine* also are candidates for gene exchange with the soybean, and therefore potentially useful for broadening the germplasm base of the crop.

"Preliminary investigations have shown that the perennial species carry resistance to diseases such as soybean rust, yellow mosaic virus, and powdery mildew. Physiological traits exhibited by perennial material such as drought tolerance, salt tolerance, and day neutrality also may be of potential use." Address: Prof. of Plant Genetics, Univ. of Illinois at Urbana-Champaign.

1940. Jackobs, Joseph A.; Staggs, M.D.; Erickson, D.R. 1983. International soybean variety experiment: Seventh report of results, 1979. *INTSOY Series* No. 24. viii + 211 p. July. (College of Agric., Univ. of Illinois at Urbana-Champaign).

• ***Summary:*** In the ISVEX trials, soybeans were tested in the following countries: Afghanistan, Algeria, Argentina, Bangladesh, Bolivia, Burma, Chile, China (Taiwan, ROC), Colombia, Cuba, Czechoslovakia, Ecuador, Egypt, Ethiopia, Fiji, French Guiana, Gambia, Ghana, Guatemala, Guinea, Iraq, Korea, Malawi, Malaysia, Mexico, Morocco, Nepal, Pakistan, Paraguay, Peru, Philippines, Portugal, Puerto Rico, Rwanda, Somalia, Sri Lanka, Sudan, Syria, Tahiti, Thailand, Turkey, United States, Zaire, Zambia, Zimbabwe.

Note: This document contains the 2nd earliest clear date seen for soybeans in Guinea, and the cultivation of soybeans in Guinea (1979, probably in May). Sixteen varieties were tested at Foulaya. CH-3 gave the highest yield, 2,690 kg/ha. The source of these soybeans was INTSOY (at the University of Illinois, USA) for ISVEX trials. Address: College of Agriculture, Univ. of Illinois, Urbana-Champaign.

1941. Tribelhorn, Ronald E. 1983. University of Colorado LEC program (Interview). *SoyaScan Notes.* Aug. 5. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Among low-cost extrusion cookers, the Insta-Pro is best for texturizing soy; the Brady can't do it, nor can it make full-fat soy flour. The LEC program is still being funded by U.S. AID, so the program can still provide services. However they are doing relatively little product development work. The active program research ended in about 1980 with the publication of LEC-10. This was the last of the ten LEC publications. LEC-7, the proceedings of the Tanzania symposium in Jan. 1979, is the best summary of worldwide work with LECs to date. The LEC program has a newsletter; Ron will send back issues to Soyfoods Center and put us on the mailing list.

LECs are cost effective at outputs of 1 ton/day or less. Wenger extruders and Anderson International machines become cost effective at outputs of more than 1 ton per day. All of the existing plants basically make cereal-soy blends for use as weaning foods or foods for school-age kids. Therefore, government funds support most of the plants.

Of their various programs, by far the most successful was the Sri Lanka program, featuring Thriposha. The Costa Rica program has also been successful and made rapid growth. The Guyana program, in operation since Dec. 1980, is presently very successful; their LECs can't make enough product to fill the demand. They are making it so inexpensively that many people in addition to the target group are also using it. Bolivia represented a combination of private and public funds; Ron does not know if it is still in operation. A program in Ecuador started in the fall of 1982. In Chihuahua, Mexico, the two plants have been very successful. An LEC plant is also in operation in Thailand. Ron's main work now is stabilizing rice bran before oil extraction. Address: Colorado State Univ., Fort Collins, Colorado.

1942. Kanasugi, Goro. 1983. Re: Work with tempeh in Japan. Letter to William Shurtleff at Soyfoods Center, Aug. 23. 2 p. [Jap]

• ***Summary:*** Ose Noboru, head of the Natto Assoc. is very ill so work to introduce tempeh to Japan is not advancing well. In 1981 Teruo Ohta brought tempeh back from Indonesia and introduced it to the Natto Assoc. in May when he lectured about it at Hanamaki hot springs *(onsen)* in Iwate prefecture. In Sept. 1981 he presented another lecture on tempeh to the Association at Yamanashi prefecture. In May 1983 at the Ueno restaurant *(Seiyoken)* in Tokyo the Natto Assoc. decided to pursue tempeh

research and popularization, including recipe testing. Ohta and Kanasugi will be advisors on the project. Mr. Ebara is in charge of tempeh cultures. In June 1983 the Natto Association sent a team of 3 men to Indonesia to study tempeh. Mr. Kanasugi, Mr. Hisao Nagayama (a natto historian), and Mr. Kikuo Chiba spent 5 days in Jakarta, Bogor, and Yogyakarta, looking at tempeh production and visiting KOPTI. The trip was successful and on their return (on June 18) they presented a report. In July the Natto Assoc. founded a research laboratory in Omiya city (Saitama prefecture) and at the end of July it started to produce tempeh spores for members of the Association only, and (perhaps) to introduce tempeh as "tempeh natto" in Japanese confections and as a meat extender. The year 1983 has been proclaimed as the "first year of tempeh in Japan" *(Tenpe Gannen).* Address: Shimo-cho 3-6, Omiya-shi, Saitama-ken 330, Japan. Phone: 048-644-1323.

1943. Claiborne, Craig; Franey, Pierre. 1983. An Indonesian treat [satays]: Food. *New York Times.* Aug. 28. p. SM54, SM64.

• ***Summary:*** Satays are an Indonesian version of shish kebab that does not have alternate layers of vegetables and can be made with almost any meat, poultry, or seafood. Easy to prepare, they are often served with a spicy and sweet peanut sauce.

One ingredient used in preparing satays that can be found relatively easily is "ketjap manis," which "is available in many shops that specialize in Asian foods." It makes a rich addition to the marinades of certain satays.

The recipe given for Beef satay calls for "2 tablespoons soy sauce, preferably ketjap manis (see note)."

"Note: Ketjap manis is a sweet soy sauce widely used in Indonesian cookery." It is available at Oriental and Far Eastern markets, including Southeast Asia Food & Trading Company in Manhattan, New York.

The recipe given for Peanut sauce for satays does not call for the use of any kind of ketjap (soy sauce).

1944. Shurtleff, William. 1983. Report on soyfoods research trip to Hong Kong, China, Singapore, and Japan: May 29 to July 10, 1983 (Log–unpublished). Soyfoods Center, P.O. Box 234, Lafayette, CA 94549 USA. 117 p. Aug. Unpublished log.

• ***Summary:*** Contents: Hong Kong: K.S. Lo and Vitasoy. May 29 (Sunday)–Plane from Hong Kong to Guangzhou City (Canton) in Guangdong (Kwantung) province. China: Guangzhou (May 29-30), Zhengzhou, Beijing, Harbin, Beijing #2 (Scurlock, Chen Xi-Hau, Joe Rakosky, Terrence Foley, local markets, vegetarian deli). Singapore: STS and Anders Lindner, Alan Yeo, American Soybean Association (Don Bushman, Sabrine Lee, Lars Wiederman).

Japan: Seiyu department store, Kibun, ASA Tokyo (Ms. Kojima), Kanji Tsuchiya, Japan Soymilk Assoc., Sano Rinji, Kikori, Prasad and natural foods, Goro Kanasugi and tempeh, Tsuchiya soymilk #1, Kikkoman at Noda (Yokotsuka #1, Mizunuma, Plant #6 modern, Yokotsuka #2, Goyo Gura, Noda Museum, Noda Library, Mr. Ichiyama), Morinaga, Kikkoman Tokyo, Japan Packaged Tofu Assoc., Natto statistics, Asahimatsu, Natto-tempeh meeting, Mr. Katoh, Nakano Masahiro, Mr. Iitsuka of Kikkoman, Daizu Shokuhin Kaihatsu, Tsuchiya #2, Nagayama, soynuts, oil association, kinako, Ishige, Mr. Mori and soy sprouts, Katoh, Arai-san, Kodansha, Nagayama and kinako, Dr. Nakano #2, Arai shoyu, Tsuchiya #3, Tenmi. Address: Lafayette, California.

1945. Fruin, W. Mark; Shurtleff, William. 1983. A soyfoods training center network: Soyfoods technology transfer from the United States and Japan to East, Southeast, and South Asia. Palo Alto, California. 29 p. 28 cm.

• ***Summary:*** Contents: 1. Introduction. 2. Japan: Asia's leading source of soyfoods technology. 3. America: World's leading supplier of soybeans. 4. Soybeans in U.S.-Asian economic and trade relations. 5. The aims of this proposal. 6. Groups interested in expanding food uses of soybeans in Asia. 7. The Sri Lanka success story. 8. United States-Japan soyfoods technology transfer. 9. Project investigators, collaborators, advisors. 10. Conclusion.

Note: This Fulbright grant proposal was submitted on 28 Sept. 1983 to Ms. Jennifer Keefe, Program Officer, Council for International Exchange of Scholars, Eleven Dupont Circle, N.W., Washington, DC 20036. Accompanying it were CVs for Fruin and Shurtleff, plus letters supporting the project from the following collaborators: Kanji Tsuchiya (Japan), Gunnar Lynum (American Soybean Assoc. director for Japan), Tokuji Watanabe (Prof., Food Science Lab., Kyoritsu Women's Univ., Japan), Harold E. Kauffman (INTSOY Director, Urbana, Illinois), Michael A. Phillips (Director, Market Development, ASA, St. Louis, Missouri), and P.S. Bhatnagar (All India Coordinated Research Project on Soybean, G.B. Pant Univ. of Agriculture and Science, Pantnagar, UP, India). Address: 1. Prof., 4060 Amaranta Ave., Palo Alto, California 94306; 2. Director, Soyfoods Center, P.O. Box 234, Lafayette, CA 94549.

1946. Shurtleff, William; Aoyagi, Akiko. 1983. The book of miso. 2nd ed. Berkeley, California: Ten Speed Press. 278 p. Illust. by Akiko Aoyagi Shurtleff. Index. Sept. 28 cm. [223 ref]

• ***Summary:*** Contents: What is miso? Preface to the second edition. Preface to the first edition. Acknowledgments. Part I. Miso: Savory, High Protein Seasoning. 1. Soybeans, protein and world hunger. 2. Miso as a food. 3. The miracle of fermentation. 4. The varieties of miso: Regular Miso: Rice miso (red / aka, light-yellow / shinshu, mellow red / amakuchi akamiso, mellow beige / amakuchi tanshoku,

mellow white / shiro koji, sweet red / edo or edo ama-miso, sweet white / Kyoto shiro miso), barley miso (karakuchi mugi, mellow barley / amakuchi mugi), soybean miso / mamé miso (Hatcho miso, soybean miso / mame miso, tamari miso). Special Miso: Finger lickin' miso / Namemiso (Kinzanji miso, moromi miso, hishio, naméiso, natto miso, goto miso), sweet simmered miso / nerimiso. Modern Miso: Akadashi miso, dehydrated or freeze-dried miso, low-salt / high-protein miso.

Part II. Cooking with Miso (400 recipes). 5. Getting started. 6. Recipes from East and West. Part III. The Preparation of Miso. 7. Making miso at home and in communities. 8. Japanese farmhouse miso. 9. The traditional miso shop. 10. The modern miso factory. Appendixes: A. A history of miso and soybean chiang. B. Other East Asian misos: Chinese chiang, Korean jang and Indonesian Taucho. C. The microbiology and biochemistry of miso fermentation. D. Miso manufacturers in the West. E. People and institutions connected with miso. F. Miso with seafoods, chicken, and meat. G. Measures, weights, and equivalents. H. So you want to study miso in Japan? I. Miso additives. Bibliography [223 references]. Glossary. About the authors (autobiographical). The Soyfoods Center.

In May 1993 a new printing of this book appeared, containing many small changes made by the authors. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549. Phone: 415-283-2991.

1947. Nakano, Masahiro. 1983. Re: Introducing tempeh to Japan. Letter to William Shurtleff at Soyfoods Center, Oct. 1–in reply to inquiry. 2 p. Handwritten. [Jap]
• ***Summary:*** One of Japan's greatest living microbiologists, Dr. Nakano and co-workers introduced tempeh to Japan. They were the first to make it on a small (noncommercial) scale and serve it to others. But they were never interested in popularizing it–then or now. He was a scholar and research microbiologist for a nonprofit organization. He is now retired. "When I was in the Japanese Army in Java, although I was fortunate in having a chance to see and hear things in my field of interest, I did not do actual research. I have a subconscious desire to avoid developing the things I learned there."

The Taiwan Governor-General's Research Institute *(Taiwan Sotokufu Kenkyujo)* was founded in 1909. Dr. Ryoji Nakazawa, the great microbiologist, worked at that lab from 1907 until 1940, when he returned to Japan; he died in 1975 at age 96. For more on tempeh, see Dr. Nakazawa's *Taikan Kinen Ronbun-shu,* his collected papers compiled and published when he retired. Dr. Nakano started to work at this Taiwan lab in 1934. Address: Dr., Kugayama 1-2-7, Suginami-ku, Tokyo 168, Japan. Phone: 03-334-6911.

1948. Chong Liek Kah. 1983. Solid substrate fermentation in Malaysia. In: Proceedings of the Third ASEAN Workshop on Solid Substrate Fermentation. See p. 93-99. Held 3-9 Oct. 1983 at Cebu City, Philippines. [Eng]*
• ***Summary:*** Includes a discussion of tempeh.

1949. IBPGR. 1983. Genetic resources of soyabean. Rome, Italy: International Board for Plant Genetic Resources, Secretariat. 19 p. 30 x 21 cm. Oct. IBPGR Working Group on the Genetic Resources of Glycine Species, held at the International Soybean Program (INTSOY) at the University of Illinois, Urbana, 9-11 Aug. 1982. [2 ref]
• ***Summary:*** This report, distributed free to developing countries but with restricted distribution to developed countries, was written after an ad hoc Working Group on the Genetic Resources of *Glycine* was held. A minimum list of descriptors is included. Address: Crop Genetic Resources Centre, Plant Production & Protection Div., FAO, Via delle Terme di Caracalla, 00100, Italy.

1950. Jutono, -; Wedhastri, Sri. 1983. The potency of usar as inoculum for tempe fermentation from various substrates and admixtures. In: Proceedings of the Third ASEAN Workshop on Solid Substrate Fermentation. See p. 157-72. Held 3-9 Oct. 1983 at Cebu City, Philippines. *
Address: Faculty of Agriculture, Gadjah Mada Univ., Yogyakarta, Indonesia.

1951. Jutono, -. 1983. Solid substrate fermentation in Indonesia. In: Proceedings of the Third ASEAN Workshop on Solid Substrate Fermentation. See p. 81-92. Held 3-9 Oct. 1983 at Cebu City, Philippines.
Address: Faculty of Agriculture, Gadjah Mada Univ., Yogyakarta, Indonesia.

1952. Okada, Noriyuki; Hadioetomo, Ratna Siri; Nikkuni, S.; Katoh, K.; Ohta, T. 1983. Vitamin B-12 content of fermented foods in the tropics. *Shokuhin Sogo Kenkyujo Kenkyu Hokoku (Report of the National Food Research Institute)* No. 43. p. 126-29. Oct. [7 ref. Eng]
• ***Summary:*** Vegetarian foods containing significant amounts of vitamin B-12 per 100 gm according to a biological assay method using *Lactobacillus leichmanii* were: tempeh (Indonesia) 4.6 mcg (micrograms), natto fermented soybeans (actually thua-nao, Thailand) 1.5 mcg, and fermented tofu (Singapore, also called Sufu) 1.1 mcg. Flesh-based foods with a high B-12 content included Ka-pi shrimp paste (Thailand) 5.3 mcg, kung-jom fermented shrimp (Thailand) 2.5 mcg, fish sauce, 3 month fermentation (Thailand) 2.4, and fish sauce (Thailand) 1.3 mcg, and fish sauce (Japan) 1.0 mcg.

Of these foods transported from tropical countries, tempeh was especially interesting because it is made of soybeans and had the highest B-12 content of any food measured. However not all tempeh samples contained such large amounts. "For example, a fresh sample of tempeh

which was transported from Indonesia as rapidly as possible contained a very low amount, 0.7 mcg/100 gm, and tempehs prepared in the laboratory by using the tempeh-making fungus, *Rhizopus oligosporus,* contained only 0.02 to 0.06 mcg/100 gm. However the low vitamin B-12 content in tempeh which was transported from Indonesia increased to a value of 8 mcg/100 gm when the sample was incubated at 30ºC, unlike in the tempeh prepared in the laboratory. It is probable that microorganisms accompanied with tempeh-making fungus were associated with the production of vitamin B-12 in Indonesian tempeh. Further studies will be required to identify the microorganisms capable of producing vitamin B-12, and useful for the fermentation food industry." Address: 1,3-5. National Food Research Inst. (Shokuhin Sogo Kenkyujo), Kannon-dai 2-1-2, Yatabe-machi, Tsukuba-gun, Ibaraki-ken 305, Japan; 2. Bagian Mikrobiologi, Departemen Botani, Fakultas Pertanian, Institut Pertanian Bogor, Jl. Raya Pajajaran, Bogor, Indonesia.

1953. Okada, Noriyuki; Tabei, Hideo; Mori, K.; Katoh, K.; Yanagimoto, M. 1983. Baioassei-hô de kenshutsu sareru nattô no bitamin B-12 chi ni tsuite [On the vitamin B-12 values detected in natto by applying a microbiological assay method]. *Shokuhin Sogo Kenkyujo Kenkyu Hokoku (Report of the National Food Research Institute)* No. 43. p. 121-25. Oct. [12 ref. Jap; eng]
• ***Summary:*** "Natto has long been considered to contain vitamin B-12. The B-12 content of natto determined by a microbiological assay method using *Lactobacillus leichmannii* ranged from 0.01-0.08 micrograms/100 gm. These values are almost the same as those reported by other authors. Although the commercial nattos analysed were not perfectly pure products, the possibility that the B-12-like activities detected in natto were produced by contaminants could be ruled out, since comparable values were found in purely fermented nattos made by using several strains of *Bacillus natto* isolated from commercial samples. However *B. natto* did not produce detectable amounts of B-12 in the liquid medium in which *B. megaterium,* known as a B-12 producer, did. Moreover the response of the natto extract to *L. leichmannii* was different from that of the B-12 standard and that of the 'natto' extract made by using *B. megaterium.* It is probable that the B-12-like activities detected in natto did not correspond to that of B-12." Address: National Food Research Inst. (Shokuhin Sogo Kenkyujo), Kannon-dai 2-1-2, Yatabe-machi, Tsukuba-gun, Ibaraki-ken 305, Japan.

1954. Soriano, Mercedes R.; Navarro, R.S. 1983. Present state of traditional food fermentation technology in the Philippines. In: Proceedings of the Third ASEAN Workshop on Solid Substrate Fermentation. See p. 101-36. Held 3-9 Oct. 1983 at Cebu City, Philippines. *
Address: National Inst. of Science and Nutrition, Manila.

1955. STS–Soya Technology Systems Ltd. 1983. Project proposal for 2000 liters/hour soymilk plant. 11 Dhoby Ghaut #11-06, Cathay Building, Singapore 0922. 24 p. Oct.
• ***Summary:*** Contents: Introduction, investment estimate, design data and technical aspects, technical description, cost/profit calculation, drawings. Address: Singapore.

1956. STS–Soya Technology Systems. 1983. 250 liter/hour Agrolactor (Brochure). 11 Dhoby Ghaut #11-06, Cathay Building, Singapore 0922. 4 p. Also published in Chinese. [Eng; Chi]
• ***Summary:*** Note: This is the earliest document seen (Aug. 2002) concerning Actimonde or the Agrolactor system. Address: Singapore.

1957. Tanuwidjaja, Lindayati; Roestamsjah, -. 1983. Studies on the effect of pressing in tempeh fermentation. Presented at the Third ASEAN Workshop on Solid Substrate Fermentation. Held 3-9 Oct. 1983 at Cebu City, Philippines. *
Address: Bandung, Indonesia.

1958. *Tetra News (Singapore).*1983. The meat of the Orient. Oct. p. 6-7.

1959. Leviton, Richard. 1983. Long summary of trip to Europe sponsored by the American Soybean Association (Interview). *SoyaScan Notes.* Nov. 29. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Discusses: Euvepro in Italy, ASA in Italy, Alpro / Vandemoortele, British Arkady, the confusion of mung beans and soybeans, tofu made from soy protein isolates that doesn't develop a spongy texture when frozen, regulatory restrictions, Bernard Storup, tofu burgers, Prolait, Le Bol en Bois, ASA soybean program in England, desire in Eastern Europe for more meat, the many small private businesses in Hungary, Soyana's excellent products (Daenzer makes 5,000 lb/week of tofu in Switzerland), the Reformhaus chain, Vietnamese tofu shop in Dornach, less refrigeration at the distribution and retail levels in Europe has led to new packaging, soyfoods have started to appear in the big international food trade shows in Europe (e.g. ANUGA). Witte Wonder opened in 1981, now makes 1,000 lb/week of seitan. Cauldron Foods (UK) makes mostly tofu burgers, and has a lot of good technical innovations such as control panels. Cauldron also makes a fermented tofu spread. Dragon & Phoenix (UK) makes several tons of tofu a day. In July Wolfgang Furth-Kuby and Lucas Kelterborn (Germany) published the first issue of a European soyfoods newsletter titled *Rundbrief.* Paul Jones (UK) has 2 plants and makes 5,000 lb/week of tofu. One man from Cauldron Foods was Paul Jones' original partner. Full of Beans also makes miso.

Oct. 28. "I have an all morning meeting at ASA's headquarters in Brussels, Belgium, with Dennis Blankenship, Rita Batens, Roger Leysen, and Michael Martin. It is proposed that I chair the 1984 First European Soyfoods Conference to be held in late September, probably in Amsterdam. ASA agrees to be a sponsor and to help secure another 6 or so sponsors. ASA also agreed to finance the production and mailing of a bi-monthly European Soyfoods Newsletter." Address: Colrain, Massachusetts.

1960. Mahmud, Mien K. 1983. Tempe: makanan tradisional yang menakjubkan [Tempeh: The astonishing traditional food]. Paper presented at Kursus Penyegar Ilmu Gizi dan Kongress Persagi VI (Refresher Course on Nutrition and 6th Persagi Congress). 8 p. Held 17-19 Nov. 1983 at Jakarta, Indonesia. [Ind]*

1961. *Oil Mill Gazetteer.* 1983. Phil-Asia soybean plant fully operational. 88(5):25. Nov.
• ***Summary:*** "The Phil-Asia soybean processing plant in Batangas, Philippines, a port area south of Manila, is now fully operational at the first stage of 600 tons of soybeans per day. Management expects to increase the daily crush to the design capacity of 1,000 tons per day in early 1984. The National Food Authority (NFA) will be tendering for soybeans at regular intervals for this plant which is the Philippines' first operational oilseed crushing facility fully dedicated to soybeans. Philippine imports of soybeans in 1983/84 are forecast at 170,000 tons, most of which will come from the United States, according to a Foreign Agricultural Service, USDA Report."

1962. *Sunset (Menlo Park, California).* 1983. Indonesian tofu? It is versatile, cheese-like *tempeh.* 171:256, 258. Nov.
• ***Summary:*** Following an introduction to and description of tempeh are recipes for Tempeh with peanut sauce, Tempeh wafers, and Tempeh and mushroom pâté, submitted by Travis Burgeson of Berkeley, California [owner of Pacific Tempeh]. Photos show: (1) Tempeh being cubed next to a tempeh package–from Pacific Tempeh. (2) Sauteed vegetables with tempeh served with seasoned bell pepper on lemon.

1963. **Product Name:** [Tofu, Spring Rolls (with Meat, or Vegetables), Tofu Burger, Soya Cakes, Soy Sprouts].
**Foreign Name:** Tofu, Fruehlingsrollen (mit Fleisch oder Gemuese), Tofu Burger, Sojakuchen, Soya Sprouts.
**Manufacturer's Name:** Thieu's Soja Spezialitaet.
**Manufacturer's Address:** Kirchgartenweg 20, CH-4143 Dornach (near Basel), Switzerland. Phone: 06-172-8831.
**Date of Introduction:** 1983. November.
**New Product–Documentation:** Richard Leviton. 1983. Report on trip to Europe with American Soybean Assoc. p. 18. Thieu (or Tieu) The Van is a Vietnamese tofu maker in Dornach near Basel. According to a newspaper report dated 9 Sept. 1983 his was a "boat people" family that came from Saigon in 1979. He makes *Fruehlingsrollen* ("spring rolls" with meat or vegetables), tofu, tofu burgers, *Sojakuchen* [Soya Cakes], and Soya sprouts. Soyfoods Center Computerized Mailing List. 1984. Feb. 7. Thieu's Soja Spezialitate, Kirschgartenweg 20.

Letter (fax) from Verena Krieger. 1990. May 31. This company cannot be located.

1964. Shurtleff, William; Aoyagi, Akiko. 1983. History of soy flour, grits, flakes, and cereal-soy blends. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 128 p. Dec. 24. Unpublished typescript.
• ***Summary:*** A comprehensive history of the subject. Contents: Part I: What are soy flour, grits, flakes, and cereal-soy blends? Introduction: Developed in the West, difference from roasted soy flour. Soy flour. Soy grits and flakes. Cereal-soy blends = soy-fortified blended foods. Etymology and nomenclature: German, French, U.S. English, U.S. whole soy flour, British English. Overview of world soy flour history. Part II: History of soy flour, grits, and cereal-soy blends in Europe and Australia. The early years (1767 to 1899). 1900 to 1919. Between two wars (1920-1939). 1940-1959. 1960 to 1983. Part III: History of soy flour, grits, flakes, and cereal-soy blends in the USA. The early years (1767-1919). 1920 to 1939. The 1940's and World War II. 1960 to 1980's. Food for Peace Program. Low cost extrusion cookers. Soy flour, grits, and flakes in America. Part IV: History of soy flour, grits, and cereal-soy blends in Canada. Part V: History of soy flour, grits and cereal-soy blends in Asia. Introduction. Bangladesh. China. India. Indonesia. Japan. Korea. Philippines. Sri Lanka. Taiwan. Thailand. Vietnam. Part VI: History of soy flour, grits, and cereal-soy blends in Latin America. Introduction. Bolivia. Brazil. Chile. Colombia. Costa Rica. Ecuador. Guatemala. Guyana. Mexico. Paraguay. Peru. Venezuela. Part VII: History of soy flour, grits, and cereal-soy blends in Africa. Introduction. Ethiopia. Ghana. Kenya. Nigeria. Rwanda and Burundi. South Africa. Tanzania. Uganda. Zimbabwe. Part VIII: History of soy flour, grits and cereal-soy blends in the Middle East.

Note: This is the earliest English-language document seen (July 2003) with the term "cereal-soy blends" in the title. Address: Lafayette, California. Phone: 415-283-2991.

1965. Ang, Tien-Sê (Hong, Tiansi). 1983. Doufu kaoyuan [On the origin of tofu]. *Xue Shu Lun Wen Ji / Kertas-Kertas Pengajian Tionghua / Papers on Chinese Studies (University of Malaysia)* No. 2. p. 29-39. Dec. [35 ref. Chi]
• ***Summary:*** Wade-Giles reference: Hung, T'ien-Ssu. 1983. "Tou fu k'ao yüan." This periodical has three titles.

1966. STS–Soya Technology Systems Ltd. 1983. Questionnaire. 11 Dhoby Ghaut #11-06, Cathay Building, Singapore 0922. 8 p. Dec.
• ***Summary:*** Asks potential clients many questions to aid in developing a turnkey soymilk plant to suit their needs. A Chinese edition of this was published in 1987 in Singapore.
Address: Singapore.

1967. Winarno, F.G. 1983. Peranan dan prospek bioteknologi dalam penanganan pasca panen taman pangan [The role and prospects of biotechnology in handling post-harvest food crops]. Paper presented at Upacara Penerimaan Jabatan Guru Besar Bidang Ilmu Teknologi Pangan Institut Pertanian Bogor (Food Technology graduation ceremony, Institute of Agriculture, Bogor). 32 p. Held 20 Dec. 1983 at IPB in Bogor. [Ind]*

1968. Faisal, K.; et al. 1983. Pemasaran kedele di Indonesia [Marketing soybeans in Indonesia]. CAER. Unpublished manuscript. [Ind]*

1969. **Product Name:** Jack 'n Jill Malt Soybean Milk.
**Manufacturer's Name:** H.K. Peggy Foods Co. Ltd. (Importer). Made in the Philippines by CFC Corp.
**Manufacturer's Address:** Hong Kong.
**Date of Introduction:** 1983.
**Wt/Vol., Packaging, Price:** 250 ml Tetra Brik Aseptic carton.
**How Stored:** Shelf stable; refrigerate after opening.
**New Product–Documentation:** Tetra Brik Co. 1983. Brochure. Tetra Brik aseptic 250 ml.

1970. Jackobs, J.A. 1983. Soybean production development in Viet Nam: A consultancy report for FAO. 27 p. Unpublished typescript. *
• ***Summary:*** Includes a 3 page addendum titled "An Assessment of the Potential for Increased Soybean Production in Vietnam."

"The soybean has been grown in Viet Nam at least since 1773 and perhaps for a much longer time. It is an important food crop and more than 30% of the potential consumption in now being produced." Jackobs traveled in Vietnam from 3 July to 14 Aug. 1982 studying soybeans.

1971. KOPTI. 1983. [Indonesian tofu and tempeh calendar (Poster)]. Jl. Falatehan I/6-8, Kebayoran Baru, Jakarta Selatan. 12 p. 33 x 54 cm. Color. Reprinted in Soyfoods Marketing. Lafayette, CA: Soyfoods Center. [Ind]
Address: Jakarta, Indonesia.

1972. Kuswanto, Kapti Rahayu. 1983. Pengalengan tempe kedele sebagai usaha untuk memperpanjang masa simpan [Canning of soy tempeh in an attempt to prolong its durability]. Yogyakarta: Fakultas Teknologi Pertanian Universitas Gadjah Mada. 20 p. Research report. [Ind]*
Address: Yogyakarta, Indonesia.

1973. Leleji, O.; Adedzwa, D.K. 1983. Announcement of the release of two soyabean varieties: Samsoy 1 and Samsoy 2. In: Proceedings of the Third National Meeting of Nigerian Soyabean Scientists. Publication 3. See p. 70-79. *
• ***Summary:*** The lines came from a cross between Malayan and Clemson Non-shattering.

1974. Mahmud, Mien K.; Hermana, -. 1983. Evaluasi klinis formula makanan dengan tempe pada anak penderita diare kronis [Clinical evaluation of a formula containing tempeh on children suffering from chronic diarrhea]. Bogor: Pusat Penelitian dan Pengembangan Gizi (Nutrition Research and Development Center). Research report. [Ind]*
Address: Bogor, Indonesia.

1975. **Product Name:** Dawn Soya Bean Drink.
**Manufacturer's Name:** Malaysia Dairy Industries Private Ltd.
**Manufacturer's Address:** 2, Davidson Road, Singapore 13. Phone: 886421/7.
**Date of Introduction:** 1983.
**New Product–Documentation:** Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 102-03.

Letter from Anders Lindner of STS. 1984. March 9. Dawn is still made by Malaysia Dairy Industries Private Ltd. (Singapore; Thio Kong Poon, Chairman and managing director of both companies) / Malaysia Milk Sdn. Bhd. (Malaysia; Vitagen). Business cards for each are enclosed.

1976. **Product Name:** Marigold Soya Bean Drink.
**Manufacturer's Name:** Malaysia Milk Industries Ltd.
**Manufacturer's Address:** Petaling Jaya, 7 Jalan 19/1, Selangor, Malaysia. Also made in Singapore.
**Date of Introduction:** 1983.
**Wt/Vol., Packaging, Price:** 250 ml Tetra Brik Aseptic carton.
**How Stored:** Shelf stable; refrigerate after opening.
**New Product–Documentation:** Singapore & Malaysia Soymilk Market Study. 1982; Shurtleff & Aoyagi. 1984. Soymilk Industry & market. p. 102-03. STS. 1985. Containers for Soymilk. Shows Tetra Brik carton, green and yellow on white. Boi. 1986. Sunday Times (Singapore). Sept. 7. "Soya Bean Milk Packs More Water than Flavor." Marigold sells for 35 cents per 250 ml. Comments: Contains artificial flavour, sweet, thin, slightly artificial, not tasty.

1977. **Product Name:** [Dawn Soya Bean Drink].
**Foreign Name:** Dawn Minuman Kacang Soya.
**Manufacturer's Name:** Malaysia Milk Sdn. Bhd. (Industries Ltd.).

**Manufacturer's Address:** No. 7, Jalan 19/1, Petaling Jaya, Selangor, Malaysia. Phone: 774388.
**Date of Introduction:** 1983.
**Wt/Vol., Packaging, Price:** Tetra Brik Aseptic carton.
**How Stored:** Shelf stable; refrigerate after opening.
**New Product–Documentation:** Singapore & Malaysia Soymilk Market Study. 1982; Shurtleff & Aoyagi. 1984. Soymilk Industry & Market. p. 102-03.

Letter from Anders Lindner of STS. 1984. March 9. Dawn is still made by Malaysia Dairy Industries Private Ltd. (Singapore; Thio Kong Poon, Chairman and managing director of both companies) / Malaysia Milk Sdn. Bhd. (Malaysia; Vitagen). Business cards for each are enclosed. Color photo of Tetra Brik carton. Yellow, brown, and red on white. Big yellow soybeans.

1978. Mulyati, Yetti; Tanuwidjaja, Lindajati; Roestamsjah, -. 1983. Utilization of mixed substrate in tempeh fermentation. *Mikrobiologi di Indonesia (Microbiology in Indonesia)* p. 431-35. [Eng]*

1979. **Product Name:** Joyce Soya Bean Milk.
**Manufacturer's Name:** Siam Food Products Co. Ltd.
**Manufacturer's Address:** Thailand.
**Date of Introduction:** 1983.
**Wt/Vol., Packaging, Price:** 250 ml Tetra Brik Aseptic carton.
**How Stored:** Shelf stable; refrigerate after opening.
**New Product–Documentation:** Tetra Pak Co. 1983. Brochure. Packaged in Tetra Brik aseptic 250 ml.

1980. Somaatmadja, S.; Siwi, B.H. 1983. Development of grain legumes in Indonesia. Presented at the Consultant Group Meeting for Asian Region Research on Grain Legumes, ICRISAT. *

1981. Soya Technologies Systems (STS. Div. of Danish Turnkey Dairies). 1983. Soymilk seminars in China, and the USSR. Paper presented in these two countries. 31 p. total. Unpublished manuscript. *
• ***Summary:*** The lectures were presented by John Davies and Sven Boejgaard of STS. Address: STS, Singapore.

1982. STS–Soya Technology Systems. 1983. The Golden Bean (Soymilk) (Poster). 11 Dhoby Ghaut #11-06, Cathay Building, Singapore 0922. 1 p. 2 x 3 feet, color. Reprinted in Soyfoods Marketing. Lafayette, CA: Soyfoods Center. Address: Singapore.

1983. Tanuwidjaja, Lindajati. 1983. Pengaruh substrat terhadap daya tahan simpan inokulum tempe [Influence of the substrate on the durability tempeh inoculum]. *Mikrobiologi di Indonesia (Microbiology in Indonesia)* p. 425-28. [Ind]*

1984. Tepora, Ermina V.; Monge, V.S. 1983. Soybean production in selected Mindanao provinces. *Quezon City, Bureau of Agricultural Economics, Economics Research Report* No. 11. 33 p. *

1985. Timotius, K.H. 1983. Perbandingan kualitas tempe yang dibuat dari bebagai macam inokulum [Quality comparison among tempeh made from various inocula]. *Mikrobiologi di Indonesia (Microbiology in Indonesia)* p. 429-30. [Ind]*

1986. **Product Name:** Soya Sauce (in 250 ml Tetra Brik).
**Manufacturer's Name:** Yeo Hiap Seng Ltd.
**Manufacturer's Address:** 950 Dunearn Rd., Singapore.
**Date of Introduction:** 1983.
**Wt/Vol., Packaging, Price:** Tetra Brik aseptic carton.
**How Stored:** Shelf stable.
**New Product–Documentation:** Tetra Pak Corp. 1983. Products brochure. p. 25.

1987. Yoshida, Shuji. 1983. Kabi ga tsukuru tabemono. Indoneshia no hakkô shokuhin [Indonesian mold fermented foods]. *Kikan Minzokugaku (Ethnology Quarterly)* 25:98-107. [Jap]
• ***Summary:*** Contains many photos of tempeh being made commercially and served in Indonesia. Address: Kokuritsu Minzokugaku Hakubutsukan (National Ethnology Museum).

1988. American Soybean Assoc. 1983. Soybean meal potential bait for Southeast Asian fish. *Checkoff Successfile.* Southeast Asia #901. 2 p.
Address: St. Louis, Missouri.

1989. Bastaman, Sjarif. 1983. Mempelajari pengaruh penambahan onggok, ampas tahu, dan parutan pepaya *(Carica papaya L.)* dalam pengolahan tempe [Study of the effect of adding onggok, okara, and shredded papaya in tempeh processing]. Thesis (Skripsi), Fakultas Teknologi Pertanian Institut Pertanian, Bogor, Indonesia. 106 p. [Ind]*
Address: Bogor, Indonesia.

1990. Hermana, -. 1983. Pengaruh konsumsi bahan makanan campuran dengan kedelai atau tempe terhadap anak balita penderita kurang kalori-protein [Effect of the consumption of food mixtures containing soybeans or tempeh on children under the age of five suffering from protein malnutrition]. PhD thesis, Fakultas Pasca Sarjana, Institut Pertanian Bogor, Bogor, Indonesia. xii + 105 p. Illust. No index. 28 cm. [84 ref. Ind]
• ***Summary:*** Children suffering from protein-energy malnutrition were fed a food supplement formula consisting of 70% rice flour and 30% tempeh flour, There was a

beneficial effect on the general status and for protection against gastroenteral infection. Address: Bogor, Indoensia.

1991. Hesseltine, C.W. 1983. Microbiology of Oriental fermented foods. *Annual Review of Microbiology* 37:575-601. [50 ref]

• ***Summary:*** Contents: Introduction. Historical account. Importance of mixed cultures. Microorganisms used.

"The Japanese Food Agency, Ministry of Agriculture, Forestry, and Fisheries (1979), gave the following figures for 1979: miso, 567,776 tons; shoyu, 1,252,431 kiloliters; and natto, 158,000 tons. In Korea, 35% of the 442,803 metric tons of soybeans produced is fermented. Indonesia uses about 75,600 tons of soybeans in making tempeh.

"There is considerable ancient writing in Chinese publications about foods made by fermentation, but the first scientific reports are only about 100 years old. From 1878 until the beginning of World War I, there was an explosion of papers and reports dealing with fermented foods and drinks... In general, studies between 1881 and 1914 were devoted to the description of the product and the local name and to the isolation and description of the microorganisms associated with the fermentation. A number of organisms new to science were described and illustrated. Additional information was given on the action of the fungus on the substrate, suggested uses of the fungus in processes that could be exploited in European technology, and a description of the substrate preparation, food use, and native methods of food preparation.

"This period of research ended abruptly with the advent of World War I, as the exchange of students and cooperation between Japan and Germany ceased. Food fermentation studies resumed in the 1950s and today considerable interest exists. This renewed interest stems from the concern with nutrition, the great enthusiasm for vegetarian and natural foods, the search for less expensive, high-protein foods, the influence of foreign students studying in the West, the need to expand export markets, the need to add products to convenience foods to add zest and flavor, and the interest in the activities of microorganisms used in fermented foods." Address: NRRC, Peoria, Illinois.

1992. International Rice Research Institute. 1983. Annual report for 1981. Los Banos, Laguna, Philippines. Soybeans: p. 472, 474-80, 503. *
Address: Los Baños, Laguna, Philippines.

1993. Jaffrey, Madhur. 1983. Eastern vegetarian cookery. London: Jonathan Cape. xii + 531 p. Illust. by Susan Gaber. Index. 24 cm.

• ***Summary:*** This is an expanded version of *Madhur Jaffrey's World-of-the-East vegetarian cookery* (1981, New York). The author of this creative book, a woman, was born in British India on 13 Aug. 1933. She first became known as an actress in India, but later found fame as a food writer. She has lived in America for more than 20 years. She presents 21 recipes for bean curd (tofu), 7 for tempeh, and some for yuba and miso. Soy-related recipes include: Aubergine slices with white miso (Japan, p. 4-5). Green beans with soy sauce (Japan, p. 20), Cabbage with miso (Japan, p. 29). Lotus root with soy-sauce dressing (Korea / Japan / Hong Kong, p. 46-47). Yellow pumpkin cooked with soy sauce (Japan, p. 74-75). Fresh soy beans, steamed (China, p. 76, with "fresh green soy beans in their pods"). Yien Koo's Spinach with fermented bean curd (China, p. 78-79). Pecel (Vegetable salad with spicy peanut sauce, plus tofu and tempeh; Indonesia, p. 87). Tempura (with tofu; Japan, p. 89-92). Soy bean sprouts (how to grow, p. 119). Soy-bean and mung-bean sprouts seasoned with sesame oil (Korea, p. 123-24). Tempeh, Fried tempeh, Fried, pre-seasoned tempeh, Sambal goreng tempeh kering (Sweet and sour tempeh), Tempeh cooked in coconut milk (Indonesia, p. 127-30). Thai fried rice (with red fermented tofu, p. 176).

Chapter 4 (p. 187-221), titled "Soy milk, bean curd, and wheat gluten," contains the following: Introduction to each ingredient. Soy milk (making your own at home). Making your own bean curd. Udofu (Yudofu, simmering bean curd with seasonings, Japan). Bean curd with watercress (Singapore Chinese). Bean curd with fresh coriander (Taiwan). Korean-style bean curd in a hot water bath. *Hiya-yakko* (Chilled bean curd, Japan). Bean curd with broccoli (Hong Kong). Cabbage cooked with bean curd (Japan). Bean curd with a deliciously spicy sauce (China). Carrots and beans with a bean-curd dressing (Japan). Bean curd, mushrooms, and peanuts in hoisin sauce (Chinese style). Sautéed bean curd (Korea). Tofu dengaku (Toasted bean curd with a miso topping, Japan). Fried bean-curd cubes (Most of East Asia). Soy-bean sprouts sautéed with fried bean curd (China). Fried bean curd with a sweet-and-sour sauce (China). Fried bean curd cakes with a mustard surprise (Japan). Inari-zushi ("Bags" of fried bean curd stuffed with sushi rice, Japan). Pressed bean curd with cabbage (China). Salad of pressed bean curd, mung-bean sprouts, and agar-agar (China). How to make fried and baked wheat-gluten balls. Stew of baked wheat gluten, potato, turnip, carrot, and cabbage rolls (Japan, p. 215). Fried wheat gluten with broccoli, carrot, and mushrooms (China). Fried wheat gluten and potato stew (Indian style). Shredded wheat gluten and Cabbage with fennel seeds (Indian style). Buddha's delight (A mixed Chinese stew, Hong Kong; with yuba, fried tofu, and fried wheat gluten balls).

Chawanmushi (Steamed savory custards, with tofu; Japan, p. 223-26). Omelette with bean curd (Japan, p. 230-31). Soy-sauce eggs (Thailand / China, p. 245). Paneer (Fresh cheese from cow's milk; India, p. 277-78). Hot or cold noodles with a soy-sauce dressing (China, p. 288). Noodles with a hot-and-sour bean sauce (China, p. 290).

Vegetarian mee krob (Crisp noodles with pressed bean curd and eggs; Thailand, p. 296-97). Noodles with quail eggs, mushrooms, spinach, and yuba (Japan; p. 298-99). Hoppers (yeast pancakes; Sri Lanka, p. 315). Roti (Flat whole-wheat bread; India, p. 320). Delicious stock made with soy-bean sprouts (p. 340). Clear soup with mushrooms, bean curd skins [yuba], and spinach (Japan, p. 346). Clear soup with soft bean curd and Chinese leaves (p. 346). Miso soup with bean curd (Japan, p. 357). Miso soup with carrots and mushrooms (Japan, p. 358). Fried, munchable soy beans [soynuts] (China, p. 373). Potato and tempeh patties (Indonesia, p. 394). Dipping sauces (with soy sauce, p. 414-17, incl. kochu chang–Korean soy sauce). Kombu relish (with soy sauce; Japan, p. 435). Shoyu daikon (White radish pickled in soy sauce; Japan, p. 436). Ginger quick-pickled soy sauce (China, p. 436). Aomidaikon (Quick pickled small white radishes, with slightly sweet yellow miso; Japan, p. 438-39). Chinese-style jellied bean-curd sweetmeat with a peanut topping (Singapore, p. 462-63).

General information [like a glossary] (p. 481-506): See: Bean curd (regular, fried, fermented *{fu-ju, nam-ye, tao-hoo-yee,* red bean curd}, pressed *{doufu kan},* pressed seasoned *{pai doufu kan},* dried bean-curd skin or yuba). Beans (azuki, soy). Bean sauce (made from fermented soy beans). Chilli paste with soy bean (and garlic). Hoisin sauce. Miso. Nam yee (see Bean curd, fermented). Nigari. Soy beans, fresh. Soy-bean sprouts. Soy milk. Soy sauce (incl. Japanese, Chinese dark and light, Japanese usukuchi, Indonesian ketjap manis). Tao Hoo Yee (see Bean curd, fermented). Tempeh. Yuba. Sources (of ingredients; p. 507-10). Address: New York City, NY.

1994. Le, Van Huu. 1983. Dai Viet su' ky toan thu [Complete set of Dai Viet history. 2 vols.]. Hanoi, Vietnam: Khoa hoc xa hoi [Social Science Publishing House]. [Vie]*
• ***Summary:*** According to this book's introductory chapter, the author of this book lived 1230-1322. The book first appeared in 1272 and was said to consist of thirty volumes. But no original is known to exist today, and some scholars doubt that there ever were 30 volumes. The original of the 1983 version was edited and printed in 1697 by historians who lived some 400 years after the original edition was first printed. Address: Vietnam.

1995. Santoso, Agus Muji. 1983. Penggunaan bawang putih *(Allium sativum L.)* untuk pengalengan tempe [The use of garlic in tempeh canning]. Thesis (Skripsi), Fakultas Teknologi Pertanian Universitas Gadjah Mada, Yogyakarta, Indonesia. 43 p. [Ind]*
Address: Yogyakarta, Indonesia.

1996. Soebagyo, Slamet Elly. 1983. Studi interaksi enzim-enzim dari dua biakan lapuk *Rhizopus* [Study of the interaction of enzymes from cultivated *Rhizopus* molds]. Thesis (Skripsi), Departemen Kimia, Matematika dan Ilmu Pengetahuan Alam Institut Teknologi Bandung, Bandung, Indonesia. 19 p. [Ind]*
Address: Bandung, Indonesia.

1997. Soetiarto, Siti Roswati. 1983. Identifikasi dan determinasi djamur genus *Rhizopus* yang berasal dari tempe [Identification and determination of molds of the genus *Rhizopus* isolated from tempeh]. Thesis (Skripsi), Bagian Biologi Institut Teknologi Bandung, Bandung, Indonesia. 51 p. PBITB. [Ind]*
Address: Bandung, Indonesia.

1998. Steinkraus, K.H. 1983. Industrial applications of Oriental fungal fermentations. In: J.E. Smith, D.R. Berry, and B. Kristiansen, eds. 1983. The Filamentous Fungi. 4 vols. Fungal Technology. London: Edward Arnold. See p. 171-89. Chap. 7. Illust. Index. 24 cm. [35 ref]
• ***Summary:*** Contents: Introduction. The koji principle. Soy sauce / Japanese shoyu as indigenous fermentations. Japanese miso. Japanese saké. Indonesian tempe / oncom–fungal fermented traditional meat analogues. Indonesian tapé ketan and tapé ketella fermentations. Conclusions. Address: New York State Agric. Exp. Station, Geneva, NY 14456.

1999. Steinkraus, Keith H. 1983. Fermented foods, feeds and beverages. *Biotechnology Advances* 1(1):31-46. [70* ref]
• ***Summary:*** Contents: Abstract. Indigenous fermented foods / beverages: Indian idli, dawadawa (daddawa), soy sauce (Thailand), Indonesian tape, fish sauces, Japanese koji, Nigerian millet beer (oyokpo), Kenyan uji. Microbial / single cell protein (SCP): Mushrooms. Address: New York State Agric. Exp. Station, Geneva, NY 14456.

2000. Steinkraus, K.H. 1983. Traditional food fermentations as industrial resources. *Acta Biotechnologica* 3(1):3-12. First published in 1982 in Saono et al., eds. Traditional Food Fermentations as Industrial Resources in the ASCA Countries. The Indonesian Institute of Sciences (LIPI) Jakarta. p. 3-16. [31 ref. Eng; ger]
• ***Summary:*** Contents: Summary. Introduction. Production of meat-like flavors from vegetable proteins. Soy sauce (Japanese shoyu) and miso fermentations. Fish / shrimp sauces and pastes. The koji principle. Meat substitutes (analogues). Indonesian tempeh kedele. Traditional tempeh fermentation. Industrial production of tempeh. A process for raising the protein content of high starch substrates. Leavened bread-like foods without the use of wheat or rye. Coconut protein as an industrial resource. References. Address: New York State Agric. Exp. Station, P.O. Box 462, Geneva, New York 14456.

2001. Sumarsono, -. 1983. Aspek-aspek penggunaan tepung tempe [Aspects of tempeh flour utilization]. Thesis (Skripsi), Fakultas Teknologi Pertanian Universitas Gadjah Mada, Yogyakarta, Indonesia (College of Agricultural Technology, Gadjah Mada University). 50 p. [Ind]* Address: Yogyakarta, Indonesia.

2002. Swaminathan, M.S. 1983. Relevance of protein improvement in plant breeding. In: W. Gottschalk and P. Hermann, eds. 1983. Seed Proteins: Biochemistry, Genetics, Nutritive Value. The Hague, Boston, and London: Martinus Nijhoff / Dr. W. Junk. viii + 531 p. See p. 1-23. [31 ref]
• ***Summary:*** Contents: Introduction. Factors limiting food output prospects. Nutrition study. Energy implications. Meeting the challenges. Emerging farming systems in the tropics and sub-tropics. Conclusion.

The number of people going to bed hungry in 1981 is greater than in 1974 when the World Food Conference in Rome unanimously resolved that all governments should strive to ensure that by 1984 "no child, woman, or man goes to be hungry, and that no human being's physical or mental potential is stunted by malnutrition."

Fig. 1 shows annual production of the world's major food crops (1980, FAO Production Year Book). The soybean is 8th (83 million tonnes), after wheat (445 million tonnes), rice (400), maize (392), potato (226), barley (162), cassava (122), and sweet potato (107). Fig. 2 shows the world's increasing dependence on grain exports from North America, Australia, and New Zealand; all other regions are net importers of grain.

Table 2 shows world use of grains for human consumption and livestock feeding from 1966 to 1980. In 1966 the ratio of the two was 1.32, whereas in 1980 it was 1.17. Thus in 1980 some 642 million tonnes of grains were used for human food and 548 million tonnes were fed to livestock.

Table 3 shows the percentage of available domestic grain used for livestock feeding in various types of countries from 1966 to 1980. In the developed countries it rose from 67.2% in 1966 to a peak of 70.7% in 1972 and 1973, then fell to 67.1% in 1980. In Eastern Europe and the USSR it rose from 42.5% in 1966 to a peak of 59.7% in 1979. In all developing countries it rose from 15.5% in 1966 to a peak of 20.3% in 1980. In all low-income developing countries it rose from 3.2% in 1966 to a peak of 3.8% in 1980. Address: International Rice Research Inst., Los Baños, Laguna, The Philippines.

2003. *USDA Plant Inventory.*1983. Plant material introduced January 1 to June 30, 1980 (Nos. 436991 to 443013). No. 188, Part I. 529 p.
• ***Summary:*** Soybean introductions: *Glycine max* (L.) Merrill. Fabaceae.

"Donated by Dr. N.I. Korsakov, Division of Grain Legume Crops, N.I. Vavilov Institute of Plant Industry, Leningrad, Soviet Union." All these varieties are designated "VIR" (Vavilov Inst.).

437069-437085. Amur Region and Far East

437124-437128. Gurijscaja and Imeretinscaja, Georgian SSR.

437129A-B. Irkutsk Region (Oblast) of Russia.

437130-437134. Gibrid ASS, Kazakh SSR.

437135-437148. Khabarovsk Province, USSR [on right bank of Amur River]

47149-437171. Krasnodar Province, USSR.

437172-437175. Kuybyshev Region, USSR.

437176-437178. Latvian SSR.

437179-437188. Lithuanian SSR.

437189-437303. Bel'tscaja, Bessarabea, Biruintsa, Brynzenscaja, Corichevava, CSchi, Dobruzanca, Errj, Moldavscaja, Rajner, Scorospelca, Staroucrainea, Vengerca nizcaja, Vysocoroslaja, Moldavian SSR.

437304. Moscow Region. 437305-437312. North Osetian [Ossetian] ASSR (An autonomous republic in the southeastern Russian SFSR on the north slopes of the Central Caucasus Mountains, bounded on the north by Stavropol Kray; Renamed Alania in 1991; capital Vladikavkaz).

437313-437315. Novosibirsk Region, USSR.

437316-437520. Primorsky Province, USSR [Maritime Province in Russian Far East, bordering on Sea of Japan, China and North Korea. Administrative center and soybean port: Vladivostok].

437521. Stavropol Province, USSR.

437522. Tshuvashskaja ASSR.

437523-437524. Turkmen SSR.

437525-437549. Ukranian SSR.

437550. Uzbek SSR (later Uzbekistan).

437551-437552. Voranezh Region, USSR.

437553-437813. Peoples Republic of China.

437814-438273. China, Northeast [formerly Manchuria] incl. Charbin [Harbin], Elita, Manczurscaja.

438274-438295. Japan (many named varieties).

438296-438309. South Korea (Republic of Korea).

438310-438312. North Korea.

438312-438341. Algeria.

438342. Argentina.

438343-438513. Australia, Bulgaria, Canada, Czechoslovakia, France, West Germany, East Germany, Hungary, India, Indonesia, Israel, Italy, Morocco, Nepal, Netherlands, Poland, Portugal, Romania, Sweden (13 Fiskeby varieties), United States (26 named varieties), Yugoslavia.

440913. Wild soybean from China. "Donated by Kirin Academy of Agricultural Sciences, Kungchuling, Kirin Province. Received through W.O. Scott, Dep. of Agronomy,

Univ. of Illinois, Urbana. Received March 1980. Collected 1979.

440927-440943. *Glycine canescens* F.J. Herman. From Australia. "Donated (but not collected) by T. Hymowitz, Dep. of Agronomy, Univ. of Illinois, Urbana. Received Aug. 1979.

440944-440974. *Glycine clandestina* Wendl. From Australia. Donated by T. Hymowitz.

440975. *Glycine falcata* Benth. From Australia. Donated by T. Hymowitz.

440976-440977. *Glycine latrobeana* (Meissn.) Benth. From Australia. Donated by T. Hymowitz.

440978-440980. *Glycine latifolia* (Benth.) Newell & Hymowitz. From Australia. Donated by T. Hymowitz.

440981. *Glycine tabacina* (Labill.) Benth. From Fiji. Donated by T. Hymowitz. Collected 1930. Sigatoka, Viti Levu, Fiji. Collected by Greenwood. Wild.

440982-440997. *Glycine tabacina* (Labill.) Benth. From Australia. Donated by T. Hymowitz.

440998-441011. *Glycine tomentella* Hayata. From Australia. Donated by T. Hymowitz.

441012-441013. *Glycine tomentella* Hayata. From China. Donated by T. Hymowitz.

441339-441383. *Glycine max* (L.) Merr. Soybean. From Indonesia (East Java, Central Java, West Nuca Tanggara [West Nusa Tenggara, incl. Lombok and Sumbawa islands, in eastern Indonesia]). Donated by S. Djojoderdjo and Soebekti, Univ. of Gadjah Mada, Jogjakarta [Yogyakarta].

442003-442004. From China, Peoples Republic of. Donated by Institute of Crop Breeding and Cultivation, Chinese Academy of Agricultural Science, Beijing. Received through G. Liang, Dep. of Agronomy, Kansas State Univ., March 1980.

442005-442021. From South Korea. "Donated by Applied Genetics Laboratory, Korea Atomic Energy Research Inst., Seoul Received through R. Loiselle, Plant Gene Resources of Canada, Ottawa.

442022-442045. *Glycine max* (L.) Merr. Soybean. From Poland. "Donated by Plant Breeding and Acclimatization Inst., Radzikow / Warszawy. Some also from the Soviet Union and Yugoslavia.

442834. *Glycine max* (L.) Merr. Soybean. From China, Peoples Republic of. "Donated by T.C. Tso, Tobacco Laboratory, USDA, Beltsville, Maryland." Collected from a market near Quilin, Kwansi Province.

Note: In Part II: 445842-445849. From. Thomas A. Lumpkin, Zhejiang Academy of Agricultural Sciences, Hangzhoe, Zhejiang, China. Address: Washington, DC.

2004. Yeo Hiap Seng Ltd. 1983. Yeo's quality foods and beverages. Singapore. 25 p. [Eng]
• ***Summary:*** "Yeo Hiap Seng's heritage dates back to 1900 in China. The Company started operations in Singapore in 1935, as a manufacturer of fine soya sauces." A photo shows the store front at one of its early locations. Many color photos show the company's products, which include the following soyfood products: Soy sprouts, salted black beans, salted yellow beans, hoi sin sauce, crushed yellow bean sauce, black bean sauce, salted soya beans, soy sauces (light or dark), and Yeo's soya bean drink (canned). Most product names are given in English, French, and Chinese. The company has offices (whose address and phone are given) in Singapore, Malaysia, Hong Kong, United Kingdom, USA (San Jose, California), and Canada (Richmond, BC). Address: Singapore.

2005. **Product Name:** K.K. (Bottled Soymilk).
**Manufacturer's Name:** King? Kong (KK) Food Products Sdn. Bhd.
**Manufacturer's Address:** Sabah, East Malaysia.
**Date of Introduction:** 1983?
**Wt/Vol., Packaging, Price:** Bottle.
**New Product–Documentation:** Color photo of Label from STS. 1987. Bottle with red and yellow label.

2006. Lindner, Anders. 1984. Re: Contract signed for soymilk plant in Indonesia. Letter to William Shurtleff at Soyfoods Center, Feb. 6. 1 p. Handwritten, with signature on letterhead. Plus 3 p. inserts.
• ***Summary:*** Sri Lanka is next. Then People's Republic of China. He encloses a copy of STS' new soymilk booklet. Address: STS, 1501 Hutchinson House, Central, Hong Kong; 505 Cathay Building, Singapore 0922. Phone: 338-6259.

2007. Steinkraus, Keith H. 1984. Re: Soy sauce in Southeast Asia. Letter to Richard Leviton at Soyfoods Center, Feb. 14. 1 p. Typed, with signature on letterhead.
• ***Summary:*** "While fish sauces and pastes are predominant in Burma, South Vietnam, Laos, and Cambodia, you will still find soy sauces being manufactured and consumed on a small scale in the Chinese communities." Address: New York State Agric. Exp. Station, Dep. of Food Science & Technology, P.O. Box 462, Geneva, NY 14456-0462. Phone: 135-787-2276.

2008. Hesseltine, C.W. 1984. Re: Three current projects at the Fermentation Laboratory. Letter to William Shurtleff at Soyfoods Center, Feb. 17. 1 p. Typed, with signature on letterhead.
• ***Summary:*** They are: (1) A review of what is known about natto. (2) Project on mixed culture fermentations and the starter culture business in China and Indonesia. "We have discovered that all the starter mold cultures in ragi, etc. are capable of anaerobic growth which is not the situation in nearly all other fungi." (3) Dr. Hesseltine is preparing an hour lecture on the history of research on fermented foods in the USDA, and particularly at the Peoria laboratory. "I

have been honored by being selected to give the Annual Lecture of the Mycological Society of America at their annual meeting next August at Colorado State University.

"Professor Doyle at the Food Research Institute informs me that he is now preparing a paper on his studies on the tofu safety situation." Address: Chief, Fermentation Lab., USDA/NRRL, Peoria, Illinois.

2009. Jackobs, Joseph A.; Smyth, C.A.; Erickson, D.R. 1984. International soybean variety experiment: Eighth report of results, 1980-1981. *INTSOY Series* No. 26. xi + 234 p. Feb. (College of Agric., Univ. of Illinois at Urbana-Champaign).

• ***Summary:*** In the ISVEX trials, soybeans were tested in the following regions and countries: (For the years 1980/1981): Algeria, Argentina, Azores, Bangladesh, Bhutan, Bolivia, Brazil, Brunei, Burundi, Cameroon, Chile, China [actually AVRDC, Shanhua, Taiwan], Colombia, Costa Rica, Czechoslovakia, Ecuador, Egypt, Ethiopia, Fiji Islands, French Guiana, Gabon, Ghana, Guatemala, Guinea-Bissau, India, Indonesia, Iraq, Korea, Lesotho, Liberia, Libya, Madagascar, Malaysia, Mali, Mauritius, Mexico, Morocco, Mozambique, Nepal, New Caledonia, Pakistan, Panama, Paraguay, Peru, Philippines, Portugal, Puerto Rico, Rwanda, Saudi Arabia, Somalia, Sri Lanka, Sudan, Surinam, Tanzania, Thailand, Turkey, United States, Upper Volta, Uruguay, Vietnam, Zaire, Zambia, Zimbabwe.

(For the year 1979): Belize, Pakistan, Turkey, Vietnam.

Note 1. This is the earliest document seen (Aug. 2009) concerning soybeans in Guinea-Bissau, or the cultivation of soybeans in Guinea-Bissau.

This document contains the earliest date seen for soybeans in Guinea-Bissau, or the cultivation of soybeans in Guinea-Bissau (21 May 1981). Sixteen varieties were tested at Granja Prabis, Bissau. ICA Tunia gave the highest yield, 1,225 kg/ha.

Note 2: This document contains the 2nd earliest date seen (May 2010) for the cultivation of soybeans in Brunei (19 May 1981). Sixteen varieties were tested at Biray Research Station by cooperator W.T.H. Peregrine. UFV-1 gave the highest yield, 2,577 kg/ha.

Note 3: This is the earliest document seen (Feb. 2006) that describes soybean variety trials in Bhutan. On 30 April 1980 sixteen varieties were planted under the supervision of Mr. Heinz Burgin at the Rural Development Project Demonstration Farm, Bumthang, Bhutan. DeSoto gave the higbest yield, 729 kg/ha. The source of all these soybeans was INTSOY for ISVEX trials.

2010. Shurtleff, William; Aoyagi, Akiko. 1984. Soymilk industry and market: Worldwide and country-by-country analysis. 2 vols. Lafayette, California: Soyfoods Center. Vol. 1, 199 p. Vol. 2, 100 p. Feb. 28 cm. [165 ref]

• ***Summary:*** A comprehensive overview, worldwide, with extensive historical information. The first study of its type, with many statistics, graphs, and tables. Volume 1 is the market study, and Volume 2 is black-and-white copies of soymilk labels and other graphics. Contents: 1. Introduction. 2. Directory of soymilk manufacturers and related companies worldwide. 3. Definitions and varieties of soymilk. 4. Overview of world soymilk industry and market, and future outlook. 5. United States soymilk industry and market. 6. Japan. 7. Korea. 8. China. 9. Taiwan. 10. Hong Kong. 11. Singapore and Malaysia. 12. Southeast and South Asia: (13. Vietnam. 14. Thailand. 15. Philippines. 16. Indonesia. 17. India. 18. Sri Lanka). 19. Europe (Incl. Plamil Foods in England, Tetra Pak Group in Sweden, Alfa-Laval and John Wilson in Sweden, Danish Turnkey Dairies–DTD and Soya Technology Systems (STS), Alpro/Vandemoortele in Belgium, Nestle, F. de Selliers in Belgium, Dansk Soyakagefabrik in Denmark, Lima Andiran in France, Galactina in Belp, Switzerland, and Semper A.B. in Sweden).

20. Latin America. 21. Africa. 22. History of Vitasoy in Hong Kong. 23. Two modern soymilk manufacturing processes: Marusan and Alfa-Laval. 24. Etymology of the word "soymilk" worldwide. 25. Analysis of ingredients in 49 popular Japanese soymilk products. 26. Bibliography. 27. About the Soyfoods Center. A table on p. 12 gives an overview of world soymilk production in 1983 ranked in descending order of annual per capita consumption. These statistics do not include China (PRC) or soy-based infant formulas, usually made from soy protein isolate. 1. Taiwan, 210 million liters, 11.1 liters/capita, growing at 30% per year. 2. Hong Kong, 39.1 million liters, 7.5 liters/capita, growing at 10% per year. 3. Singapore, 11.2 million liters, 4.7 liters/capita, growing at 15% per year. 4. South Korea, 67.0 million liters, 1.60 liters/capita, growing at 60% per year. 5. Malaysia, 21.4 million liters, 1.53 liters/capita. 6. Japan, 131.8 million liters, 1,10 liters/capita, growing at 101% per year. 7. Thailand, 50.0 million liters, 1.00 liters/capita. 8. USA, 9.6 million liters, 0.04 liters/capita. Total world production: 548.3 million liters.

Page 36 gives an overview of the U.S. market for soy-based infant formulas and adult soymilk. Production of soy-based infant formulas (on a ready to serve basis) in 1983 was as follows: Ross Laboratories made 14,720,000 gallons of Isomil (i). Mead Johnson made 14,080,000 gallons of Prosobee. Loma Linda made 2,240,000 gallons of Soyalac. And Wyeth Labs made 960,000 gallons of Nursoy. Thus 32,000,000 gallons of soy-based infant formula were made in the USA in 1983.

Also in 1983, consumption of soymilk by adults in the USA was as follows: 1,743,000 gallons were made by specialized soymilk manufacturers in the USA (Loma Linda Soyagen 1,000,000 gallons; Worthington Soyamel 670,000 gallons, Miller's Soy (private label) 73,000 gallons).

690,000 gallons were imported (328,000 gallons of Vitasoy by Vitasoy USA, 254,000 gallons of Yeo's by YHS, 50,000 gallons of Edensoy by Eden Foods, 25,000 gallons of President by President, 25,000 gallons of Kibun by Kibun, 8,000 gallons of To-Neu by San-J International). 250,000 gallons were made fresh by tofu companies (45,000 gallons by Mighty Soy, 41,000 gallons by Victor Foods [Scarborough, Ontario, Canada], 39,000 gallons by Quong Hop & Co., 35,000 gallons by Wy Ky, and 90,000 gallons by others).

Yield. 1 ton of raw soybeans yields approximately 4,320 gallons of soymilk. Conversion: 3.785 liters = 1 gallon. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549.

2011. Shurtleff, William; Aoyagi, Akiko. 1984. Brief history of Yeo Hiap Seng Ltd. and the company's work with soymilk worldwide (Document part). In: Shurtleff and Aoyagi. 1984. Soymilk Industry and Market: Worldwide and Country by Country Analysis. Vol. 1. 177 p. See p. 100-02.

• ***Summary:*** "Soymilk entered the modern age in Singapore in 1954, when Yeo Hiap Seng introduced the first commercial bottled soymilk. The company traces its origins to the year 1900 when the patriarch of the Yeo family, Mr. Yang (in the Amoy dialect, his name was pronounced Yeo Keng Lian) purchased a small company named "Hiap Seng" in the city of Chang-chou (Zhang Zhou), Fukien (Fujian) province, China. "Hiap Seng" means "unite to succeed." Yeo Keng Lian changed the company's name to reflect his family's ownership. He worked as a manufacturer and retailer of fermented soybean seasonings: soy sauce *(jiang-you),* Chinese-style miso *(dou-jiang),* and fermented tofu *(furu).* All three products were sold from day one under the "Light House" brand. By working together, the family did succeed. Their soy sauce, fermented in the traditional Chinese way in wooden vats and earthenware jars, was of superior quality and the business prospered. The original plant was located near the center of Chang-chou. In about 1920 a second plant was established in the eastern part of the city, and in the late 1920s a third plant was set up in the southern part of the city. Each of the three fermented soy products were produced in all three plants; the second and third plants also produced some pickled vegetables.

In 1935, during the Japanese invasion of China, when life was difficult and unsettled in Fukien province, Yeo Keng Lian sent his eldest son, Yeo Thian In, to Singapore to investigate possibilities there. The son founded the Yeo Hiap Seng Sauce Factory at 410 Outram Road, Singapore 3. He was joined shortly by the rest of the family. The company continued to make the same three fermented soy products that it had made since 1900 in China. In 1947 the growing business was moved into larger quarters at 950 Dunearn Road, its present location. The move out of China was a wise one, for in 1949 the three Yeo Hiap Seng plants in Fukien were taken over by the Chinese Communists. By the mid-1940s, Yeo's quality soy sauce was a common sight in Singapore.

In 1950 YHS decided to diversify into canned products, such as chicken curry, fish, and meat. Then in 1954 they launched their first soymilk. Called Beanvit, it was subsequently renamed Yeo's Soybean Drink. A rather sweet soymilk sold like a soft drink in sterilized bottles, it was marketed in both Singapore and Malaysia, where it was the first product of its type. (Vitasoy was first sold like a soft drink in sterilized bottles in Hong Kong in 1953.) In 1955 the company changed its structure to that of a "Limited" (Ltd.) company. In 1958-59 YHS expanded its soft drink line by bottling favorite traditional Chinese beverages, such as chrysanthemum teas and herb teas. In 1962 YHS began its first export sales to Hong Kong. In 1967 YHS soymilk and teas were first sold in UHT (Ultra High Temperature) aseptic Tetra Pak cartons (tetrahedral/pyramid shaped; 285 ml).

"YHS was the world's first company to package soymilk in aseptic Tetra Pak cartons, and the first to use Tetra Pak for any beverage in Singapore. (Vitasoy in Hong Kong did not start using Tetra Pak until 1976). Shortly after introducing sweetened soymilk in the tetrahedral pack, YHS launched enriched Vitabean in the same carton. It was fortified with half of the adult Minimum Daily Requirement of most essential vitamins. Sterilization in bottles would have destroyed most of the added vitamins, but the UHT process did not. In 1974 packaging was changed to Tetra Brik (250 ml), but bottling continued. During the late 1970's YHS changed its soymilk brand name to Yeo's. By 1976 Yeo Hiap Seng's soymilk production had climbed to 50 million bottles and cartons a year, and by 1980 to 75 million (250,000 a day), prompting the company to build a new plant to double its capacity. In 1983 YHS had the biggest share of the Singapore soymilk market (Alan Yeo, personal communication, 1982, 1983).

"Yeo Hiap Seng pioneered soymilk throughout Southeast Asia. In 1959 they opened their first soymilk plant at Kuala Lumpur in Malaysia. By 1984 they had four soymilk plants there at Kuala Lumpur, Jahore Baru, Prai, and Kuching. Malaysia, with its 14 million people, was a bigger market than Singapore, with its 2.4 million people. By 1984 YHS had the lion's share of the Malaysian soymilk market. During the 1970's, YHS started exporting soymilk to Hong Kong (where they got a small share of the market). In 1979 they began exporting canned soymilk to the USA, where they had offices and a warehouse in San Jose, California. In early 1983 they introduced a low-sugar soymilk to the US. Sales, however, were slow. YHS was not interested in the China market, since they thought that it would be too difficult to get profits out in hard currency. They were franchising their soymilk process and technology

in Indonesia, where the product is being marketed under the YHS name. They plan to share in the promotion, too.

Starting in 1974 Yeo Hiap Seng began a new phase of its expansion and diversification by acquiring the Singapore franchises for Pepsi-Cola and Mirinda. These were followed by franchises for Schweppes in 1985 and 7-Up in 1986. In 1985 the company acquired distribution rights for Budweiser beer and in 1987 they branched out into prawn farming.

"The 1981 Annual Report of Yeo Hiap Seng Ltd. shows that this publicly held company was run by Yeo Thian In (Chairman) and Alan Yeo Chee Yeow (Managing Director). From 1977 to 1981, sales of all products grew from $39.5 to $95.8 million and pre-tax profits from $7.1 to $11.5 million. Their Soft Drinks Division, one of the largest in Singapore, Malaysia, and Hong Kong, provided the main thrust of company growth." Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549.

2012. Shurtleff, William; Aoyagi, Akiko. 1984. Brief history of Alfa-Laval's work with soymilk worldwide (Document part). In: Shurtleff and Aoyagi. 1984. Soymilk Industry and Market: Worldwide and Country by Country Analysis. Vol. 1. 177 p. See p. 120-22.

• ***Summary:*** "Alfa-Laval, the world's largest supplier of dairy plants and systems, with some 10,000 employees, celebrated its hundredth anniversary in Sweden in 1983. It was a pioneer in the development of UHT (ultra high temperature) sterilization plants for dairy milk in the early 1960s. Continuous process UHT, guaranteeing milk and juices a shelf life of a month or more without refrigeration, and giving milk a much better flavor than autoclaved sterilized milk, caught on rapidly in Europe and many developing countries. By 1978 UHT milk, which slowly replaced pasteurized and refrigerated milk, had about 40% of the market in Europe. Alfa-Laval made UHT systems based on both direct heating (injection of high pressure steam into the milk flow to bring the temperature up to 135–140ºC) and indirect heating (in a plate heater, to 140ºC for 4 seconds). Alfa-Laval's direct system was called VTIS (Vacu-Therm Instant Sterilizer) and their indirect system, considered the more advanced and economical of the two, was called Steritherm.

"Starting in the early 1960s Alfa-Laval began to sell soymilk system components to soymilk manufacturers in East Asia. The UHT VTIS system was found to work very well, since the vacuum stripped off beany flavors. Alfa installed a VTIS for Yeo Hiap Seng in 1967 and one for Hong Kong Soya Bean Products Co. (makers of Vitasoy) in 1974.

"A key man behind Alfa-Laval's growing interest in soymilk is John Wilson, who got involved with soymilk in 1967, as technical manager for the Cold Storage Group (CSG) in Singapore and Malaysia. His background was in dairy technology. To help CSG launch a soymilk product, he studied traditional tofu processes in Singapore, then mechanized them. He set up CSG's first soymilk line in Petaling Jaya, a suburb of Kuala Lumpur, Malaysia, in 1969, and then another in Singapore later that year.

"In 1971 Wilson joined Alfa-Laval and started developing complete process lines for soymilk, based on a suspended (unfiltered) product made from full-fat enzyme-active soy flour. But only one plant for making suspended soymilk was ever sold (to Africa in 1982). In 1978 soymilk technology R&D was centered under John Wilson in Alfa-Laval, at Lund, Sweden. Systems for making clarified (filtered) soymilk with low bean flavor were developed.

"Alfa-Laval sold complete soymilk lines to Lam Soon (Ace Canning) in Kuala Lumpur, Malaysia (operation started in December 1979) and Kickapoo, in Bangkok, Thailand (from Feb. 1981). By early 1984 they had sold equipment or entire plants to at least twelve soymilk manufacturers in East Asia, including many of the largest (Hong Kong Soya Bean Product Co., Kibun, Dong Bang, President, Siam Food Prods., etc.).

"In 1981-82 Alfa stepped up its soymilk activities dramatically. It published attractive and informative 10-to-15-page large-format booklets on soymilk and its production in English, Chinese, and French, and began heavy promotion worldwide. Alfa-Laval went after the China market in a big way. They offered to install a soymilk plant in Beijing for the Ministry of Light Industry to use for one year, free of charge on a trial basis. Their 12-page brochure in Chinese on soymilk *(Douru)* was widely circulated. During a 3-month period in 1983 they sent five soymilk delegations to China, and began to set up an office in Hong Kong, run by a China trader with ten years experience, to focus on the China market.

"In late 1982 Alfa-Laval and Kibun (in Japan) formed a powerful alliance by signing an important, interesting, and unorthodox agreement. Alfa-Laval supplied Kibun with some of Kibun's original soymilk equipment, but eventually Kibun had to modify it extensively. Now, when Alfa-Laval finds a new equipment client, they tell the client, according to the agreement, that Kibun is their preferred supplier of the soymilk process. Kibun then signs a separate contract with the client for technical assistance, including product formulation and quality control. This could be a joint venture, a license for Kibun patents and technology, and/or purchase of actual patented equipment made by Kibun's food engineering company. Likewise, when Kibun licenses others to use its process, it often asks Alfa-Laval to supply the plant. There are no kickbacks between Alfa-Laval and Kibun. The arrangement works nicely since Alfa-Laval is strong in plant design, while Kibun is strong in processing technology and formulation. Yet Kibun holds no soymilk patents.

"Alfa-Laval has made a major contribution to soymilk production by being the world's first company to develop and sell an automated soymilk system. Their system is based on their UHT sterilizer, and incorporates an automated clean-in-place cleanup system. By inactivating the soybean enzymes at the bean stage, before grinding, the system produces a good-tasting soymilk. The economical plant size has a capacity of 2,000 liters/hr, with 1,500 liters/hr the economical minimum." Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549.

2013. Shurtleff, William; Aoyagi, Akiko. 1984. Brief history of Soya Technology Systems (STS-DTD) work with soymilk worldwide (Document part). In: Shurtleff and Aoyagi. 1984. Soymilk Industry and Market: Worldwide and Country by Country Analysis. Vol. 1. 177 p. See p. 122.
• ***Summary:*** "In 1982 Danish Turnkey Dairies (DTD), a major competitor of Alfa-Laval in the field of supplying dairy plants and equipment, decided to compete in supplying soymilk plants as well. Founded in 1969 by Jorn Jensen in Denmark, DTD was acquired in about 1979 by DDS, The Danish Sugar Corporation. By 1983 DTD had built 117 dairy plants in 35 countries. In May 1982 DTD established Soya Technology Systems to focus on soymilk technology. STS opened their main office in Singapore under the direction of Anders Lindner, who had previously worked for 15 years with Tetra Pak. STS licenses soymilk technology, and processes. They published a fine booklet on soymilk and sent out 4,500 copies worldwide in January 1983. A new, improved edition was published and widely disseminated in early 1984. STS is active worldwide in promoting soymilk and selling their systems. In early 1984 they sold a 4,000 liter/hour plant in Sri Lanka. The company emphasized the concept of "Turnkey," which is "single source responsibility. You are guaranteed a complete plant at a fixed price on a fixed date, producing exactly what you had in mind." One of the DTD group of companies called IPT (Integrated Processing Technologies) is an engineering and contracting company that works with STS to design and build plants and install equipment." Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549.

2014. Shurtleff, William; Aoyagi, Akiko. 1984. History of soy protein concentrates, isolates, and textured soy protein products. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 25 p. March 4. Unpublished typescript.
• ***Summary:*** A comprehensive history of the subject. Contents: Definition of types of products. Part I: History of modern soy protein products from origin to 1964. Soy protein isolate: Tofu, Nagel in New York 1903, Beltzer in 1911, Ajinomoto in 1919, Cone and Brown patent in 1928, Glidden (first plant in U.S. for production of industrial grade soy protein isolate) in 1935, first study of use of soy isolates in food (Woodruff at University of Illinois, 1938), Glidden first company in the West to produce a soy protein isolate for use in food (1939, enzyme-modified), Glidden first with large-scale production of non-enzyme modified isolates (1957), Worthington Foods introduced Soyamel in 1952 (first soymilk based on isolate). Soy protein concentrates: First developed and introduced in Germany in 1925, first commercial food-grade concentrates and first patent from Griffith Laboratories in 1959. Textured soy protein products: Developed in China 1,000 years ago, made from tofu or yuba, earliest Western meat analogs developed by John Harvey Kellogg about 1896 (without soy), first synthetic industrial protein fiber (Lanital, made from casein) introduced in Italy 1936, first industrial (non-food) soy protein fibers in 1938 from Robert Boyer of Ford Motor Co. (used for upholstery), Boyer got patent for use in food (1951), rights purchased by Worthington, Dr. Harry Miller's soya loaf in 1939, Worthington first to produce a meat analog based on spun soy protein fibers in 1960, textured soy flour (TSP or TVP) introduced as food ingredient in U.S. in 1964.

Part II: History of modern soy protein products in the U.S. from 1965 to 1981. 1964 Belden report from Harvard Business School *Protein Paradox*. Commercial Protein Foods Studies Program of the U.S. Agency for International Development (AID) encouraged U.S. firms to develop protein foods for the Third World in 1967. General Mills Bac-O's test marketed 1966. Producers. February 1971 breakthrough when USDA authorized use of TVP in school lunch programs. 1972 *Soybeans. Chemistry and Technology,* edited by Smith and Circle, contained all the research on nutrition and processing up to that time. 1973 high beef prices led to beef-soy retail blends. Appearance of TSP cookbooks, starting in 1971. First World Soy Protein Conference held in Munich, Germany, in 1973. In 1974 Miles Laboratories/Worthington Foods introduced Morningstar Farms meat analogs, the first soy protein meat analog entrees marketed to mainstream America. Textured soy concentrates and other concentrate developments. New developments with isolates. New flavorings. New textured soy flour development. 1978 Keystone Conference on soy protein and human nutrition sponsored by Ralston Purina. Problems with government regulation.

Part III: History of modern soy protein products outside the U.S. and Europe (1960-1981): Japan. China. Other Asia: Philippines, India, Sri Lanka. Latin America: Colombia, Mexico. Address: Lafayette, California. Phone: 415-283-2991.

2015. Lindner, Anders. 1984. Re: Soymilk and Soya Technology Systems (STS). Letter to William Shurtleff at Soyfoods Center, March 9–in reply to inquiry. 2 p. Typed, with signature on letterhead. Plus 3 p. inserts.
• ***Summary:*** Answers questions about Alfa-Laval, Marusan and Seikensha, Dawn soymilk made by Malaysia Dairy

Industries, Green Spot (Thailand) owned by Mr. C.C. Cheung, packaging variables, Yeo Hiap Seng.

Attachments: (1) Photocopies of business cards for Thio Kong Poon of Malaysia Dairy Industries Pvt. Ltd. of Singapore. (2) Thio Keng Poon of Malaysia Milk Sdn. Bhd. (Malaysia; Vitagen brand). (3) C.C. Cheung of Green Spot (Thailand) Ltd. (Green Spot, Vitamilk, and F&N brands). (4) Information about three soyabean milk manufacturers in Thailand: Green Spot (Vitamilk brand), Kickapoo (Lactasoy), United Milk Co. (Bonus), plus product sizes and prices. Address: STS, 1501 Hutchinson House, Central, Hong Kong; 505 Cathay Building, Singapore 0922. Phone: 338-6259.

2016. Jenkins, Nancy. 1984. From Vietnam, subtle mix of flavors. *New York Times.* March 21. p. C1.
• ***Summary:*** Estimates of the Vietnamese population of New York City range from 10,000 to 20,000; all agree that the number is growing. In the last few years at least six Vietnamese restaurants have opened in Lower Manhattan.

Nuoc mam is the fundamental ingredient in Vietnamese cuisine; it is used as a seasoning in almost every dish, taking the place of salt and soy sauce. The best quality nuoc mam comes from Phu Quoc, an island off the south coast of Vietnam.

Another important seasoning is tuong, a sweet bean sauce [made from soybeans]; it can be purchased at a number of grocery shops in Chinatown, such as Hoa Than (218 Canal St.) and Thuan-Nguyen (82 Mulberry St.). When Vietnamese from all over New York City do their weekly shopping on Sunday morning, one of the foods they buy is "soft little cakes of sticky rice with sweet yellow bean paste inside."

A recipe for Ba-Nam's nem nuong with Nuoc leo sauce calls for "2 tablespoons tuong" as an ingredient.

Chef Huy's chicken with lemon grass calls for "1 tablespoon nuoc mam" and "1 tablespoon thick soy sauce" as ingredients.

2017. Handy, R.; Mardanus, D. 1984. Menjadi bangsa tempe yang baik [Becoming a good tempeh nation]. *Majalah Promosi.* March. p. 17-19. [Ind]*
• ***Summary:*** Java has 78% of Indonesia's total soybean production and 77% of the total harvested acreage.

2018. Isnijah S.P., Siti; Suharto, Ig.; Yuda M., Adin; Indianti, Tami. 1984. Evaluasi proses panas pada lima jenis olahan tahu dan tempe dalam kaleng [Evaluation of heating on five different processes for canning tofu and tempeh]. Paper presented at Scientific Meeting (Pertemuan Ilmiah) Lembaga Kimia Nasional–LIPI. 24 p. Held March 1984 at Bandung. [Ind]*
Address: Bandung, Indonesia.

2019. Na Lampang, Arwooth. 1984. Soybean production in Thailand. *Tropical Agriculture Research Series* No. 17. p. 37-43. March. International Symposium on Soybean in the Tropics and Subtropics. [6 ref]
• ***Summary:*** Abstract. Soybean production in Thailand. Cropping patterns and practices. Varietal adaptation and improvement. Pest management. Harvest and storage. Marketing. Consumption and utilization. Prospects and constraints. Acknowledgement. Discussion. Tables: (1) Soybean acreage, yield and production in Thailand (1971-81). (2) Balance of soybean export and importation during 1976-1930. (3) Soybean prices at different locations (US g/kg) (1977-1981). Address: Field Crop Research Inst., Dep. of Agriculture, Bangkhen, Bangkok 10900, Thailand.

2020. Ojima, M. 1984. Closing remarks. List of Participants. *Tropical Agriculture Research Series* No. 17. p. 167-79. March. International Symposium on Soybean in the Tropics and Subtropics.
Address: Chief of First Crop Div., National Agriculture Research Center, Japan.

2021. Shanmugasundaram, S. 1984. Limited popularity of soybean cultivation in South and Southeast Asia. *Tropical Agriculture Research Series* No. 17. p. 115-25. March. International Symposium on Soybean in the Tropics and Subtropics. [19 ref]
• ***Summary:*** Contents: Abstract. Research emphasis. Socio-economic aspects. Major causes for low yield and future prospects: varietal development, agronomic aspects, disease and insect problems, adaptability to unfavorable environments. Conclusion. References.

Tables: (1) Soybean area, production and yield in South and Southeast Asia. (2) Soybean exports. (3) Asian soybean imports. (4) Soybean production costs and returns in Thailand, Philippines, and Taiwan. (5) Comparison of production factors between grain soybean and its competing crops–vegetable soybeans, pods, seeds, and adzuki bean in Taiwan, 1979-80 (in US$/ha). (6) Production costs and returns for soybeans in selected South and Southeast Asian countries and the USA. (7) Major soybean cultivars grown by farmers in different countries until 1972. (8) Major soybean cultivars developed after 1972 and grown by farmers until 1982. (9) AVRDC soybean cultivars released by national programs. (10) Yield of G 2261 in three different densities at IRRI in the dry season. (11) Yield of selected AVRDC genotypes at Sukamandi in West Java, Indonesia. (12) Cultivars with high yield potential in the tropics.

Figures: (1) Graph of area planted to soybean, adzuki beans and vegetable soybean in Taiwan (* Kaohsiung district only), 1971-1982. (2) AVRDC selections with high yield potential that are adapted to different seasons. Address: AVRDC, Shanhua, Taiwan.

2022. Somaatmadja, Sadikin. 1984. Development of soybean culture in Indonesia. *Tropical Agriculture Research Series* No. 17. p. 23-36. March. International Symposium on Soybean in the Tropics and Subtropics. [3 ref]

• ***Summary:*** Contents: Abstract. Area and production: Share in national food production, national soybean production, producing centers, soybean area. Supply and demand situation: Export and import, future demand and production, utilization. Methods of cultivation: Cropping system, cultivation, pests, diseases and other problems. Research and CRIFC: Research program and activities. Support for soybean production. Further prospects and main constraints. Discussion (questions and answers).

Utilization (p. 28): "1. Side-dish with rice: Tempe (fermented soybean cake), tahu (soybean cake), tauco (soybean paste), tauge (soybean sprout), kecap (soy sauce) and goreng kedelai (fried soybeans). Of these, tempe and tahu are very important in the diet of the people.

"2. Snacks: Roasted soybeans, kerupuk tahu (tahu chips), boiled young soybean pods" [edamame].

Tables: (1) Annual average soybean production during and before PELITA (Five-year development plan, 1964-1981). (2) Soybean production in the last six years, 1977-1982 (East Java, Yogyakarta, Lampung, Central Java, Nusa Tenggara Barat {NTB}, West Java). (3) Soybean production in six [major soybean producing] provinces, 1988-1981. (4) Soybean production in four additional centers, 1977-1981 (D.I. Aceh, N. Sulawesi, Bali, S. Sulawesi). (5) Soybean harvested area, yield and production in sawah (rice fields) and tegalan (dry land), 1979-1981. (6) Export and import of soybean, 1969-1982 (Indonesia was a small exporter until 1977 when exports stopped; imports over 100,000 tonnes began in 1976, and by 1982 had risen to 476,000 tonnes). (7) The estimated demand for soybean and production target, 1983-1988 (Source: Directorate General of Food Crops). (8) The important insects of soybean. (9) Improved soybean varieties. (10) Packages of technology in the intensification and areal [area] expansion programs.

Graphs: (1) Demand, production, and import of soybeans, 1978-1982. (2) Target of soybean area, 1983-1988 (tegalan field area is expected to rise rapidly; sawah field area will stabilize starting in 1985). A map of Indonesia (p. 31) shows seven research institutes under the Central Research Institute for Food Crops (CRIFC). They are located in Bogor, Sukamandi, and Lembang (W. Java), Sukarami (W. Sumatra), Banjarmasin (S. Kalimantan), Maros (S. Sulawesi), and Malang (E. Java). Address: Central Research Inst. of Food Crops, JL Merdeka 99, Bogor, Indonesia.

2023. Suzuki, Steven. 1984. Pacific Rim potential for edible soybeans. In: Ontario Soya-Bean Growers' Marketing Board. ed. 1984. Ontario Soybean Symposium. Chatham, Ontario, Canada: OSGMB. 319 p. See p. 224-41.

• ***Summary:*** Soybeans were first exported from Canada about 12 years ago when a Japanese house approached the Ontario Soybean Grower's Marketing Board for a trial shipment to Japan. The trial worked out very well and in a short time Ontario's soybean exports became a multi-million dollar business. Ontario soybeans are very clean, the quality is comparable to Japanese and Chinese soybeans, and the supply is consistent. However the price is high in relation to Chinese and U.S. soybeans. As a result, Ontario soybeans are sold in high-priced markets, as for making premium quality miso or soyamilk. The supply of Chinese soybeans is irregular. Address: Manager, Grain Trading Section, Okura & Co. America Ltd., New York, NY.

2024. *Tropical Agriculture Research Series.*1984. General discussion: H.E. Kauffman, chair. No. 17. p. 162-66. International Symposium on Soybean in the Tropics and Subtropics.

• ***Summary:*** Participants in this discussion include: Bhatnagar, Sumarno, Trikha, Sadikin, Rahman, Galal, Al Jibouri, Lampang, Shanmugasundaram. Gotoh. Address: INTSOY.

2025. Wernham, Les. 1984. Exports–Problems and opportunities [for Canadian soybeans]. In: Ontario Soya-Bean Growers' Marketing Board. ed. 1984. Ontario Soybean Symposium. Chatham, Ontario, Canada: OSGMB. 319 p. See p. 246-53.

• ***Summary:*** Soybean exports from Ontario have expanded dramatically during the past 10 years; in 1982 they reached a high of 132,000 tonnes worth $44 million. The East Asian market including Japan, Korea, Hong Kong, and Malaysia accounted for 81% of Ontario's export soybean sales in 1983, with an additional 8% going to Europe. The main buyers in 1982 were: Japan 47,414 tonnes, Netherlands 19,545 tonnes, Singapore 18,039 tonnes, Indonesia 16,652 tonnes, Hong Kong 15,234 tonnes.

Most of these soybeans are sold for human consumption. "For example, one of Sweden's foremost pharmaceutical manufacturers has in the past years been that country's largest single importer of Canadian soybeans. Taking about 3,000 tons annually, this company produced a patented intravenous nourishment called Intralipid." Tiny soybeans (5 mm diameter or less) are used to make bean sprouts and natto. For soybean exports, freight constitutes an average 21% of the net delivered cost to the buyer in his country. They are shipped in bagged or bulk (20 or 40 foot) containers. The main focus of breeding should be to develop varieties that do not carry a common bitterness or beany flavor. Address: Grain Manager, King Grain, Chatham, ONT, Canada.

2026. Simpson, Rita J. 1984. Re: 1982 statistics on production of soybean-based products in Tetra Brik packages. Letter to William Shurtleff at Soyfoods Center, April 18. 1 p. Typed, with signature on letterhead.
• ***Summary:*** The products include plain and flavored soybean milk, plus tofu (million liters): Japan 51.0, Hong Kong 15.0, Malaysia 11.5, Korea 7.0, Thailand 4.0, Singapore 2.5.

"Our international office is aware of your need for the 1983 statistics and I will forward them when received." Address: Vice President, Information, Brik Pak Inc., P.O. Box 802605, Dallas, Texas 75380. Phone: 214 934-0338.

2027. Steinkraus, Keith H. 1984. History of his work with tempeh (Interview). Conducted by William Shurtleff of Soyfoods Center, April 27. 2 p. transcript. [65 ref]
• ***Summary:*** First Flora Yap came to do tempeh research at his lab. Then he began working on tempeh with Dr. György in Philadelphia, Pennsylvania. Dr. György had traveled to Indonesia many times and knew tempeh well; he was well aware of the severe malnutrition among Indonesian children, and he felt that tempeh offered a way of improving their diet. But he didn't have the facilities to make tempeh in larger quantities, so Dr. Steinkraus made the tempeh and sent it to Dr. György, who used it in his nutritional studies. György found that tempeh was much more resistant to the development of rancidity than soybeans. That led to the work with Murata on antioxidants. Many nutritionists believe that rancid food, which contains high levels of peroxides, is quite harmful to consumers.

Then in 1959 Dr. Steinkraus went to Indonesia, mainly to visit the Saridele soymilk plant there which was supported by UNICEF. They were having trouble with the nutritional value of their soymilk. While in Indonesia, Dr. Steinkraus visited some tempeh plants for the first time. Address: New York State Agric. Exp. Station, Geneva, NY 14456.

2028. Steinkraus, Keith H. 1984. Re: Early work with Flora Yap and Tempeh at Geneva, New York. Letters to William Shurtleff at Soyfoods Center, April 30 and May 14. 1 p. each.
• ***Summary:*** Yap Bwee Hwa of Indonesia obtained her degree in nutrition. At that time Dr. Steinkraus was also a faculty member in the Graduate Field of Nutrition. She did her course work under the direction of Prof. Louise Daniel. She did her research in Dr. Steinkraus' laboratory but the rat feeding experiments were done under the direction of Louise Daniel and Dr. Richard Barnes, formerly Director of the Graduate School of Nutrition.

"Dr. van Veen and I were in contact for a number of years before he left FAO in Rome to come to Cornell University. It is obvious that Flora Yap also had been in contact with Dr. van Veen, perhaps during his trips to Indonesia...

"Perhaps a letter to Ms. Yap at Am Muehlenwaldchen 1A, D-6670 St. Ingebert, West Germany, will give you further information on why Flora came to my laboratory clutching her small bottle of sun-dried tempeh which she used for inoculum. I still have that original bottle of dried ground tempeh... On it was written 'Enzyme Preparation Obtained in Indonesia by Miss Yap.'" Address: Prof. of Microbiology, Dep. of Food Science & Technology, New York State Agric. Exp. Station, P.O. Box 462, Geneva, NY 14456-0462. Phone: 135-787-2276.

2029. Abdullah, Aminah; Baldwin, Ruth E. 1984. Mineral and vitamin contents of seeds and sprouts of newly available small-seeded soybeans and market samples of mungbeans. *J. of Food Science* 49(2):656-57. March/April. [10 ref]
• ***Summary:*** "Germination reduced iron and increased phosphorus and sodium contents in both soybeans and mungbeans, but potassium content was not changed significantly. Germination increased amounts of thiamin, riboflavin, niacin, and ascorbic acid in both soybeans and mungbeans." Address: 1. Dep. of Food Science & Nutrition, National Univ. of Malaysia, Bangi, Selangor, Malaysia; 2. Dep. of Food Science & Nutrition, Univ. of Missouri, Columbia, MO 65211; Biological & Agricultural Index 1984/10, p. 577.

2030. Ohta, Teruo. 1984. Seijinbyô o fusegu to Amerika de hyôban no Jawa nattô, tenpe [Tempeh, Java natto, prevents geriatric diseases and is popular in America]. *Watashi no Kenko (My Health).* April. p. 66-69. [Jap]
Address: National Food Research Inst. (Shokuhin Sogo Kenkyujo), Kannon-dai 2-1-2, Yatabe-machi, Tsukuba-gun, Ibaraki-ken 305, Japan: Bucho, Norin Suisansho.

2031. Yap, Bwee Hwa Flora. 1984. Re: Early history of her work with tempeh. Letter to William Shurtleff at Soyfoods Center, May 17. 2 p.
• ***Summary:*** The first Indonesian to do scientific research on tempeh, and to write a post-graduate thesis on the subject was Ms. Yap Bwee Hwa–a Chinese Indonesian, whose name comes from the Hokkian dialect of Fujian (Fukien) province. After graduating from the Fakultet Ilmu Pasti dan Alam (Faculty of Natural Sciences and Mathematics) in Bandung with a major in biochemistry (degree equivalent of MSc), she went to work in Jakarta at the Nutrition Institute under Dr. Poorwo Sudarmo, a progressive physician interested in nutritious, low-cost foods for infants. She then won a Fulbright scholarship to the United States and Sudarmo encouraged her to study tempeh. After reading an article by van Veen on the value of tempeh in prisoner of war camps, she made up her mind. The Fulbright committee

suggested that she study at Cornell University, so she wrote Dr. Hand, head of the Department of Food Science and Technology at Cornell's New York State Agricultural Experiment Station. While still in Indonesia, she visited tempeh plants to study the process, collected tempeh from the Jakarta market, then dried it and put it into a little brown bottle for later use as tempeh starter. She left Indonesia for the USA in August 1957. In the summer of 1958 she started to work in Dr. Keith H. Steinkraus' laboratory at Geneva, New York, where, for the first time, she prepared tempeh. This was probably the first tempeh ever made in America. A graduate student in nutrition and food science, Ms. Yap pursued her interest in tempeh as a nutritious food for infants and children, in part because of the high rate of infant mortality in Indonesia caused by undernutrition. In 1960 she wrote her MS thesis titled *Nutritional and Chemical Studies on Tempeh, an Indonesian Soybean Product.* That same year she co-authored the Cornell group's first tempeh publication "Studies on Tempeh–An Indonesian Food" (Steinkraus et al. 1960). It is also interesting to note that it was from the pulverized sample of tempeh that Yap brought with her from Indonesia that the group isolated the culture of *Rhizopus oligosporus,* which Dr. C.W. Hesseltine later identified and gave the number NRRL 2710 (ATCC 22959). This is still the most widely used tempeh culture strain in the USA. Address: Am Muehlenwaeldchen 1A, D-6670 St. Ingebert-Rohrbach, West Germany.

2032. Torii, Yasuko. 1984. New developments with tempeh in Japan (Interview). Conducted by William Shurtleff of Soyfoods Center, May 25. 4 p. transcript.
• ***Summary:*** This interview, conducted during a visit by Mrs. Torii to Soyfoods Center in Lafayette, California, discusses: Marukin Shokuhin Kogyo in Kumamoto city, Japan, Mr. Goro Kanasugi, the recent start of production of tempeh starter in Japan, tempeh made by Takashin / Takato, René Breuls, sales outlets for tempeh in Japan, Marusan-Ai in Okazaki, update on Torigoe, soybeans in Indonesia, symposium at Tsukuba (Japan) on tempeh and natto, Japan Tempeh Research Society *(Tenpe Kenkyukai,* Korin Shuppan KK, Iriya 1-27-4, Taito-ku, Tokyo), Okinawa fermented tofu *(tofu-yo),* Yamagata no Shojin Bushi (dried tofu that is shaved like katsuobushi). Address: Kamitsuchidana 324, Ayase-shi, Kanagawa-ken 252, Japan. Phone: 0467-76-0811.

2033. *Campus News (National University of Singapore).* 1984. Soy sauce success on campus. No. 27. p. 1. May.
• ***Summary:*** Dr. Yong Fook Min of the National University of Singapore Department of Biochemistry has developed a new process for making high-quality soy sauce in only 9 days–rather than the typical 90 days. It will soon be tested on a pilot plant production scale.

2034. Harvey, Gerald W. 1984. Market opportunities for U.S. soybean sales. *Foreign Agriculture.* May. p. 19-21.
• ***Summary:*** From $482 million in 1960, the value of U.S. soy exports rose to $7,900 million in calendar 1983 and is expected to surpass $8,000 million this year. Discusses the outlook for Mexico, Venezuela, Ecuador, Peru, Brazil, Argentina, Paraguay, Korea, China, Malaysia, Philippines, Indonesia, Burma, Thailand, Nigeria, USSR, Yugoslavia, Poland, and Romania. Address: Oilseeds and Products Div., Foreign Agricultural Service. Phone: 202-447-8809.

2035. Soyfoods Center. 1984. Tempeh (color slide show). P.O. Box 234, Lafayette, CA 94549. 75 slides. Narration with each set.
• ***Summary:*** Slide show (#4). 1. The Soyfoods Center Presents... 2. Tempeh is a delicious high-protein fermented or cultured soyfood. Sold in 3/4-inch thick cakes and usually deep or shallow-fried until crisp and golden brown, tempeh has a flavor and texture resembling those of southern-fried chicken or fish sticks. For centuries a backbone of the Indonesian diet, tempeh is prepared fresh each morning at some 41,000 shops on Java alone. 3. Tempeh is increasingly available at reasonable prices throughout the United States, especially at natural or health food stores, or at Indonesian specialty shops. Tempeh is an excellent source of nutrients, containing 50 percent more protein than hamburger and completely free of cholesterol; it is also the world's richest known source of vegetarian vitamin B-12. Like all soyfoods, tempeh is rich in lysine, the essential amino acid in shortest supply in most cereal grains. Serving tempeh and grain at the same meal boosts the amount of usable protein by up to 40 percent. 4. Tempeh has many virtues. 5. It promises to be an important part of meatless diets and of the new emerging American cuisine.

6. A typical package of tempeh. 7. There are various types of tempeh. 8. Here is a kit for making tempeh at home; it contains everything you will need. 9. Tempeh at a market in Bali, Indonesia. 10. Different sized packages of tempeh in Indonesia; made and sold wrapped in banana leaves.

11. Tempeh sold in a market place in Java. On the left is tofu simmered in turmeric, a natural preservative. 12. Now let's learn how to make tempeh at home. The soybeans can be dehulled either wet or dry. We prefer wet dehulling. But this is how it is done dry. For best results with dry dehulling, preheat the soybeans at 250ºF in an oven for 10 minutes, or just until the hulls split. 13. Tempeh is easily made at home. Begin by combining 2½ cups soybeans with 7½ cups water in a large pot. 14. Bring just to a boil. 15. Then remove from heat, cover, and allow to stand for 8 to 16 hours.

16. Carefully pour off water from pot then vigorously rub beans between the palms of both hands for 3 to 4 minutes to remove hulls. 17. Then pour off hulls into a strainer. Repeat this process several times until all the beans are dehulled. 18. To the drained beans in the pot add 10 cups (hot) water and 1½ tablespoons vinegar. 19. Bring to a boil and cook, uncovered, for 45 minutes, then pour contents of pot into a large colander and allow beans to drain well. 20. Then allow beans to dry for 20 to 30 minutes on a double layer of absorbent toweling.

21. To make the container for incubation you can use Ziploc bags, baking pans, pie tins, etc. We prefer Ziploc bags. Take two 7-by-8-inch polyethylene bags and, using an ice pick, make holes in a grid pattern every ½ inch. 22. When the soybeans have cooled to body temperature and are well dried, transfer them to a separate clean tray for inoculation. 23. Now we are ready to inoculate them. The inoculum, tempeh starter, is available from The Farm in Tennessee or from Organic Gardening magazine. Once you buy one small packet you can make more of your own, using illustrated instructions in our book of tempeh. To inoculate, simply take 1 teaspoon of starter, sprinkle it over the beans... 24. And mix well. 25. Then spoon half of the inoculated beans into each of the two perforated bags.

26. Flatten each bag to a thickness of ½ to 3/4 inch. 27. Then place bags in an incubator. This incubator is made from a Styrofoam cooler or picnic basket heated by a 20-watt electric bulb regulated by an aquarium or chick brooder thermostat. A water heater room or any other place as warm as 86ºF (30ºC) can serve as an incubator. 28. Incubate the tempeh at 86 to 88ºF for 22 to 26 hours. When done, the beans should be bound together firmly into fragrant white cakes. 29. A large cake of finished tempeh and tempeh in burger rounds made in yogurt containers. 30. Here is an incubator made from two cardboard boxes, the space between the larger and the smaller being filled with batting for insulation. Note the perforated rack on which the tempeh is placed.

31. Good tempeh looks like this when sliced. 32. Tempeh is as versatile and delicious as it is nutritious and inexpensive. Most of the tempeh in Indonesia is served deep-fried or shallow-fried to give it a crisp texture and savory flavor. Here tempeh is being shallow fried to make crisp tempeh chips. 33. Crisp tempeh chips with creamy tofu dip. 34. Tofu burger. 35. Tofu burgers (open faced) made with round tempeh patties.

36. Some people like to grill their burgers first with a miso sauce. 37. Label of tempeh patties. 38. TLT; Tempeh, Lettuce & Tomato Sandwich. 39. Tempeh Sloppy Joe. 40. Canning Tempeh Sloppy Joe.

41. Tempeh burritos or tacos. 42. Tempeh in pita bread. 43. Tempeh Guacamole and Crisp Tempeh Bits on tortillas. 44. Breaded Tempeh Cutlets or Croquettes. 45. Tempeh Lumpia, a Filipino dish.

46. Tempeh Gyoza or Egg Rolls. 47. Tempeh Felafels; Temptations. 48. Tempeh is delicious simmered in coconut milk with herbs and spices. The milk is easily made at home in a blender as described in The Book of Tempeh. 49. Simply pour the mixture of coconut pulverized with hot water into a strainer and press out the coconut milk with your fingertips. 50. Tempeh starter can also be made at home. Here is a method for growing it on soybeans and sifting off the spores. 50A. It can also be grown on pressure cooked white rice, cooked in a Mason jar.

51. Now to Indonesia. A sketch of a large Indonesian tempeh shop. 52. In a few areas, tempeh is incubated packed in bamboo halves. 53. Close-up. 54. Carrying the tempeh to market. 55. Indonesian tempeh wrapped in banana leaves and polyethylene bags.

56. Tempeh in small packets wrapped with banana leaves in the Yogyakarta market, May 1977. 57. Close-up. 58. Here is a wife cooking tempeh in a typical village kitchen. 59. Thin tempeh slices at the marketplace are dipped in a batter of spiced coconut milk and rice flour, then deep-fried to make tempeh chips. 60. Here are tempeh cutlets, seasonings, and chips.

61. Other ready-to-eat tempeh items in a West Javanese market. 62. Tempeh chips in a marketplace in Yogyakarta, Java. 63. Making grilled tempeh on skewers like shish kebab over a home barbecue. 64. Making Sate, a similar skewered delicacy with a wonderful dipping sauce, sold here by a street vendor. 65. Javanese markets are a festival of colors. Most tempeh cuisine includes a load of blazing hot chilies...

66. ...which are ground by hand in stone mortars for use in sauces. 67. Like most traditional societies, Indonesia has a grain-centered diet. The colors of natural grains and beans in the markets are a feast for the eyes. 68. In Indonesia the remarkable winged bean is also made into tempeh; or it can be made into tofu or deep-fried tofu.. 69. A close relative of tempeh is onchom, which is usually made from peanut presscake or okara with a Neurospora mold. It is sold in cakes in the markets of West Java. 70. ...and may have a distinctive orange color from the mycelium.

71. To make onchom, steamed peanut presscake is packed into molds, 72. Inoculated with onchom from a previous fermentation, 73. Placed in an incubator where it generates its own heat from fermentation, 74. And looks like this when it is finished. Address: Lafayette, California.

2036. Soyfoods Center. 1984. Tempeh production in the USA (color slide show). P.O. Box 234, Lafayette, CA 94549. 77 slides. Narration with each set.
• ***Summary:*** Slide show (#5). A. The Soyfoods Center presents... B. Basic types of tempeh shops. C. Temperate climate dry dehull tempeh method. D. Temperate climate wet dehull tempeh method.

1. This sequence shows The Tempeh Works in Greenfield, Massachusetts, April 1980. The soybeans are dry dehulled without preheating or pre-grading. 2. Overview of the shop interior. 3. Ditto, with soaking vats in use. 4. Cooking soybeans in a steam-jacketed cooker. 5. Skimming off the hulls. 6. Running soybeans from cooker into sack in centrifuge. 7. Beans in sack in centrifuge. 8. Preparing to centrifuge beans. 9. Transferring centrifuges soybeans into inoculation container. 10. Inoculating the soybeans.

11. Mixing in inoculum by hand. 12. Scooping inoculated beans into pre-perforated polyethylene bags. 13. Weighing bags. 14. Another view of filling area. 15. Heat-sealing the bags. 16. Compacting beans and flattening bags. 17. Transferring bags on rolling rack into incubation room. 18. Bags on racks in incubation room. 19. Pressure steaming tempeh in bags; tempeh is distributed refrigerated, not frozen. 20. Wall mounted sanitation unit.

21. Making tempeh at Island Spring in Vashon, Washington. The weighed soybeans are transferred into a used (inoperative) steam jacketed kettle used as a wash and rinse tank. 22. After washing and rinsing (but without soaking), the beans are dehulled in a tofu shop stone mill. 23. Then cooked and skim-dehulled in a steam jacketed kettle. 24. After being drained in the screen-bottom kettle, they are dewatered in a centrifuge. 25. Then put in a mixer with inoculum and mixed well. 26. The inoculated beans are placed 8 ounces at a time in polyethylene tofu tubs, packed by hand with a tamp.

27. Then placed on trays in a rolling rack in the tubs. 28. The mouth of each tub is covered with plastic film using a tofu packaging machine, perforated with an attachment on the machine. 29. As shown here. 30. The tubs filled with inoculated beans are placed on trays in a rolling rack and rolled into an 8-foot-cube incubation room. 31. After incubation the perforated top of each tub is covered with a label to close the perforations. 32. The finished tempeh and its package look like this.

33. Now we will visit Surata Soyfoods in Eugene, Oregon. The tempeh maker is Benjamin Hills. The soy beans are precooked in a large pot over a gas burner. 34. Then dehulled in a tofu shop stone mill. 35. After a second cooking they are drained in the pressing sack of a tofu hydraulic press, then pressed to dewater them. 36. Inoculated with starter. 37. Mixed well by hand. 38. Scooped in 8-ounce quantities into perforated Ziploc-type bags. 39. Which are placed on bread racks. 40. And incubated in a large incubation room. 40A. Examining the finished tempeh. 40B. Freezing the tempeh for long distance distribution.

41. Tempeh Enterprises in Toronto, Ontario. The soaked beans are dehulled in a meat grinder with a special extruder blade attachment. 42. The cooker, specially designed, places the cooking pot on the stove then carries it later to the draining sink. 43. The hulls are skimmed off during cooking. 44. Ziploc-type bags are perforated using a sharpened screwdriver and a special grid set over an opened drawer.

45. The beans are weighed into perforated bags in 16-ounce quantities. 46. Tamped firm. 47. And placed overhead on racks in an incubation room. 48. Each cake is cut into fourths. 49. For freezing, the cakes are placed between perforated racks to ensure air circulation. 50. These Coleman refrigerators, used to distributed refrigerated or frozen tempeh, plug into the cigarette lighter of a car.

51. At Northern Soy in Rochester the tempeh is frozen on these racks. 52. Finished tempeh made in a metal tray, from The Tempeh Works. 53. Tray tempeh being cut. 54. Freezing this tempeh. 55. A low-technology dry dehuller developed at the University of Illinois. 56. Another view. 57. Gale Randall's home tempeh incubator in Nebraska. 58. Bag tempeh. 59. Tray tempeh.

60. Making tempeh starter at Island Spring. A positive pressure hood with the hood down. 61. Inoculating rice (already pressure cooked in a Mason jar) under the hood. 62. Overview of positive pressure hood. 63. Pulverizing the starter in a blender. 64. Drawings of Rhizopus oligosporus by the Japanese scientist, Kendo SAITO, who named it in 1905. 65. The Rhizopus mycelium. 66. The Rhizopus sporangia. 67. Rhizopus after sporulation.

68. Living tempeh starter, made by GEM Cultures on nutrient agar in a petri dish. 69. Method for doing a viable spore count on tempeh starter (or transferring a pure culture). Pipetting a spore suspension or dilution into petri dish. 70. Adding nutrient agar. 71. Shaking all together. Address: Lafayette, California.

2037. Soyfoods Center. 1984. Tempeh production in Indonesia USA (color slide show). P.O. Box 234, Lafayette, CA 94549. 72 slides. Narration with each set.

• ***Summary:*** Slide show (#6). 1. The following slides show the production of tempeh in Indonesia in a number of different shops using different technologies, methods, and scales of production. Here we see a very large shop, the Oeben shop in Bandung, West Java, which uses 660 pounds of dry soybeans daily. First, water is brought to a boil in large caldrons. 2. Then poured into wooden vats containing washed soybeans. 3. The soybeans are soaked overnight in the warm water. There they undergo a prefermentation, which lowers the pH and causes foaming. 4. The soak water is discarded and the beans drained in woven bamboo baskets. 5. Then they are treaded underfoot to remove the hulls, which are floated off in a tank. 6. The beans are transferred back into the caldron and simmered or steamed for 1½ to 2 hours.

7. Again they are well drained. 8. And a weight is put on top to help expel excess water. 9. After about 30 minutes they are transferred to a large cooling tray, and cooled with

a fan. 10. Tapioca is sprinkled on in this shop to serve as an energy source for the starter and to help reduce the moisture content. 11. The inoculum consists of soybeans which have been inoculated and allowed to sporulate between hibiscus leaves (we will see the process shortly). The leaves are pulled apart and their surfaces rubbed over the warm soybeans; the spores come off and inoculate the beans. 12. The inoculated beans are then poured into shallow trays lined with perforated plastic. 13. Leveled and smoothed.

14. Stacked and covered on top to form a sort of incubator, the heat being generated by the fermentation process. 15. After about 8 hours of incubation in this way, the trays are unstacked and placed in incubation racks. Here they are left to incubate for 14 hours. 16. Then each tray is inverted leaving the plastic-wrapped tempeh resting on the bottom of an empty tray. 17. Here they are allowed to stand for about 17 hours more, or a total of 39 hours. 18. At about midnight, each pallet of tempeh is cut into cakes and sold.

19. The same shop also incubates about half of its tempeh in small perforated plastic bags. 20. To make the typical Indonesian tempeh inoculum, inoculated soybeans are placed about 20 to 30 on the fuzzy underside of hibiscus leaves, which are placed together like sandwich halves and stacked 4 to 6 layers deep in trays lined with perforated plastic sheeting. 21. Several trays are covered with cloth while they incubate for 3 to 4 days until the mold sporulates. 22. The leaves are then uncovered and allowed to dry. 23. Just before inoculating the next batch of soybeans, the leaf sandwich is opened, revealing the sporulated mold.

24. A modern stone mill dehuller. 25. A simple machine for dehulling and hull separation.

26. In this next small shop in West Java, the beans are dehulled by rubbing between the hands. 27. And the hulls poured off. 28. They are incubated in plastic bags, which are first stacked and perforated many at once with an ice pick. 29. Inoculated beans are poured into each bag. 30. The bags flattened. 31. Then arranged on long incubation shelves. 32. Which are put into racks. 33. Or under the rafters and incubated at room temperature for about 48 hours. 34. Midway through the fermentation, each bag is inverted and patted to compact the beans. 35. At the same shop, some of the inoculated beans are incubated inside long tubes of banana leaves joined together by wooden pins. 36. The finished tempeh is carried to market to be sold by children. 37. Or elders.

38. In this small but typical shop in Bali the soybeans are cooked in a drum-can caldron. 39. Treaded underfoot by the riverside to loosen the hulls. 40. Which are poured off first. 41. Then completely floated away by the river current. 42. After the second cooking, the beans are inoculated with homemade hibiscus leaf starter. 43. Scooped into plastic bags. 44. And incubated under the eaves, outdoors, for about 48 hours. 45. The next morning the craftsmen puts his tempeh and his neighbor's tofu in cans on the back of his bicycle. 46. And is off to market.

47. Now lets look at a large modern Indonesian shop, Tempeh Murni, in Yogyakarta, East Java. Here is Mr. Murni and his soybean granary. 48. The soaked beans are carefully washed and any stones removed by hand. 49. Then they are cooked in large caldrons. 50. And dehulled in this homemade stone mill rather than by foot. 51. The hulls are floated off by hand on shallow bamboo trays in barrels of water. 52. A delicate process.

53. Inoculation takes place again with hibiscus leaf inoculum on large bamboo trays. 54. Small portions of beans are wrapped in banana leaves. 55. And incubated in racks. 56. In some west Javanese shops the beans are wrapped in long portions in banana leaves. 57. And in food technology laboratories new dehullers are being developed, which both remove the hulls and float them off.

58. The aristocrat of Indonesian tempehs is Malang Tempeh, made in the city of Malang, East Java. In many areas there are tempeh cooperatives and the beans are dehulled by treading them underfoot in bamboo baskets in communal ponds. Then they are recooked and cooled in bamboo trays. 59. The hibiscus leaf inoculum rubbed in. 60. Banana leaves are perforated. 61. And used to line large tables. 62. A unique method. 63. Inoculated beans are poured onto the tables. 64. And smoothed.

65. To form a layer the depth of the middle finger up to the knuckle, about 1¼ inches, which is much thicker than most tempeh 66. The layer of beans is then covered with perforated banana leaves. 67. And the leaves weighted with bricks to compact the beans and hold in the heat. 68. After a 48-hour fermentation, the tempeh is cut at a slant into cakes. 69. Which look like this. 70. These are placed in boxes. 71. And taken to the market to be sold. Address: Lafayette, California.

2038. Claiborne, Craig. 1984. Q&A. *New York Times.* June 6. p. C6.

• ***Summary:*** Q. A reader recently read a novel about Victorian England and a relish or condiment named "Windermere catchup" was mentioned. "Are you familiar with this?"

A. Yes. It was a type of mushroom ketchup made with or flavored with horseradish.

"The Malaysians claim the original [ketchup] was theirs and ketjap manis, used throughout Indonesia, is available in specialty food shops all over the world." Today, the "most famous ketchup is, of course, tomato ketchup." Address: Food editor, the Times.

2039. Shurtleff, William; Aoyagi, Akiko. 1984. History of soy sauce, shoyu, and tamari. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 118 p. June 6. Unpublished typescript.

• ***Summary:*** A comprehensive history of the subject. Contents: What is soy sauce? Etymology. World overview. Part I: History of soy sauce in China and Taiwan. Early Chinese soy sauces (shih-you and jiangyou). The 1800's. 1900-1948. 1949-1980's (People's Republic of China). Taiwan. Hong Kong. Part II: History of soy sauce in Southeast Asia and Korea. Dissemination and common characteristics. Association of Southeast Asian Nations (ASEAN)–general. Philippines (1912-). Thailand (1974-). Malaysia (1970-). Singapore. Indonesia. Vietnam. Korea. Part III: History of shoyu in Japan. Hishio (jiang), tamari, and other forerunners of shoyu (700-1600). The development of shoyu (1500-1700). Standardization of the shoyu formula (1716-1867). The rise of shoyu in Japan (1750-1867). Overview of origins. Shoyu during the Meiji period (1868-1911). Shoyu from 1912-1945. The postwar period and modern times (1945-1981). Part IV: History of soy sauce in Europe. Part V: History of soy sauce in Australasia and the Pacific. Part VI: History of soy sauce in the United States. Part VII: History of soy sauce in Latin America, Africa, the Indian Subcontinent, and the Middle East. Address: Lafayette, California. Phone: 415-283-2991.

2040. Hansen, Barbara. 1984. Tofu. *Los Angeles Times.* June 7. Food section (Part VIII). p. 1, 9, 12, 14. Thursday.
• ***Summary:*** Don Bushman, American Soybean Assoc. director in Singapore, notes that the Asian soybean market is growing rapidly. "Indonesians consume about 1 million tons of soybeans annually, 60% to 65% of them in the form of tofu, and 35% to 40% as *tempe.* The fifth-largest nation in the world in terms of population, Indonesia imports 400,000 tons of soybeans a year, about 90% of them from the United States. Some 25,000 to 30,000 tons of soybeans are used annually for food in Malaysia, and 15,000 to 20,000 tons are imported to Singapore for food use, Bushman said. In Singapore and Malaysia, most of the tofu is made with Canadian beans, he added, explaining that Canada is able to deliver the beans at a lower cost. Thailand produces all of its food beans domestically and does not import additional supplies, Bushman said. However, the United States sends soy meal for animal feed to this and other Asian countries."

2041. Chandrasiri, Vasina. 1984. Assessment of protein quality in soybean processed foods: Available lysine contents. *J. of the National Research Council of Thailand* 16(1):35-50. Jan/June. [18 ref. Eng; tha]
• ***Summary:*** Available lysine contents of soybeans and 10 soyfoods was determined as follows: raw soybeans 6.62 g/ 16 g nitrogen, cooked soybeans 6.12, white tofu 5.64, yellow tofu 6.24, soft curd tofu 5.63, tube tofu 6.17, yuba 8.13, soymilk 4.43, soy sprouts 3.79 (each g/16g N).

Values for fermented soyfoods were as follows: white soybean paste [miso] 4.72, black soybean paste 3.72, fermented curdcake (okara) 5.35. 30 minutes of boiling did not reduce the available lysine significantly. The study concluded that there was no reduction in available lysine content of soybeans before they were made into fermented or non-fermented soyfoods. There was no change in the amount of available lysine in the non-fermented soyfoods, but there was a small, statistically significant reduction in fermented soyfoods. Address: School of Home Economics, Sukothaithammatirat Univ., Thailand.

2042. Wilson, John C. 1984. The manufacture of soymilk which is not contaminated with undesirable "beany flavor," resulting from enzyme induced oxidation of fats. Paper presented at the Singapore Inst. of Food Science & Technology Symposium. 19 p. Held June 14-15 at the Hyatt Hotel, Singapore. [8 ref]
• ***Summary:*** Introduction: "This paper anticipates a series of questions and tries to inform the reason for things pertaining to our topic according to the perspective from which we see things in 1984." Who are the real giants? Shall we not give tribute?" 1. What is the interest in the world regions for a soymilk without the traditional 'beany flavour'? What need creates an interest, creates a demand of such proportions? China, South East Asia, North East Asia, North America, hippies, vegetarians, tofu, *The Book of Tofu,* by Shurtleff and Aoyagi.

2. What is the history behind the long delayed but sudden phenomenal development of this product? Dr. Harry W. Miller in Shanghai (1936), K.S. Lo in Hong Kong [1941], in-bottle sterilizing by K.S. Lo, development of UHT processing and aseptic packaging by Yeo Hiap Seng in Kuala Lumpur, Malaysia (1967), the advent of the brick shaped aseptic carton. The traditional soymilk process: "Filtering off the fibrous material,... one is left with the basic soymilk extract or soybase to which some sugar is added" (p. 8). Improvements in soymilk flavor: Cornell hot-grind process. University of Illinois hot water blanch method "is the basis of most modern soymilk processing." Developments in Japan since the mid-1970s, which have grown "out of the Illinois process but overcoming the 'chalkiness' by a filtration step using a decanter or some form of continuous filtration." The quality is excellent but the yield of protein is unfortunately only about half compared to the almost 100% achieved by the original Illinois method."

3. What are the developments in the market areas? Soyfoods industry and market statistics published annually by Shurtleff. Trends in: Japan, South East Asia, Indian Subcontinent, Mid East [Middle East], Europe (Flavor is not as good as in Japan. "There is also a political impediment. It would be suicidal to set up a soymilk industry as a 'substitute cow's milk...' considering today's ailing European dairy industry and the militant stand of the European dairy farmer. But as surely as margarine has come

and been accepted, a prime quality soymilk will come to Europe. It is a matter of time"). Africa (financing troubles, the good work of IITA in Ibadan, Nigeria). South America ("A market spoilt! Take Brazil–the world's 2nd largest producer and exporter [of soybeans]. People have had inferior quality product almost forced down their mouth"). North America.

4. What is the state of the art in the manufacturing technique for a "bean free" tasting soymilk? (Contains a flow chart with 13 steps, of which No. 10 states: "Blend ingredients: Blend into the soybase the ingredients necessary to a particular formulation, e.g., sugar, vegetable fat, emulsifier–stabilizer, flavouring–aromas," p. 16)

This paper deals with the phenomenal growth of the soymilk industry in northeast Asia, and the likeliness that its influence will spread worldwide in the near future.

Note: This is the earliest English-language document seen (May 2006) that uses the word "soybase" to refer to a concentrated form of soymilk. However, no definition of the degree of concentration or total solids content is given. Address: Soya Process Product Manager, Alfa-Laval, Box 1008, S-221 03, Lund, Sweden.

2043. *Nikkei Sangyo Shinbun (Japan Economics and Industry News).* 1984. Indonesia daizu shizen shokuhin. Nihon de tenpe kokusai kaigi [An Indonesian natural soyfood. International tempeh symposium in Japan]. July 13. [Jap]
Address: Tokyo, Japan.

2044. Hermana, -. 1984. "Tempe" superior to any other vegetarian food. *Indonesia.* July. p. 58-59.
• ***Summary:*** Mr. Hermana, age 45, whose photo is shown, recently earned his doctorate from the Bogor Institute of Agriculture (IPB) with a thesis on tempe. As part of his research from Dec. 1980 to Sept. 1982, Hermana fed tempeh to 420 children between the ages of 13 and 36 months in the villages of Bendungan in Bogor and Dlingo in Yogyakarta. About 30% of Indonesian children suffer an alarming protein-calorie deficiency. Feeding them a mixture of grain and tempe led to dramatic weight gains. Address: Bogor, Indonesia.

2045. Shurtleff, William; Aoyagi, Akiko. 1984. History of tempeh: A fermented soyfood from Indonesia. Lafayette, California: Soyfoods Center. 81 p. July 17. No index. 28 cm. 2nd ed. 1985. 91 p. [375 ref]
• ***Summary:*** Contents: 1. Introduction. 2. Etymology. 3. World Overview. 4-8. History of Tempeh in Indonesia. 9-11. History of Tempeh in Europe and Australia. 12-15. History of Tempeh in the United States and Canada. 16-18. History of Tempeh in Japan. 19-23. History of Tempeh in Asia (China, Taiwan, Southeast Asia, India, Sri Lanka). 24. History of Tempeh in Latin America. 25. History of Tempeh in Africa. 27. International Interest. 28. U.S. and Third World Problems.

The world's largest tempeh manufacturers are as follows:

Company name, Country, Year Started, Avg. Weekly Production

1. Marusan-Ai, Japan, 1983, makes 15,148 lb/week = 6,885 kg/week

2. Tempe Production Inc., Netherlands, 1969, makes 13,200 lb/week = 6,000 kg/week

3. Quong Hop/Pacific Tempeh, USA/CA, 1980, makes 7,000 lb/week = 3,182 kg/week

4. White Wave, USA/CO, 1979, makes 5,850 lb/week = 2,659 kg/week

5. Soyfoods Unlimited, USA/CA, 1981, makes 5,800 lb/week = 2,636 kg/week

6. Torigoe Flour Milling, Japan, 1983, makes 5,770 lb/ week = 2,623 kg/week

7. The Tempeh Works, USA/MA, 1979, makes 5,500 lb/week = 2,500 kg/week

8. Marukin Foods, Japan, 1983, makes 4,620 lb/week = 2,100 kg/week. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549.

2046. Hansen, Barbara. 1984. Satay's nod to the games: Let's eat out. *Los Angeles Times.* Aug. 2. p. 129.
• ***Summary:*** The spirit of the Olympic Games in Los Angeles has even touched an Indonesian restaurant in Alhambra. "Through Aug. 31 the Indonesia Satay House [208 E. Valley Blvd.] will serve all customers a dish of *cendol* (pronounced chendol) in recognition of the Games."

Under new management, the restaurant's menu has a Sumatran flavor, which means the dishes are less sweet than in Japan.

The chicken dishes are memorable; *"ayam panggang kecap* is chicken mildly seasoned with sweet Indonesian soy sauce.

The Javanese *ketoprak* contains "puffy squares of fried tofu and crumbled *krupuk* (Indonesian style chips)."

*"Tahu goreng* (fried tofu) features crisp, fried tofu blocks propped up against a mixture of shredded lettuce and bean sprouts. This arrangement is sprinkled with chopped toasted peanuts and seasoned with a sweet soy sauce dressing."

2047. Miller, Bryan. 1984. Diner's journal. *New York Times.* Aug. 3. p. C18.
• ***Summary:*** This is a brief review of Toons, a Thai restaurant, at 417 Bleecker St., at Bank St. "One of the better appetizers was shrimp fritters, a tasty combination of ground shrimp with herbs that have been wrapped in bean curd skin [yuba] and deep-fried ($3.95)." They came with a mild sweet-and-sour sauce.

2048. Bertrand, Jean-Pierre. 1984. Protein-rich oilseeds: Soya–International situation and regulations. *Courier (The): Africa-Caribbean-Pacific–European Community* No. 86. p. 82-85. July/Aug.

• ***Summary:*** Contents: Introduction. Soya and the American policy dominate the situation in 1983/84. Brazil's soya boom runs out of steam. American reaction [to Brazil's rise]. Adaptation strategies in countries importing and/or producing substitute products (palm oil producers such as Malaysia, and rapeseed producers such as Canada). Eastern Europe and China. Address: Researcher, Laboratoire d'Economie et Sociologie Rurales, INRA (Institut National de la Recherche Agronomique), 6, Passage Tenaille, 75014, Paris, France.

2049. Finley, David; Goldberg, Ray. 1984. Kikkoman Corporation. Unpublished Harvard Business School Report. 33 p. No. 9-585-102. [10 ref]

• ***Summary:*** A ten year update on the original 1974 Harvard Case Study of Kikkoman and one of the best insights available into Kikkoman's history and operations (although some of the data has been disguised for competitive reasons). Kikkoman sales in 1982 were about $547 million.

Contents: Early diversification–The wine industry. Company history. Soy sauce production. The soy sauce industry. Structural change. Kikkoman strategy. Expanding soy sauce sales in Japan. Diversifying into other food products (Kikko Foods was established in 1961). Development of the U.S. market. New businesses (Restaurant, health food, and leisure). Technological innovation. Final considerations.

Exhibits. 1. 30 top Japanese food companies in FY (Fiscal Year) 1982, with sales. (1) Kirin Brewery, (2) Suntory, (5) Yuki-jirishi/Snow Brand Milk Products, (6) Ajinomoto, (8) Meiji Milk Products, (9) Nisshin Flour Milling, (10) Morinaga Milk, (19) Showa Sangyo, (20) Nisshin Oil, (23) House Food, (25) Kikkoman.

3. Quantity of soy sauce produced and market share of major Japanese manufacturers. 1982 soy sauce market share was Kikkoman 30.4%, Yamasa 8.9%, Higashimaru 4.6%, Higeta 3.0%, and Marukin 2.5%. Thus the top 5 had 49.4% of the market. 5. Change in per capita food intake (1975-79). 6. Kikkoman financial data. 8. List of main products. 9. World per capita wine consumption by country. France is tops with 90 liters/person/year. 11. Growth through diversification. In 1964 soy sauce accounted for 87% of Kikkoman's sales, in 1983 for 59%. 12. 1980 Asian population of the U.S. by state. Total: California 1,253,987. Hawaii 583,660. New York 310,531. Illinois 159,551. Texas 120,306. New Jersey 103,842. Washington state 102,503.

Oriental immigrants to the USA 1972-81. Total. 1,794,682. From Philippines 375,517. Korea 290,322. Vietnam 233,274. China and Taiwan 213,908. Address: 1. Research Associate; Prof., Harvard Business School, Boston, Massachusetts 02163.

2050. *Palawija News (Bogor, Indonesia).* 1984. Palawija crops. 1(1):1. Aug.

• ***Summary:*** Coarse grains, pulses, roots and tuber crops (CGPRT)–or *palawija* in Indonesian–play a major role in the economies of most developing countries of Asia and the Pacific. They serve as food staples and as a source of protein; they are also used as livestock feed and raw materials in several agro-industries. However, they are commonly regarded as inferior substitutes for rice or wheat for human consumption. They have not benefited from the green revolution; their productivity has remained low and they cannot compete with rice or wheat for the farmers' scarce resources of good land or costly inputs. They are mostly cultivated by small-scale farmers, usually under rainfed conditions. As a result, their availability for food has stagnated in most countries, and industries had to rely more and more on imports. Address: The CGPRT Centre, Jalan Merdeka 99, Bogor, Indonesia.

2051. *Palawija News (Bogor, Indonesia).* 1984. The CGPRT Centre (Pusat Palawija). 1(1):2. Aug.

• ***Summary:*** The Regional Co-ordination Centre for Research and Development of Coarse Grains, Pulses, Roots and Tuber (CGPRT) crops in the Humid Tropics of Asia and the Pacific (CGPRT Centre) was established in 1981 by the United Nations Economic and Social Commission for Asia and the Pacific (UN/ESCAP) to promote regional co-operation for research and development of CGPRT crops. The Centre has the status of a subsidiary body of ESCAP and is open to all members and associate members of ESCAP.

Outlines the objectives, services, and programmes of the Centre. In the initial stage only a few crops, including cassava, maize, soybean, and selected pulses, and a few countries will be covered; these will be gradually increased. Address: The CGPRT Centre, Jalan Merdeka 99, Bogor, Indonesia.

2052. Rakosky, Joseph, Jr. 1984. Trip report–China and Singapore: July 15 to August 7, 1984. Morton Grove, Illinois. 34 p. 28 cm.

• ***Summary:*** Contents: Itinerary. Executive summary. Recommendations: China, Singapore. Detailed report: Beijing (Beijing Edible Oil Co., Joint venture discussion), Yantai (Moping Oil Mill, Yantai Meat Products Factory, Qinxia Vegetable Plant), Dalian (Liaoning Dalian Oil Industry Plant, Dalian Meat Processing Factory), Singapore (Materials Management Organisation; Military Base). Appendixes: Contact names and addresses: Beijing (8), Yantai (7), Dalian (7), Singapore (16). Address: PhD, Soy

Protein Consultant, American Soybean Assoc. Phone: 312/966-7660.

2053. Beversdorf, W.D. 1984. Development of new soybean varieties for soy foods [in Canada]. In: Ontario Ministry of Agriculture and Food, Market Development Branch. 1984. Workshop on Export Markets for Ontario Soybeans: Edited Proceedings. 45 p. See p. 18-20. Held 5 Sept. 1984 at Wheels Motor Inn, Chatham, ONT, Canada. 28 cm.
• ***Summary:*** "Historically, soybean breeding efforts in Canada have been directed toward improving yields, increasing the area of adaptation (to shorter season and cooler geographic areas) and improving pest tolerance. As soybean production has increased toward domestic self-sufficiency, the industry has placed more emphasis on development, production, and marketing of special quality beans for specific non-oil export markets...

"In Canada, yield of soybeans per unit land area has remained a primary consideration in soybean breeding (except for natto-type beans) because of licensing requirements for pedigreed seed production and marketing. Among high yielding breeding lines, large seed size, white or yellow hilum colour and high seed quality (resistance to discolouration and cracking) are common selection criteria associated with tofu and miso export potential."

Canadian soybean breeders are generally aware of the characteristics defined during the 1982 "Soybean Export Mission to South East Asia" for various soyfood uses. These desired soybean characteristics are shown in Table 1 for natto, miso, tofu, soymilk, and soy sprouts. Address: Assoc. Prof., Univ. of Guelph, Guelph, ONT, Canada.

2054. Chan, Fred. 1984. General uses of soybeans in Hong Kong and competition from Chinese soybeans. In: Ontario Ministry of Agriculture and Food, Market Development Branch. 1984. Workshop on Export Markets for Ontario Soybeans: Edited Proceedings. 45 p. See p. 15-17. Held 5 Sept. 1984 at Wheels Motor Inn, Chatham, ONT, Canada. 28 cm.
• ***Summary:*** Tofu: The two major types of tofu in Hong Kong are soft tofu (which is displayed in water to maintain its form) and mild tofu (which is firmer, is displayed on wooden planks, and is the most common type). Chinese soybeans are preferred to Canadian soybeans because after a maximum of 5 hours on display in the open market, water will start to weep from the tofu made from Canadian soybeans. In 1983, about 6,000 tonnes of imported soybeans were used to make tofu in Hong Kong; this was about 33% of the total soybeans imported.

Bean curd sheets and bean curd sticks [yuba] are very common snacks and dishes in Hong Kong. "Canadian soybeans have an advantage in this market because they produce whiter soymilk which in turn will produce whiter colour products. However, the bigger size of the Chinese soybean results in a higher yield... Manufacturers will normally mix 60% of Canadian soybeans with 40% of Chinese soybeans in order to achieve a higher output of whiter sheets... Total utilization was around 4,000 tonnes in 1983, with Canadian soybeans representing 78%.

Soy sauce and bean paste: The market is dominated by Chinese soybeans because bigger beans produce more sauce and paste. In 1983 approximately 6,000 tons of soybeans were used to make soy sauce and bean paste, with Chinese soybeans representing 75%, Vietnamese 14%, and Canadian 11%.

Soymilk: In 1983 about 1,800 tonnes of soybeans were used to make soymilk in Hong Kong, mostly by Vitasoy. Chinese and Canadian soybeans each share about 50% of the market.

Discusses various reasons that Chinese soybeans are very competitive in Hong Kong. The Chinese Oil, Cereal and Foodstuff Company in Hong Kong has an office in Hong Kong. Under this national organization are two agents specializing in Chinese soybeans. Transport time from China to Hong Kong is 7 days versus 32 days from Canada. Address: Director, Chung Hing Co., Hong Kong.

2055. Chen, Steve. 1984. Soyfoods in the Far East and USA: Products, markets, trends. In: American Soybean Assoc., ed. 1984. First European Soyfoods Workshop, Proceedings. Brussels, Belgium: ASA. 36 p. See p. C1-C38. Held Sept. 27-28 at Amsterdam, Netherlands. [11 ref]
• ***Summary:*** Contents: Summary. 1. Introduction: Ten reasons why soybeans will be a key protein source for the future. 1. Soyfood products. A. Non-fermented soyfoods: Fresh green soybeans, soybean sprouts, soynuts, soymilk, soy flour, yuba or soy protein film, tofu. B. Fermented soyfoods: Soy sauce, miso, tempeh, natto, fermented tofu, soy nuggets (tou-shih, hamanatto). 3. Soyfoods markets and trends in the Far East: Taiwan, China, Japan, South Korea, Indonesia, Malaysia, Singapore, Thailand, Philippines. 4. Soyfoods markets and trends in the U.S. 5. References. Plus 15 tables and 8 figures.

"It is our [American Soybean Association's] strong intention that marketing and consumption of soy protein should not in any way deter the expansion of the production and sale of as much animal protein as the world can be expected to produce in the years ahead. Soy protein foods are being intentionally brought to the market to complement and not necessarily to replace animal protein products."

"Taiwan imported 1.41 million tonnes (metric tons) of soybeans in 1983 and used about 250,000 tonnes as soyfoods for direct human consumption, which made Taiwan one of the highest in per capita consumption of soyfoods (13.2 kg or 29 lb) in the world. In the past 10 years (1974-1983), the consumption of traditional soyfoods showed an average increase of 3% per year as compared to 12% and 8.1% for poultry and soy oil, respectively. The

market for packaged soymilk, soy pudding and tofu has also been expanding rapidly in recent years in Taiwan." Table 7 shows the production of soymilk in Taiwan, which grew from 103,600 tonnes in 1974 to 210,000 tonnes in 1983, for an average growth rate of 8.2% a year.

China produces about 9 million tones of soybeans a year, and about half of these are consumed as soyfoods, giving a per capita consumption of 4.5 kg of soyfoods. "An improvement in the general economy and soyfood technology and equipment will bring a sharp increase in soybean demand and more soyfoods consumption."

In South Korea soymilk consumption has increased more than seven-fold in the last 4 years. Currently about 10,000 tonnes of soybeans are used to make 70,000 tonnes of soymilk. "It is projected that soymilk production in Korea will double in 1984 as compared to the previous year."

Indonesia continues to be Southeast Asia's largest consumer of soybeans as food. In 1982/83 soybean consumption was 6.7 kg per capita. Indonesia consumes about 1 million tonnes of soybeans annually, 60-65% of them in the form of tofu and 35 to 40% as tempeh.

Malaysia consumes only about 30,000 tonnes of soybeans per year as food. In Singapore, more than 75% of the population of 2.5 million are Chinese. Therefore tofu, soysauce, and soymilk are the predominant traditional soyfoods consumed.

Thailand consumes about 40,000 tonnes of soybeans a year as food, mainly in the form of tofu. The Philippines uses only 5,000 tonnes of soybeans annually for food, mainly as tofu.

To summarize (Table 6), annual per capita consumption of soybeans in various East Asian countries, in descending order of the amount consumed, is as follows: Taiwan 13.2 kg (population 19 million); Japan 8.3 kg (population 120 million); South Korea 7.5 kg (population 40 million); Indonesia 6.7 kg (population 150 million); Singapore 6.25 kg (population 2.4 million); China 4.5 kg (population 1,000 million); Malaysia 2.1 kg (population 14 million); Thailand 0.8 kg (population 50 million); Philippines 0.3 kg (population 15 million). Address: Director, American Soybean Assoc., Room 603, Kwang-Wu Building, No. 386, Tun Hua South Road, Taipei, Taiwan.

2056. Epp, Peter H. 1984. Growers' interest in supplying export markets. In: Ontario Ministry of Agriculture and Food, Market Development Branch. 1984. Workshop on Export Markets for Ontario Soybeans: Edited Proceedings. 45 p. See p. 42-45. Held 5 Sept. 1984 at Wheels Motor Inn, Chatham, ONT, Canada. 28 cm.

• ***Summary:*** In 1954 Ontario soybean growers began to seek export markets when the Ontario Soybean Growers' Marketing Board organized the first export of Canadian soybeans to the United Kingdom.

In the late 1960s, samples of Canadian soybeans were forwarded to Pacific Rim countries to try to determine whether Canadian varieties were acceptable to the tofu and miso markets of those countries.

The replies indicated that Japanese food manufacturers preferred U.S. varieties such as Kanrich, Amsoy, Corsoy, Ohio, and I.O.M. (Indiana, Ohio, Michigan) soybeans.

In 1970 an export promotion booklet titled "Cansoy" was introduced to 52 foreign countries promoting the story of Canadian soybeans.

"Ontario soybean samples continued to be forwarded annually but received no support or interest until the spring of 1972. At that time the C. Itoh people in Toronto indicated the Harwood variety, produced by the Harrow Research Station, possessed qualities favorable to the manufacture of tofu and miso. C. Itoh was willing to purchase a shipment of 750 tons for further testing by some of their customers. The soybean board made several important decisions: (1) To include a letter with the soybeans from the Canadian Grain Commission stating that the shipment consisted of 85-90% Harwood variety soybeans. In other words, the identity of the Harwood variety had been preserved or maintained, and not mixed with other varieties. This marks the start of Canada's identity preserved (IP) program and a strong commitment to providing the soybean characteristics that Asian food products wanted. (2) To pay $6,920 of the total freight and stevedoring costs to Japan.

In Feb. 1982 the OSGMB sponsored its first export mission to Asia–to Japan, South Korea, Hong Kong, Singapore, and Malaysia.

Since the Harwood variety, Dr. Buzzel of the Harrow Research Station has devoted a great deal of time breeding soybean varieties suitable for the edible market. Address: Chairman, Ontario Soya-Bean Growers' Marketing Board, Chatham, ONT, Canada.

2057. Goot, Pieter van der. 1984. Agromyzid flies of some native legume crops in Java. *AVRDC Publication* No. 84-216. 98 p. Sept. Translated from the original 1930 Dutch edition. [33 ref]

• ***Summary:*** This is an English-language translation of the original Dutch-language document by van der Goot. Contents: Preface. Introduction. Soybean fly (*Melanagromyza phaseoli* Coquillett; now classified as *Ophiomyia phaseoli* Tryon). Soybean stemborer (*Melanagromyza sojae* Zehntner). Soybean topborer (*Melanagromyza dolichostigma* de Meijere). The 1984 preface by N.S. Talekar begins: "Among all insect pests that attack grain legumes in tropical to subtropical Asia, Africa, Australia, and Oceania, tiny flies belonging to the family Agromyzidae (Diptera), commonly known as 'beanflies,' are probably the most destructive... The infestation, especially in the seedling stage, can result in total crop destruction.

"Pioneering research on beanflies was done early in this century in Indonesia where these insects cause considerable damage, especially to soybean. Dr. P. van der Goot, a Dutch entomologist, made detailed observations of these pests and published a bulletin... (on them) in 1930. This publication contains a wealth of information on the biology and control of agromyzid flies in Java. However, this information remained inaccessible to non-Dutch speaking researchers. In fact, scores of research papers and theses have been published on beanfly pests without referring to this pioneering work."

This translation was done by Mr. Tobias van Hameren, Agricultural University, Wageningen, The Netherlands, during his tenure as a research as a research scholar at AVRDC during the summer of 1983. Address: Tropical Vegetable Information Service, Asian Vegetable Research and Development Center, Shanhua, Taiwan.

2058. Loh, Michael. 1984. An overview of export markets for edible soybeans. In: Ontario Ministry of Agriculture and Food, Market Development Branch. 1984. Workshop on Export Markets for Ontario Soybeans: Edited Proceedings. 45 p. See p. 1-9. Held 5 Sept. 1984 at Wheels Motor Inn, Chatham, ONT, Canada. 28 cm.

• ***Summary:*** "Ontario first exported edible soybeans in 1972 and over 12 years have built it into a $40 million business. 1981 was our best year when exports totalled $46 million... The bulk of Ontario's soybean exports are sold to the Far East [East Asia]–Japan ($8 million in 1983), Singapore ($6 million), Hong Kong ($3.5 million), Malaysia ($1 million), Indonesia, and Korea." In these countries soybeans are consumed in the daily diet of the people. In Japan, for example, they are made into miso, tofu, natto, soymilk and shoyu. Korea also makes soy sprouts, Indonesia makes tempeh, and Singapore, Malaysia, and Hong Kong make dried yuba. In addition, sales to the Netherlands, United Kingdom, and France are quite significant.

Concerning Ontario's market share of soybean imports for food use: Japan imports 877,300 tonnes, of which 27,000 tonnes or 3.1% is from Ontario. Singapore and Malaysia import 36,000 tonnes, of which 20,000 tonnes or 55.0% is from Ontario. Hong Kong imports 20,000 tonnes, of which 10,000 tonnes or 50.0% is from Ontario.

Japan's sources of its 877,300 tonnes of imported soybeans are as follows: USA 570,000 tonnes (65%), China 280,000 (32%), Canada 27,000, South America 300.

Japan uses its 877,300 tonnes of imported soybeans as follows: tofu 485,000 tonnes (55.3%), miso 180,000, natto 185,000, soymilk 25,000, cooked soybeans 10,000, shoyu 6,500, other 85,800. Within these figures, Ontario's soybeans are used as follows: Miso 20,000 tonnes (11.1% of the total), natto 5,000 tonnes (5.9%), and tofu 2,000 tonnes (0.4%). Address: Export Development Specialist, Ontario Ministry of Agriculture and Food, Toronto, Canada.

2059. Ohta, Teruo. 1984. Kongetsu no kotoba: Muen daizu shokuhin tempe kaihatsu ni omou [Words for this month: Development of tempeh, an unsalted fermented soyfood]. *Daizu Geppo (Soybean Monthly News).* Sept. p. 2-3. [Jap]

• ***Summary:*** "In Feb. 1982, as a part of the International Scientific Technology Cooperative Research Project of the Science and Technology Administration (Kagaku Gijutsu-cho), the Agricultural University (Bogor, Indonesia) and the National Food Research Inst. (Japan) decided to do cooperative research on the development of technology for making practical use of microorganisms. As part of the negotiations and field research, I got the opportunity to study the actual situation of tempeh production and consumption in various areas of Indonesia." A photo shows Ohta sensei. Address: Norin Suisan-sho Shokuhin Sogo Kenkyu-jo, Oyo Biseibutsu Bucho [Tsukuba, Ibaraki-ken, Japan].

2060. Plucknett, Donald L.; Blase, M.G.; Campbell, T.A. 1984. Amaranth: Modern prospects for an ancient crop. Washington, DC: National Academy Press. vii + 80 p. 23 cm. Report of an Ad Hoc Panel of the Advisory Committee on Technology Innovation, Board on Science and Technology for International Development, Office of International Affairs, National Research Council, National Academy of Sciences.

• ***Summary:*** Contents: Introduction. The plants. Production. Grain amaranths. Vegetable amaranths. Research needs. Appendixes: A. Selected readings. B. Research contacts. C. Germplasm collections and commercial seed suppliers. D. Biographical sketches of panel members.

"In pre-Columbian times grain amaranth was one of the basic foods of the New World–nearly as important as corn and beans. Thousands of hectares of Aztec, Inca, and other farmland were planted to the tall, leafy, reddish plants. Some 20,000 tons of amaranth grain were sent from 17 provinces to Tenochtitlan (present-day Mexico City) in annual tribute to the Aztec emperor Montezuma... A century ago, the soybean, sunflower, and peanut were considered unworthy of concentrated research. Today, they are among the world's most important crops. Amaranth, too, could rise to universal prominence.

"Three species of the genus *Amaranthus* produce large seedheads loaded with edible seeds. *Amaranthus hypochondriacus* and *Amaranthus cruentus* are native to Mexico and Guatemala; *Amaranthus caudatus* is native to Peru and other Andean countries...

"With a protein content of about 16 percent, amaranth seed compares well with the conventional varieties of wheat (12-14 percent), rice (7-10 percent), maize (9-10 percent), and other widely consumed cereals. Amaranths began attracting increased research attention in 1972 when Australian plant physiologist John Downton found that the

seed also contains protein of unusual quality. It is high in the amino acid lysine."

One exciting potential of amaranth grain lies in its high protein content as compared with other grains: Amaranth 16% (mean; range 12-19%), rye 13% (range 9-18%), oats 12% (range 7-23%), barley 10% (range 8-21%), wheat 10% (8-19%), corn 10% (range 8-17%), rice 7% (range 7-10%). Another virtue is the high content of lysine and methionine, two essential amino acids. The lysine content of amaranth is 0.82%, compared with oats (the next highest grain) 0.5%, rye 0.4%, barley 0.4%, wheat 0.36%, rice 2.8%, and corn 2.5%.

"Vegetable amaranths: Seed is not the only nutritious product from the versatile amaranth. The leaves also are rich in protein as well as in vitamins and minerals... Although virtually unlisted in agricultural statistics, vegetable amaranths may actually be the most popularly grown vegetable crop in the tropics.

"In the hot, humid regions of Africa, Southeast Asia (especially Malaysia and Indonesia), southern China, southern India, and the Caribbean, amaranth species such as *Amaranthus tricolor, Amaranthus dubius,* and *Amaranthus cruentus* are grown as soup vegetables or for boiled salad greens (potherbs). In North American deserts, where summers are too hot for lettuce or cabbage production, *Amaranthus palmeri* has long been a major wild green among Indians. In Greece, boiled *Amaranthus blitum* leaves have been a favorite salad (called vleeta) since the days of Homer...

"Leading amaranth's development is the Rodale Research Center near Emmaus, Pennsylvania, where more than a thousand different accessions collected from all parts of the world are being bred, grown, and evaluated." Address: Washington, DC.

2061. Quisumbing, Reya. 1984. Soybean project scores breakthrough. *PCARRD Monitor* 12(8-9):2. Aug/Sept.
• ***Summary:*** "A pilot soybean production project proved that soybean can be grown commercially in the country. If production is indeed pushed through, the Philippines will no longer import millions of dollars worth of soybeans for the animal industry.

"The breakthrough in soybean production was revealed during the field evaluation of the soybean pilot production program held recently in Lupao, Nueva Ecija. Previous attempts to grow soybeans on a commercial scale in Luzon were not successful."

The key was to train farmers to follow a package of recommended practices and technologies. Address: Information officer.

2062. *USDA Plant Inventory.* 1984. Plant material introduced January 1 to December 31, 1983 (Nos. 475834 to 483096). No. 191. 761 p. Sept.
• ***Summary:*** Soybean introductions: *Glycine max* (L.) Merrill. Fabaceae.

476879-476933. North Vietnam by Dr. Joseph A. Jacobs. "From Vietnam, Socialist Republic of. Donated by National Institute for Agricultural Science; Ho Chi Minh City (Saigon). Received through J.A. Jackobs, Dept. of Agronomy, Univ. of Illinois, Urbana, Illinois. Received Sept. 1982. Most of these 56 cultivars (seeds) have Vietnamese names, but one (Palmetto) is from the USA.

476934-476936. 3 more varieties from North Vietnam. "Donated by Station for the Improvement of Degraded Soil; Ha Bac Province, Viet Yen District.

476937-476941. 5 more varieties from North Vietnam. "Donated by Central Seed Agency; Hanoi."

476942-476943. 2 more varieties from North Vietnam. Names: Cuc and DT 74. "Donated by Cooperative Farm; Phuc Tho District. All the above received through J.A. Jacobs, Sept. 1982.

481676-481691 (p. 604-06). "From Bhutan. Collected by Croston, R.P.; Dorji, T.; IBPGR; Department of Agriculture; Rome, Italy; Thimphu, Bhutan. Received through International Board for Plant Genetic Resources (IBPGR), Rome, Italy. Received May 1982." The seed of 16 cultivated soybean varieties, all form local original sources, were collected from farm stores in Bhutan between 31 Aug. and 2 Oct. 1981. No. 65–Mendigang-Sisiding, Thimpu District. 1600 meters elevation. Sown April-May, harvested Oct.-November. Pods non-shattering. Seeds white. Local name Sinchumkap. No. 66–Same as No. 65 except: Local name Sinchumnap. No. 170–Tongsa Dzong, Poengernang village, Tongsa District, 2250 meters. Sown March-April, harvested Sept.-Oct. Seeds white. Local name Shiooley. No. 232–Khompang, Lhuntshi District, 1800 meters. Sown April, harvested Oct. Seeds white. Local name Shauling Ngunti. No. 233–Khompang, Lhuntshi District, 1800 meters. Sown April, harvested Oct. Seeds white. Local name Shauling Kharti. No. 253–Bordapang, Lhuntshi District, 1350 meters. Sown March, harvested May. Seeds white. Local name Shauling Kharti. No. 266–Banendangsa, Lhuntshi, District, 1650 meters. Sown March-April, harvested Sept.-Oct. Seeds white. Local name Shauling kharti. No. 282–Wangmakhar, Mongar District, 1300 meters. Sown March-April, harvested Sept. Seeds brown and black. Local name Shauling. No. 311–Mongor Dzong, Mongor District, 1700 meters. Sown March, harvested Sept. Seeds brown. Local name Libi. No. 341–Pirbi, Mongar District, 1500 meters. Sown Feb.-March, harvested Sept. Seeds brown. Local name Libi. No. 352–Napchang, District, 1400 meters. Sown March, harvested Sept. Seeds brown. Local name Lephe. No. 385–Lungtenzampa, Tashigang District, 700 meters. Sown April, harvested Aug.-Sept. Local name Libi. No. 388–Rijigang, Tashigang District, 1750 meters. Sown June, harvested Oct. Local name Shiuli. No. 406–Kenanifrang, Bidung block, 1400

meters. Sown March, harvested Oct. Seeds brown. Local name Reybi. No. 442–Kabgesa, Thimphu valley, 2200 meters. Sown May, harvested Oct. Seeds white. Local name Sinkap. Address: Washington, DC.

2063. Claiborne, Craig; Franey, Pierre. 1984. Food: Seppi Renggli, the masterful chef of the Four Seasons in New York, celebrates the restaurant's first quarter century... *New York Times.* Oct. 14. p. SM77-78.
• ***Summary:*** When this restaurant opened 25 years ago, it "was said to be the world's costliest restaurant, taking more than $4.5 million to create." It has long been considered one of the very finest restaurants in Manhattan.

The recipe for Seppi Renggli's fruit salad calls for "2 teaspoons ketjap manis (a sweetened soy sauce, available where fine imported Oriental foods are sold)."

2064. *J. of the American Oil Chemists' Society.*1984. New soy crushing facility [in Indonesia]. 61(10):1521, 1523. Oct.
• ***Summary:*** "Indonesia's first soybean crushing facility is expected to be operational in late 1985 or early 1986, reducing that nation's dependence on imported soybean meal for its poultry industry and increasing the volume of soybean imports.

"The plant capacity is estimated at 300,000 tonnes annually, which should produce about 240,000 tonnes of meal. That is about the volume of soybean meal imported from the U.S. during 1984. Domestically produced soybeans are used almost exclusively for human foods such as tempeh and tofu.

"Oil palm and coconut are the major sources of vegetable oil in Indonesia, with palm, palm kernel and coconut oils accounting for 99% of Indonesia's 1.8 million tonne production."

2065. Watanabe, Tadao. 1984. Daizu to tenpe–Indonesia tenbyô [Soybeans and tempeh–A sketch of Indonesia]. *Daizu Geppo (Soybean Monthly News).* Oct. p. 1-5. [Jap] Address: Torigoe Seifun K.K. Komon; Kyushu Daigaku, Meiyo Kyoju.

2066. Florida, Nancy K. 1984. Re: Early reference to tempeh in the *Serat Centhini.* Letter to William Shurtleff at Soyfoods Center, Nov. 26. 5 p. [5 ref. Eng]
• ***Summary:*** Contains a summary and historical overview of the *Serat Centhini,* a transliteration and a translation of Canto XXXI of the Javanese script by Ms. Florida in the poetic metre, a list of 5 references consulted, and 3 manuscript sources. The 2 abbreviations used are: LOr = Leiden Oriental Collection, Leiden University Library. SP = Sasono Poestoko, Karaton Surakarta, Surakarta, Central Java, Indonesia.

Note: Nancy is preparing a 4-volume work titled *Javanese Language Manuscripts of Surakarta, Central Java: A Preliminary Catalog,* to be published in 4 volumes by Cornell Univ. Southeast Asia program. Address: Dalem Joyoksuman, Gajahan RT 9/ RK I, Solo, Jateng 57115, Indonesia.

2067. Soyfoods Center. 1984. Early reference to tempeh discovered in Javanese literature of 1815 (News release). P.O. Box 234, Lafayette, CA 94549. 2 p. Nov. 28. [3 ref]
• ***Summary:*** Prior to 1984, the earliest document seen worldwide that mentioned tempeh (a fermented soyfood that originated in Indonesia) was an 1895 article by a Dutch scientist and microbiologist, H.C. Prinsen Geerligs. It was generally thought that tempeh had originated in Java long before this time but there was no proof.

In July of 1984 William Shurtleff, with help from Amin Sweeney, Prof. of Malay and Indonesian Literature and Languages at the Univ. of California at Berkeley, pushed the date of the earliest document seen that mentions back to 1875, with the discovery of a reference to tempeh (actually *tempe)* in a Javanese-Dutch dictionary, the *Javaansch-Nederduitsch Handwoordenboek* by the Dutch scholars J.F.C. Gericke and T. Roorda.

Now Shurtleff, with the help of Prof. Sweeney, Eric Oey (one of his students), and Nancy Florida (an American living in Solo, Indonesia, cataloging ancient Javanese texts) has found an earlier reference to tempeh in the *Serat Centini,* which was written in about A.D. 1815 on the orders of Sunan Sugih, then Crown Prince and later Pakubuwana V of Surakarta, in today's eastern Central Java. The main author was probably Rangga Sutrasna. This classic work of Modern Javanese literature contains a line mentioning "onions and uncooked *tempe."*

Although the *Serat Centini* was written in about 1815, it is quite possibly based on much older sources. Address: Lafayette, California.

2068. *Soya Foods (ASA, Europe).*1984. The Soyafoods Interview: Henk P.M. Rigter, Consuma B.V., Netherlands. Nov. p. 6.
• ***Summary:*** Consuma B.V. is a 100% subsidiary of Chemex B.V., a company trading soy proteins. Consuma started on 15 Aug. 1983 with the production of tempeh. The company presently employs 4 people and Righter is the director. The tempeh is made in the standard way except the *Rhizopus* inoculum has been specially developed for Consuma. The product is marketed to health food stores, and to the wholesale trade for Indonesia "toko" restaurants. Later they hope to sell to normal food retail outlets. The company is trying to develop a throw-away package that will give the tempeh a longer shelf life. Address: Christiaan Huygensstraat 10, 2665 KX Bleiswijk, Netherlands.

2069. STS–Soya Technology Systems. 1984. Project proposal for 400 liter/hour soymilk plant, Type A. 11 Dhoby

Ghaut #11-06, Cathay Building, Singapore 0922. 36 p. Booklet. Nov.
• ***Summary:*** Contents: Introduction. Investment estimate. Design data and technical aspects. Technical description. Cost/profit calculation. Drawings. Address: Singapore.

2070. *Soybean Update.* 1984. Developing countries best growth markets for soybeans. Dec. 10.
• ***Summary:*** "The major export growth area for the U.S. bean complex is in the developing countries of Asia and South America," according to Rich McDonnell, Deputy Director of Analysis for the Foreign Agricultural Service (FAS). "McDonnell said the developing countries of Mexico, Taiwan, South Korea, Indonesia, Malaysia, and Venezuela have shown a significantly higher rate of import growth during the last few years than Western Europe, Japan and the Soviet Union.

"Soybean shipments into those 6 countries rose about 400% in 1983/84 from 1.1 million tonnes imported in 1974/75, reported McDonnell. While the USDA analyst does not foresee a long continuation of this rate of growth, he stresses that 'per capita consumption of meal and oil in these countries is far from saturation levels.'"

2071. *Foreign Agriculture.* 1984. Singapore consumers say "Yes" to U.S. soybean oil. Dec. p. 2.
• ***Summary:*** With technical assistance from the American Soybean Assoc., a U.S. company (AceMark) has developed a 100% soybean cooking oil, called Soyalite. In little more than a year, Soyalite has won 2% of Singapore's cooking oil market.

2072. Jackobs, J.A.; Smyth, C.A.; Erickson, D.R. 1984. International soybean variety experiment: Ninth report of results, 1982. *INTSOY Series* No. 27. xiv + 103 p. Dec. (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** In the ISVEX trials, soybeans were tested in the following countries: (For the year 1982) Afghanistan, Azores, Bangladesh, Burma, Cameroon, Chile, China (Taiwan, ROC), Colombia, Cyprus, Dominican Republic, Ecuador, Egypt, French Guiana, Gabon, Ghana, Guatemala, Indonesia, Ivory Coast, Korea, Madagascar, Mauritius, Mexico, Morocco, Mozambique, Nepal, New Caledonia, New Hebrides, Nicaragua, Pakistan, Paraguay, Portugal, Puerto Rico, Reunion, Rwanda, Saudi Arabia, Senegal, Somalia, Sudan, Swaziland, Thailand, Turkey, United States, Uruguay, Vietnam, Yugoslavia, Zaire, Zambia, Zimbabwe.

(For the year 1981) Australia, Rwanda.

2073. Ahmad, Syahrial; Roestamsjah, -. 1984. Aktivitas air dari tempe kering dan perkiraan masa simpannya dalam pengemas plastik [Water activity of dried tempeh and the its estimated durability in plastic wrappers]. Bandung: Lembaga Kimia Nasional–LIPI. 19 p. Research report. [Ind]*
• ***Summary:*** Preservation of tempeh. Address: Bandung, Indonesia.

2074. ATM-ROC. 1984. The prospect of soybean production in East Java. Indonesia. Unpublished manuscript. *

2075. Jones, Russell. 1984. Loan-words in Indonesian. *Nusa (Jakarta, Indonesia)* 19:vi-ix, 1-38. [2 ref]*
• ***Summary:*** Soybean sprouts are known in Indonesian as *taoge* from Hokkien *tâu* 'beans' and *gê* 'sprout.' For soya bean sauce Indonesian uses *taocio* from Hokkien *tâu-chiu* 'a thick salt sauce made from pulse.' An interesting example is the word for 'bean curd' *tahu;* this is from Hokkien *tâu-hû* 'bean-curd shaped, but not yet pressed,' and we should expect the word to appear in Indonesian (as it does in Malay) as *tauhu;* now the word happens to be one of the earliest of the foreign loans recorded in an Indonesian language, occurring in a list of words served at a banquet mentioned in an Old Javanese inscription of the 10tb century (The Watu Kura A [Watukura] inscription, plate 5A, lines 4-5, see Antoinette M. Jones 1976, p. 90-91) indicating the antiquity of its adoption and suggesting that the Indonesian form comes via the old Javanese, which is also *tahu.* Address: Dep. of South East Asia and the Islands, School of Oriental and African Studies, Univ. of London, Malet St., London WCIE 7HP, England. Phone: 01-637-2388.

2076. Mulyati, Yetti; Tanuwidjaja, Lindajati; Roestamsjah, -. 1984. Pembuatan tempe dengan beberapa macam kacang [Preparation of tempeh using different types of beans]. Bandung: Lembaga Kikia Nasional LIPI. 12 p. Research report. [Ind]*
Address: Bandung, Indonesia.

2077. Potan, Nark. 1984. Progress report of soybean research in Thailand. Presented at Upland Crop Varietal Testing Tour and Soybean Workshop. Held at AVRDC, Shanhua, Taiwan, China. *
Address: Oilseed Crops Branch, Field Crops Research Inst., Dep. of Agriculture, Banghken, Bangkok 10900, Thailand.

2078. Pramono, -. 1984. Tempe dalam kehidupan masyarakat umum [Tempeh in the public life]. District of Karang, Trenggalek, Central Java. Ministry of Education and Culture. Unpublished manuscript. Third prize winner, popular writing contest. [Ind]*

2079. Puslitbang Gizi. 1984. Bahan makanan campuran dengan tempe [Mixing ingredients with tempeh]. Unpublished manuscript. [Ind]*

• ***Summary:*** Puslitbang Gizi is an abbreviation for Pusat Penelitian dan Pengembangan Gizi, the Nutrition Research and Development Center.

2080. Sambas, Ikeu Yatmika. 1984. Telaahan hubungan penjatahan kedelai dari kopti dengan perkiraan harga pokok dan titik impas (Studi kasus di Sentra Industri Kecil tahu Kelurahan Babakan, Kecamatan Babakan, Ciparay, Kotamadya Bandung) [Correlation study between soybean allocation from KOPTI (Tofu-Tempeh Cooperative) with the price estimation and the breakeven point (A case study at the Center for Small Industry in Babakan, Ciparay, Bandung)]. Sarjana thesis, Bogor Agricultural University. [Ind]*

2081. Sison, R. 1984. Rationale/objectives of the National Soybean Program. Paper prepared for the first orientation training seminar on soybean production for rice based areas. Held 11-13 Dec. 1984 at Los Banos, Philippines. *
• ***Summary:*** In the Philippines, the major producer is Mindanao, which is in the south. Although production has gradually increased in the last 10 years, the total area planted to soybeans was only 8,320 ha in 1983. Imports that year totaled 31,000 tonnes of soybeans and 261,000 tonnes of soybean meal. The demand for soybean meal as animal feed has prompted the government to direct efforts toward accelerating production.

2082. Slamet, Dewi Sabita. 1984. Penelitian pengaruh pemberian bahan makanan campuran (BMC) kedele terhadap absorpsi besi [Research on the effects on iron absorption of consuming foods made of soybeans]. Bogor: Pusat Penelitian dan Pengembangan Gizi. 28 p. Research report. [Ind]*
Address: Bogor, Indonesia.

2083. Soebagio, Lanita S. 1984. Laporan penelitian pengaruh pemakaian air tercemar dalam proses pembuatan tempe [Research report on the effects of using contaminated water in tempeh processing]. Jakarta: Akademi Gizi. 66 p. [Ind]*
Address: Jakarta, Indonesia.

2084. Subowo, Tutu; Suharto, -; Kurniati, -. 1984. Penelitian kerusakan dan korosi kaleng pada makanan kaleng tempe dan tahu [Research on tin can damage and corrosion effects in canned tempeh and tofu]. Bandung: Lembaga Kesehatan Nasional, LIPI. 26 p. Research report. [Ind]*
Address: Bandung, Indonesia.

2085. Sumarno, -. 1984. Defining soybean breeding objectives for the Indonesian cropping system programme. Presented at the Asian Soybean Workshop, Jakarta. *

2086. Tanuwidjaja, Lindajati. 1984. Bench scale powder from tempe inoculum production. Bandung: Lembaga Kimia Nasional–LIPI. 3 p. Research report. [Eng]*
Address: Bandung, Indonesia.

2087. Arifin, -; Sultoni, -; et al. 1984. Soybean commodity system in Indonesia. Bogor, Indonesia: CRIFC (Central Research Inst. for Food Crops). 128 p. *
Address: Indonesia.

2088. Bhumiratana, Amara. 1984. ASEAN Protein Project, 1974-1984. Bangkok, Thailand: ASEAN Subcommittee on Protein. 111 p. Illust. 29 cm. [Eng]
• ***Summary:*** The ASEAN nations are Indonesia, Malaysia, the Philippines, Singapore, and Thailand. Contents: 1. Malnutrition problems in ASEAN countries (incl. Soy-based products as a solution to malnutrition). 2. Administration of the ASEAN Protein Project. 3. Objectives. 4. Methodology. 5. Results of ASEAN member country research: Soy products developed (high-protein, low-cost foods for infants and children, soy milk and soy milk powder, full-fat soy flour), fermentation products developed (tempe: from shophouse business to modern factory, oncom chips and flour, soy sauce, the ASEAN culture collection), other related projects, exchange of information (incl. details on the 15 ASEAN protein workshops held between July 1975 and Oct. 1984, and the publications resulting from each). 6. New ASEAN projects. 7. Conclusion.

This book, which contains many color photos and focuses on soybeans, describes one of the most successful ASEAN programs, emphasizing cooperation among the ASEAN nations in an attempt to solve the problem of malnutrition common to the region. The project, conceived in Aug. 1971, receives major funding and technical assistance from the Australian government. In May 1978 the ASEAN Full-Fat Soy Flour (FFSF) Factory in Chiang Rai, Thailand, was completely installed and has been producing continuously since then. It has a capacity of 100 tons/month. Numerous photos of the facility are shown. A pilot plant has produced up to 50 tons/month of Kaset Infant Food, which has been well accepted in 573 health centers throughout Thailand and is being evaluated in other ASEAN countries. A photo of the package (plastic bag) is shown.
Address: Bangkok, Thailand.

2089. Bray, Francesca. 1984. Crop systems (Document part). In: F. Bray. 1984. Science and Civilisation in China. Vol. 6, Biology and Biological Technology. Part II: Agriculture. Joseph Needham series. Cambridge, England: Cambridge University Press. xxvii + 724 p. See p. 423-510.
• ***Summary:*** Note: Chinese characters are given for all italicized Chinese words or terms. Crop systems in China emphasize cereal grains far more heavily than any farming

system in the West. Productive livestock play a very small role in China's farm economy, and the proportion of arable land devoted to pastures is very small. Grain has always been the essential ingredient in Chinese diets, with millets and wheat in the north, and rice in the south, providing almost all the carbohydrates and a significant part of the protein. Legumes, especially soybeans and their products, provided supplementary proteins and also restored the soil's nitrogen content. The Chinese have been among the best-fed people in the world, especially during periods of economic prosperity like the Sung dynasty.

Important crops like rice, millet, and hemp have been cultivated in China since neolithic times; soybeans, which emerged later, were probably first domesticated in north China during Chou times (after 1045 B.C.); from there it spread to Japan and Southeast Asia, then eventually to the Americas and Europe.

Crop rotations (p. 429): By Western standards, the size of Chinese land holdings were very small, even as early as Han times. During the Sung, a large holding was considered to be 100 *mu* (about 15 acres or 6 ha). During the 1930s, the average holding was 5½ acres in North China and 3 acres in the south–but these small farms were very productive. The fertility of the soil came not from the manure of grazing livestock on fallow land but from the application of fertilizers (such as human excrement, river mud, or oil-cake) and the wise use of crop rotations including legumes, green manures, and other soil-enriching crops. Continuous cropping seems to have been widely established in China by Han times. The *Ch'i Min Yao Shu* (544 A.D.) recommended various crop rotations. For example, foxtail millet *(Setaria italica; ku)* should be preceded by adzuki bean, hemp, sesame, or soybean. Broomcorn millet *(Panicum miliaceum; shu)* should be preceded by soybean or foxtail millet. Adzuki beans should be preceded by wheat or barley, or foxtail millet. Note: In 1978 the adzuki bean was reclassified from *Phaseolus angularis* (Willd.) to *Vigna angularis* (Willd.). The Chinese term for grain, *ku,* has been applied not only to the main cereal grains but also to such field crops as hemp and beans, also cultivated for their grains. Thus *wu ku,* the "five grains," a term often found in Classical Chinese texts, was understood to comprise setaria millet *(chi),* panicum millet *(shu),* rice *(tao),* wheat and barley *(mai),* and legumes *(shu)*–though some commentators substituted hemp *(ma)* for rice. Other classifications referred to the "six grains" *(liu ku)* or "nine grains" *(chiu ku).*

Table 10 (p. 433) shows some common Chinese crop rotations. In the winter wheat area 3-year rotation (20th century): Winter wheat, soybeans (summer), fallow, kaoliang (summer), winter wheat, soybeans or black soybeans (summer). The Kiangsu high land 3-year rotation started with wheat or barley (winter), then soybeans and sesame (summer).

Millets, sorghum (incl. kaoliang) and maize (p. 434-59). Discusses many species, glumes, spikes, panicles, awns, illustrations (p. 438-39, 444), table of terminology of Chinese millets (p. 440, incl. glutinous varieties), distribution, food uses. The name *kaoliang* ("tall millet") first appears in the *Wang Chen Nung Shu* (+1313). The plant, cultivated primarily in northeastern China, is characterized by tall stems ten feet high, huge panicles, and comparatively large black seeds. A map (p. 437) shows the distribution of four species of millet plus Job's tears.

Wheat and barley (p. 459-77). Both are of Near Eastern origin. They may have been grown in some parts of China as early as neolithic times, and were certainly cultivated during the Shang (1600 to 1045 B.C.) and Chou (after 1045 B.C.) in areas such as Shantung and Anhwei. "The most important feature distinguishing wheat and barley from the native Chinese cereals is that they are winter crops, that is to say they are sown in the autumn or winter and harvested in the late spring." Their great attraction was that they were supplements to, not substitutes for, the more traditional crops, and were harvested in the lean summer season when supplies of millet and rice were running low. "Since tbey did not compete for field-space with autumn-ripening crops, wheat and barley permitted the development of highly productive crop rotations." In northern China they were often rotated with millet or kaoliang, and even replaced them entirely in some areas. Northern rotations often included soybeans or other legumes. Illustrations from *Pên Ts'ao Kang Mu* (+1596) (p. 468-69). Only during the T'ang dynasty did wheat and barley really become economically important in China. The *Pu Nung Shu,* by Chang Lu-Hsiang (+1620) mentions the use of bean-cake *(tou ping)* as a fertilizer on wheat fields. For wheat and barley, the yield to seed ratio (number of grains harvested for every grain planted) was about 3 or 4 to 1 whereas rice in China was 50 or 100 to 1. Today wheat is clearly the most important crop in North China.

Rice (p. 477-510). Rice *(Oryza sativa [Oryzae sativa])* has been a key crop in the Chinese economy since the T'ang dynasty (+618-906). Two sub-species are commonly distinguished: *indica* is short and round-grained whereas *japonica* is long-grained. Most Asians reserve glutinous rice for ceremonial purposes. Address: Research Fellow, East Asian History of Science Library, Cambridge, England.

2090. Bromfield, Kenneth R. 1984. Soybean rust. American Phytopathological Society, 3340 Pilot Knob Rd., St. Paul, MN 55121. 65 p. Monograph No. 11. [124 ref]
• ***Summary:*** This monograph is one of the most important contributions to the understanding of soybean rust. The author reviews the importance of leaf rust in countries where the disease occurs and gives detailed information for each country about when the disease and pathogen were first recorded.

The disease is caused by *Phakopsora pachyrhizi* Sydow. Research on soybean rust...

Early reports on soybean rust in Asia include Japan 1902, India 1906, Taiwan 1914, and Philippines 1914.

The section titled "The Americas" (p. 7) states: In the Americas, the soybean rust pathogen has been reported on a number of leguminous species as *P. pachyrhizi* or as one of its synonyms, the most common being *P. vignae.* Countries from which the pathogen has been reported and the year of first report are: Puerto Rico (1913), Mexico (1917), Cuba (1926), Trinidad (1926), St. Thomas (1926), Colombia (1933), Guatemala (1940), Brazil (1940 as *P. crotolariae,* 1979 as *P. pachyrhizi),* Venezuela (1943), Chile (1962), and Costa Rica (1976).

Note: Letter (e-mail) from Morris Bonde, USDA / ARS Foreign Disease–Weed Science Research Unit. 2005. April 6. The rust reported on soybeans on all these Western Hemisphere countries can be assumed to be *Phakopsora meibomiae*. Address: USDA ARS, Plant Disease Research Lab., Fort Detrick, Frederick, Maryland 21701.

2091. Deomampo, N.R.; et al. 1984. Commodity industry profile for soybean. PCARRD. *

2092. Jones, Antoinette M. Barret. 1984. Early tenth century Java from the inscriptions: A study of economic, social and administrative conditions in the first quarter of the century [A.D.]. Dordrecht, Holland: Cinnaminson; U.S.A.: Foris Publications xi + 203 p. Illust. 24 cm. *

• ***Summary:*** This book is based on her 1976 PhD thesis from the University of London titled "Aspects of economic, social and administrative conditions in Central and East Java in the first quarter of the tenth century A.D." Soybeans are not mentioned among the commodities imported to or exported from Java before the 11th century. Address: England.

2093. Kikkoman. 1984. Kikkoman (Singapore) PTE. LTD. (Brochure). Tokyo: Kikkoman Corp. 9 p. [Eng]

• ***Summary:*** Construction of this plant began in Aug. 1983. "The completion of the facility in July 1984 was celebrated with a push-button ceremony to signal the beginning of Kikkoman Soy Sauce production in Singapore." The plant cost $14 million to build. The grand opening of the Kikkoman shoyu plant in Singapore was on 21 Nov. 1984. Located at 7 Senoco Crescent, Singapore 2775, the plant has a production capacity of 3,000,000 liters a year, an area of 18,000 square meters, and 40 employees. Address: Tokyo.

2094. Ko Swan Djien. 1984. Fermentation of foods by moulds. In: Robert A. Samson, Ellen S. Hoekstra, and C.A.N. van Oorschot, eds. 1984. Introduction to Food-Borne Fungi. 2nd ed. Baarn, Netherlands: Centraalbureau voor Schimmelcultures. 248 p. See p. 236-42. [47 ref]

• ***Summary:*** Contents: Introduction. Species used for fermentation. Natural inoculation. Traditional starters: Chinese yeast, tane koji, tempe inoculum. Fermented foods and mycotoxins. Roles of the moulds: Synthesis of enzymes, mould growth, synthesis of colouring compounds, protection of the product. Conclusion. Address: Bandung Inst. of Technology, Indonesia, and Agricultural Univ., Wageningen, Netherlands. Present address: Tarthorst 333, 6708 HL Wageningen, The Netherlands.

2095. PUSKOPTI (Pusat Koperasi Produsen Tempe Tahu Indonesia). 1984. The planning programmes of PUSKOPTI 1983–1984. Jalan Falatehan I/6–8 Kebayoran Baru, Jakarta Selatan, Indonesia. 18 p. 29 cm. [Eng]

• ***Summary:*** Contents: Introduction. Policy and steps of realization. Planning programmes: The Division of Organization, Div. of Effort and Production, Div. of Finance. Target indication of programmes 1983/1984. Budget 1983/1984.

KOPTI is the Production Cooperative of Tempeh and Tofu Producers of Indonesia. PRIMKOPTI and PUSKOPTI work together for the prosperity and profitability of its members. Address: South Jakarta, Indonesia. Phone: 733083–733230.

2096. Suparmo, -. 1984. Evaluation of tempeh prepared from germinated soybeans. MSc thesis, Michigan State University. 81 p. Page 97 in volume 23/01 of Masters Abstracts. *

Address: Michigan State Univ.

2097. Wood, B.J.B. 1984. Progress in soy sauce and related fermentations. *Progress in Industrial Microbiology* 19:373-409. M.E. Bushell, ed. Modern Applications for Traditional Biotechnologies. [100 ref]

• ***Summary:*** Contents: Introduction. Soy sauce: Introduction, raw materials and koji, the *unami* taste, defatted soybean meal, microbiological considerations, moromi stage of fermentation, refining of and properties of shoyu, patents, work with Japan. Miso. Tempeh. Conclusions.

Tables show: (1) Glossary of terms used in soy sauce and similar fermentations: *Koji, miso (hatcho, mame, mugi, genmai, kome), moromi, shoyu (koikuchi, usukuchi, tamari, shiro, saishikomi), tamari, teriyaki.* (2) Recently published national standards for soy sauce, miso, etc. (cites 8 standards, 5 from Taiwan and 1 each from Thailand, Malaysia and USA). (3) Recent patents relating to shoyu and miso production and processing: Japanese 1980 shoyu (13 patents), Japanese 1981 shoyu (11), USA 1979 (2), USA 1980 (2), Japanese 1979-1981 miso (8), USA tempeh 1979-1980 (3 patents). (4) Japanese journal titles and their

English translations (11 journal frequently cited in FSTA–Food Science and Technology Abstracts). Address: Applied Microbiology Div., Dep. of Bioscience and Biotechnol, Univ. of Strathclyde, Glasgow, G1 1XW, Scotland.

2098. American Soybean Assoc. 1984?. Soybeans assist shift to shrimp. *Checkoff Successfile.* Southeast Asia #902. 2 p. Undated.
Address: St. Louis, Missouri.

2099. Judoamidjojo, R. Muljono; Itoh, T.; Tomomatsu, A.; Matsuyama, A. 1985. The analytical study on "kecap" [kechap]–an Indonesian soy sauce. *Nippon Shokuhin Kogyo Gakkaishi (J. of Japanese Society of Food Science and Technology)* 32(1):67-73. Jan. [8 ref. Eng; jap]
• ***Summary:*** "Kecap is a major seasoning or condiment in Indonesia which is made from fermented soybean. The commercial products are classified as 'common,' 'sweet,' 'salty' and 'viscous.' The composition of kecap varieties was characterized by their high sugar contents (40.51-65.45%) except the salty varieties (3.84-19.36%). The sugar contents were mostly sucrose, glucose and fructose and were derived from the sweetening agent added, i.e. palm sugar, cane sugar or molasses."

"In 1980, the national production of kecap in Indonesia could be estimated about 18,000-20,000 kl." A detailed description is given of the process for making kecap. Address: 1&4. AP4 Project, Faculty of Agricultural Engineering and Technology, Bogor Agricultural Univ., Darmaga, Bogor, Indonesia; 2. Faculty of Agriculture, Tohoku Univ. Tsutsumidori-Amamiyacho, Sendai 980; 3. Japan International Cooperation Agency, Ichigaya Honmuracho 42, Shinjuku-ku, Tokyo 162.

2100. Lee, C.Y.; Suraweera, D.E.F. 1985. A note on soya bean marketing in Sri Lanka. In: Sri Lanka Soybean Utilization Training Program and Workshop: Proceedings. 2 vols. See p. 97-111. Available from Soyabean Foods Research Center, Gannoruwa.
• ***Summary:*** From farmers the soybeans go to either the Paddy Marketing Board (PMB), Co-ops, private traders, or village boutiques. PMB sells to either Ceylon Tobacco Co. (Thriposha) or Ceylon Oils and Fats Corp. Address: 1. Regional Marketing, Credit and Cooperatives Officer, FAO Bangkok, Thailand; 2. Senior Agricultural Economist, Dep. of Agriculture, Peradneiya, Sri Lanka.

2101. Oyekan, Peter; Navasero, Evelyn; Omueti, Olusola. 1985. Current status of soybean research, production, and utilization in Nigeria. In: Sri Lanka Soybean Utilization Training Program and Workshop: Proceedings. 2 vols. See p. 459.
• ***Summary:*** "Soybean was introduced to Nigeria about 1908 and it was cultivated for many years as an export crop in a small area in Benue State where the introduced variety 'Malayan' was adopted. The crop is usually grown in small holdings in mixed cropping with sorghum or maize or as an intercrop in citrus orchards... active soybean research programs that were started in the 1960s at four agricultural research institutes with Nigeria have produced soybean varieties with inherently better storability as well as ability to nodulate without prior inoculation with prepared Rhizobium. These improved varieties yield between 1.5–2.0 tonnes/ha as against about 1.8 tonnes/ha from the local variety 'Malayan'..."

"The improved varieties are also adapted to a wider area of the country, making it now possible to grow soybean commercially in 12 of the 19 states of the country instead of only one. This development has led to increased soybean production estimated at 75,000–80,000 tonnes in 1984.

"At present all the soybean produced in Nigeria is consumed locally. The bulk of the current production is used in making 'Dawadawa' a fermented soybean produce used in flavouring Nigerian soups."

"The Federal Government of Nigeria has recently adopted soybean as one of the crops that is being given priority. The Federal Government is currently funding some aspects of soybean research." Address: Nigeria.

2102. Sri Lanka Soybean Project. International Soybean Project (INTSOY). 1985. Soybean Utilization Workshop: Summary report. Urbana, Illinois: INTSOY. 15 p. Held 14-16 Jan. 1985 at Soyfoods Research Center, Gannoruwa, Peradeniya, Sri Lanka.
• ***Summary:*** The workshop was organized by the Sri Lanka Dept. of Agriculture, and INTSOY. Contents: Background. Workshop objectives. Highlights. Nutrition. Sociology. Appendix I: Participants (directory of 28 people from 13 countries, including Bangladesh, Egypt, India, Indonesia, Korea, Nepal, Pakistan, Philippines, Sri Lanka, Thailand, Vietnam, and Zambia). Appendix II: Instructors (all from Sri Lanka or INTSOY). Appendix III: Course schedule. Address: Urbana, Illinois.

2103. Sri Lanka Soybean Project; International Soybean Project (INTSOY). 1985. Sri Lanka Soybean Utilization Training Program and Workshop: Proceedings. 2 vols. Gannoruwa, Peradeniya, Sri Lanka. 525 p. Held 14-25 Jan. 1985 at Gannorowa, Sri Lanka. No index. 28 cm.
• ***Summary:*** The proceedings of this interesting workshop exist only as an unpublished manuscript. The program was divided into the following segments, each with its own convenor: Introduction and history. Soybean production (C.N. Hittle). Production and marketing (N. Ranaweera). Training and publicity (S. Wijeygoonewareena). Nutrition (P. Soysa). Utilization (A. Nelson). Laboratory practicals–Production of soy-based foods at SFRC. Dry Zone tour to Agriculture Research Station and Rajasoya in Maha

Illupallama, Anuradhapura District farmer's field, Pelwehera seed production farm. Hill country tour. Commercial processing (L.S. Wei, T.D.W. Siriwardena). Home level processing (Ellen Jayawardena). Field tours: CARE Thriposha plant, oils and fats corporation plant (Seeduwa), U.N. Gunasekara plant, Forbes and Walker plant, Glaxo Ltd. Contains a directory of instructors (25) and participants: 24 students came from 12 countries–Bangladesh, Egypt, India (4), Indonesia, Korea, Nepal (2), Nigeria (3), Pakistan, Philippines, Thailand (3), Vietnam (2), Zambia (4). Address: Sri Lanka.

2104. Hermana, -. 1985. Pengaruh konsumsi bahan makanan campuran dengan kedelai atau tempe terhadap anak balita penderita kurang kalori-protein [Effect of the consumption of food mixtures containing soybeans or tempeh on children under the age of 5 suffering from protein-calorie malnutrition]. Presented at Seminar Nasional Hasil Penelitian Perguruan. Held on 25-28 Feb. 1985 in Bandung, Indonesia. [Ind]*

• ***Summary:*** Based on Hermana's 1983 PhD thesis.

2105. Kawashima, Noriko. 1985. Tenpe ryôri no are kore [Various aspects of tempeh cookery]. *Daizu Geppo (Soybean Monthly News).* Feb. p. 32-35; March. p. 40-43; May. p. 36-41. [Jap]

• ***Summary:*** This 3-part article contains numerous tempeh recipes (Japanese-, Indonesian-, and Western style) and black-and-white photos of them. Address: Tenpe Ryori Kenkyuka (Wife of Kawashima sensei).

2106. Sutardi, -; Buckle, K.A. 1985. Reduction in phytic acid levels in soybeans during tempeh production, storage and frying. *J. of Food Science* 50(1):260-61, 263. Jan/Feb. [18 ref]

• ***Summary:*** Less than 10% of the phytic acid originally found in the soybeans remained after tempeh fermentation, storage for 72 hours, and deep-frying. Address: 1. Faculty of Agricultural Technology Gadjah Mada Univ., Yogyakarta, Indonesia; 1-2. School of Food Technology, Univ. of New South Wales, P.O. Box 1, Kensington, NSW 2033, Australia.

2107. *TVIS News.* 1985—. Serial/periodical. The Tropical Vegetable Information Service, Asian Vegetable Research and Development Center (AVRDC), P.O. Box 42, Shanhua, Tainan 741, Taiwan. Vol. 1, No. 1. Feb. 1985.

• ***Summary:*** This periodical supplements (but does not replace) *Centerpoint,* a newsletter which continues to be published by AVRDC. In the first issue of *TVIS News* (Feb. 1985) are four short articles about soybeans (each cited separately) and an 8+ page worldwide bibliography on the soybean (most entries have an abstract), which includes articles about West Java (#40001), Puerto Rico (#40002), Brazil (#40003-04), Vietnam (Mekong Delta #40040-41), Cambodia, China, Thailand (#40034), Taiwan (#40032), etc.

2108. Wang, Wen-hsiou; Widodo, Ir. 1985. Introduced soybean cultivars in Indonesia. *TVIS News* 1(1):4. Feb.

• ***Summary:*** Soybean can be planted in Central Java both in the spring (upland, from Jan. to late March) and fall (lowland, from June to early Aug., after 1 or 2 rice crops) seasons.

The purpose of this trial was to screen four promising, small-seeded soybean varieties for commercial plantings. Two of these had been developed by AVRDC (Taiwan) and two were from Indonesia. The trial was conducted at the Provincial Horticultural Farm at Bandungan.

Table 3 shows that the two AVRDC varieties gave the best yields, 2.3 and 2.1 tones per ha. The seed giving the highest yield had a 1,000 seed weight of 126 gm. Address: 1. Agronomist, ROCATM; 2. Agronomist, Inc. Counterpart. Both: P.O. Box 31, Salatiga, Semarang, Indonesia.

2109. Australian Department of Immigration and Ethnic Affairs. 1985. A land of immigrants. Australia. 16 p. 28 cm.

• ***Summary:*** Human beings first set foot on the Australian landmass at least 40,000 years ago. Probably originating in Southeast Asia, they were the ancestors of today's Australian Aborigines.

European discovery: The first European visitors to Australia were the Dutch, who explored the Gulf of Carpentaria in 1606 and landed in 1642. In 1642 the Dutchman Abel Tasman discovered Tasmania. In 1688 the English buccaneer, William Dampier, in a stolen vessel, the Cygnet, visited Australia's northwest coast. In 1699 he returned in command of the Royal Navy Ship, Roebuck, to continue his exploration of New Holland, the name the Dutch had given the continent after Tasman's voyages. In 1770 navigator James Cook claimed the eastern part of Australia for Britain; he discovered Botany Bay and named the land New South Wales; it did not come to be called Australia until the 19th century.

A colony is born: "Loss of her North American colonies following the Declaration of Independence on 1776 prompted Britain to seek a new land suitable for penal settlement... Before the revolt of the American colonists (1775-83), Britain had been transporting about 1,000 convicts a year, mainly to Virginia and Maryland. Between 1717 and the War of Independence (1775-83), at least 50,000 English convicts were shipped to America. In 1779 Sir Joseph Banks, a botanist with Capt. Cook, first suggested the establishment of British penal colony at Botany Bay, New Holland (Australia). In 1783 an American suggested that American colonists loyal to Britain be resettled in New Holland; actually, most moved to Canada. On 26 Jan. 1788 the first group of 736 British convicts plus several hundred non-convicts arrived at Sydney Cove, Port

Jackson, New South Wales, and Governor Phillip founded the settlement at Sydney Cove–a date that is still celebrated each year as "Australia Day" (prior to 1932 called "Foundation Day"). The first party of free immigrants arrived in 1793. The country was first named Australia in 1817 and the entire continent was claimed by Britain in 1829. By the late 18th century, when the first European settlers arrived, an estimated 250,000 to 300,000 Aborigines were living in Australia. Shipping of convicts to eastern Australia was abolished in 1840, but it continued until 1853 in Tasmania and until 1868 in Western Australia. By that time, some 160,000 of them had been sent to Australia.

The Australian Gold Rush: The discovery of gold at Bathurst, about 100 miles northwest of Sydney, New South Wales, in 1851 (3 years after it was discovered in California), and later at Ballarat and Bendigo, north of Melbourne, Victoria, brought a flood of fortune seekers from around the world–including China. The Chinese population on the goldfields increased rapidly, reaching 17,000 by 1855, at which time an act to restrict Chinese entry was passed, thus beginning the policy of "White Australia." In the gold rush decade, more than 600,000 immigrants arrived. [Note that the early gold fields were located in southwest Australia, the same area where soybeans were most widely grown after 1980.] From 1850 to 1860, Australia's non-Aboriginal population grew from 405,356 to 1,145,585. In 1861 there were 40,000 Chinese in Australia. Japanese began to arrive in the late 1800s.

In the second half of the 19th century, gold mining led to the establishment of many coastal and inland centres in Queensland (in northeastern Australia; separated from New South Wales in 1859). Gold drew thousands of miners to fields such as Gympie, Charters Towers and the Palmer River valley; the Mount Morgan mine was established in 1882. Gold also brought people to Western Australia, where the famous goldfields, Coolgardie and Kalgoorlie, were discovered in the second gold rush of 1892-1983. In 10 years Western Australia's population rose from 93,000 (in 1886) to 138,000 (in 1896). From 1851 to 1891, some 1,390,000 were attracted to Australia by the discovery of gold and the subsequent rapid development of agriculture. The 1891 population of 3,174,400 included 46,600 from Asia.

White Australia: In 1901 the Commonwealth of Australia was established, with Canberra as its capital. The Commonwealth Government passed a policy restricting Asian immigration in general. In 1901 Australia's population was 3,773,801–not including Aborigines whose numbers had fallen to about 95,000. Some 77% of the population were born in Australia and 18% in Britain. Roughly 32,000 were Chinese and 3,593 were Japanese-born. This so-called "White Australia" policy that began officially in 1901 prevented the immigration of non-Europeans from more than 50 years. "In 1901 Japanese-born residents of Australia totalled 3,593 but as a result of the Immigration Restriction Act of that year, their numbers declined. During World War II, most returned to Japan or were interned. By 1981, with a non-discriminatory immigration policy, Japanese-born residents of Australia had increased to 8,060.

On 26 Jan. 1949 ("Australia Day") it first became possible for a person to become a citizen of Australia, as the Australian Citizenship Act went into effect. Before that, the nationality status for Australians was simply "British subject."

Starting in the late 1940s, the "White Australia" policy was gradually and increasingly relaxed; it was finally abolished in 1973. Since World War II, immigration has included more than 400,000 refugees. The largest single group has been the 88,112 Indo-Chinese (including 68,000 Vietnamese, many of them "boat people") who arrived between April 1975 [when the USA was defeated in Vietnam] and June 1984. As of 1981, 9.3% of Australia's overseas-born residents had been born in Asia.

Note: These Asians must have brought soybeans and soyfoods to Australia before 1900, but we have yet to see anything published documenting this pioneering work. Indeed, no one knows when and how soybeans first arrived in Australia. Address: Australia.

2110. Birch, Renee E.W.; Swanson, B.G. 1985. Tempeh fermentation and protein quality of beans *(Phaseolus vulgaris). Annual Report of the Bean Improvement Cooperative* 28:72-73. March. [2 ref]

• ***Summary:*** The authors made soy tempeh, soy-corn tempeh (using 3 ratios of soy:corn), small red bean (SRB, *Phaseolus vulgaris)* tempeh, and SRB-corn tempeh (3 ratios). The soy-corn tempeh (1:1) had the highest protein quality as measured by PER (3.11), followed by soy-corn tempeh (2:1) with a PER of 3.03. Casein, by comparison, had a PER of 2.59. SRB tempeh had the lowest PER, 1.69. Address: Dep. of Food Science & Human Nutrition, Pullman, Washington 99164-6330.

2111. Buchanan, Alex. 1985. Prof. Amara Bhumiratana (1919-1984). *ASEAN Food Journal (Malaysia)* 1(1):2. March.

• ***Summary:*** Prof. Bhumiratana died on 12 Dec. 1984. "His position as a foundation member of the Editorial Board of this ASEAN Food Journal reflected his very high standing in the ASEAN community of food technologists. It was his leadership as Chairman which firmly established the ASEAN Sub-Committee on Protein as an effective vehicle of regional co-operation, thus making it the first effective regional R and D project among the ASEAN countries. This provided the background and experience on which ASEAN and Australia were able to launch the ASEAN Food Waste Materials Project and later the ASEAN Food Technology

Research and Development Project. Both these initiatives were first put forward by Professor Amara... Yet his main contributions to the development of food science and technology were undoubtedly in Thailand. The Institute of Food Research and Development in Bangkok was created and built to its present size entirely under his leadership." Address: Australian High Commission, Kuala Lumpur, Malaysia.

2112. Byrne, Maureen. 1985. The future for soyfoods. The first European Soyfoods Workshop was held in Amsterdam by the American Soybean Association, and papers covered subjects from marketing to microbiological standards. *Food Manufacture (London)* 60(3):49, 51, 53. March.
• ***Summary:*** Contains an interesting full-page table in which Oriental soyfoods are classified into two types: Non-fermented and fermented. The non-fermented soyfoods are: Fresh green soybeans, soybean sprouts, soynuts, soymilk, soy flour, soy protein-lipid film (yuba, tou-fu-pi), soybean curd (tofu). For each food is given the local names, description, and uses.

The fermented soyfoods are: Soy sauce, miso, tempeh, natto, fermented tofu, and soy nuggets. For each fermented soyfood is given the local names, organisms used, description, and uses.

Soy sauce includes chiang-yu from China, shoyu from Japan, ketjap from Indonesia, kanjang from Korea, toyo and see-ieu from Southeast Asia.

Soy nuggets include tau-shih from China, tao-si from the Philippines, tau-cheo from Malaysia, tauco from Indonesia, and Hamanatto from Japan.

2113. Kawashima, Noriko. 1985. Indonesia no nattô "tenpe" no tabekata [How to eat tempeh, Indonesia's natto]. *Shin Eiyo (New Nutrition).* March. p. 55-59. [Jap]

2114. Okada, Noriyuki; Hadioetomo, R.S.; Nikkuni, S.; Itoh, H. 1985. Isolation of bacteria producing vitamin B-12 from fermented soybean tempeh from Indonesia. *Shokuhin Sogo Kenkyujo Kenkyu Hokoku (Report of the National Food Research Institute)* No. 46. p. 15-20. March. [20 ref. Eng; jap]
• ***Summary:*** Eighteen samples of tempeh were gathered various from places in Indonesia: Bogor, Ciomas, Cisarua, Pacet Cianjur, Cicurug, Kedunghalang, and Semplak. Bacteria isolated from these tempeh samples were identified. 13 of 33 isolates were identified as *Klebsiella pneumoniae*–which is known to produce vitamin B-12. Address: National Food Research Inst. (Shokuhin Sogo Kenkyujo), Kannon-dai 2-1-2, Yatabe-machi, Tsukuba-gun, Ibaraki-ken 305, Japan.

2115. Rosario, R.R. del; Maldo, O.M.; Macias, A.N. 1985. Development of improved vegetable milk formulation. *Philippine Agriculturist* 68(1):112-17. Jan/March. [11 ref]
• ***Summary:*** Soymilk was made from whole soybeans using coconut milk as a masking agent. Using the traditional hot-grind process, the optimum level of coconut milk to effect masking was 23 ml per 750 ml of soymilk. The bland tasting soy-coco-milk was then used to produce various flavors. Address: Inst. of Food Science & Technology, UP at Los Baños, College, Laguna 3720, Philippines.

2116. Shurtleff, William; Aoyagi, Akiko. 1985. The book of tempeh: The delicious, cholesterol-free protein. 2nd ed. New York, NY: Harper & Row. 175 p. March. Illust. by Akiko Aoyagi Shurtleff. Index. 28 cm. [374 ref]
• ***Summary:*** Contains 130 Western-style and Indonesian recipes. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549 USA.

2117. Tang, T.C.; Lim, G.; Nga, B.H. 1985. Screening for aflatoxins in *Aspergillus oryzae* strains used in soy sauce fermentation. *ASEAN Food Journal (Malaysia)* 1(1):19-21. March. [6 ref]
Address: Singapore.

2118. Tanuwidjaja, Lindayati; Roestamsjah, -. 1985. Preparation and utilization of powder form inoculum for tempeh fermentation. *ASEAN Food Journal (Malaysia)* 1(1):22-24. March. [4 ref]
• ***Summary:*** Studies on the preparation of powder form inoculum utilizing *Rhizopus oligosporus* ITB L36 (obtained from the Bandung Institute of Technology) and various substrates (white polished rice, tapioca waste, mixture of tapioca waste and soybean flour) showed that rice inoculum produced more spores and had a longer shelf-life. Further studies utilizing the rice inoculum in tempe fermentation indicated that the inoculum concentration affected the texture, appearance, soluble solid, soluble nitrogen as well as ammonia content of the tempe produced. Address: National Inst. for Chemistry, Indonesian Inst. of Sciences, Bandung.

2119. Forman, Gail. 1985. First came the egg: Recipe's to answer Easter's dilemma. *Washington Post.* April 3. p. E1, E14, E16.
• ***Summary:*** In the West, people generally eat eggs for breakfast, using only very few recipes. But in Asia, they are used with great robust diversity and imagination.

"The Javanese omelet is concocted of eggs fried with onions and chilies and seasoned with sweet, thick Javanese soy sauce called *ketjap manis* or *ketjap benteng."*

Chawan-mushi (Japanese savory egg custard) calls for "1 tablespoon, plus 1 teaspoon Japanese soy sauce."

2120. Hasil simposium. Daftar peserta [Recommendations of the symposium, and directory of participants]. 1985. In:

Hermana and Karyadi, eds. 1985. Simposium Pemanfaatan Tempe Dalam Peningkatan Upaya Kesehatan dan Gizi [Proceedings of the National Symposium on Tempeh]. 148 p. See p. 8-19. Held 15-16 April 1985 in Jakarta. [Ind; Eng]
• ***Summary:*** There are 8 recommendations for policy decisions and operational action. Within the recommendations for research there are 7 for technology research, 2 for nutrition research, 5 for health research, 2 for socio-economic research, and 3 for socio-cultural research. Among the latter: "In-depth study of the history of tempeh to conserve traditional wisdom."

The directory gives the name and organization or address for 93 attendees. Address: Indonesia.

2121. Hermana, -; Karyadi, Darwin. eds. 1985. Simposium pemanfaatan tempe dalam peningkatan upaya kesehatan dan gizi [Symposium on the use of tempeh for strengthening the health and nutrition services]. Bogor, Indonesia: Departemen Kesehatan R.I., Badan Penelitian dan Pengembangan Kesehatan, Pusat Penelitian dan Penembangan Gizi, Komplek Gizi Jl. Dr. Sumeru, Bogor 16112. vi + 148 p. Held 15-16 April 1985 in Jakarta. Illust. No index. 28 cm. [Ind]
• ***Summary:*** This pioneering symposium on tempeh attempted to call attention to the many valuable aspects of this traditional Indonesian food. It was sponsored by the Ministry of Health. Some 113 people attended. Address: Bogor, West Java, Indonesia.

2122. Hermana, -. 1985. Beberapa prinsip alternatif penggunaan tempe dalam peningkatan status gizi golongan rawan gizi. 1. Tempe dalam penanggulangan keadaan gizi kurang dan manejemen dietetik diare pada anak balita [Several alternative principles in the utilization of tempeh to improve the nutritional status of those in critical nutritional condition]. In: Hermana and Karyadi, eds. 1985. Simposium Pemanfaatan Tempe Dalam Peningkatan Upaya Kesehatan dan Gizi [Proceedings of the National Symposium on Tempeh]. 148 p. See p. 32-37. Held 15-16 April 1985 in Jakarta. [6 ref. Ind]
Address: Pusat Penelitian dan Pengembangan Gizi, Bogor, Indonesia.

2123. Mahmud, Mien K. 1985. Beberapa prinsip alternatif penggunaan tempe dalam peningkatan status gizi golongan rawan gizi. 2. Tempe dalam peningkatan status gizi dan kesehatan Ibu Hamil [Several alternative principles in the utilization of tempeh to improve the nutritional status of those in critical nutritional condition]. In: Hermana and Karyadi, eds. 1985. Simposium Pemanfaatan Tempe Dalam Peningkatan Upaya Kesehatan dan Gizi [Proceedings of the National Symposium on Tempeh]. 148 p. See p. 38-43. Held 15-16 April 1985 in Jakarta. [3 ref. Ind]
Address: Pusat Penelitian dan Pengembangan Gizi, Bogor, Indonesia.

2124. Mangkuwidjojo, Soesanto; Pranowo, Djoko; Nitisuwirjo, Sutjipto; Noor, Zoeheid. 1985. Pengamatan daya hipokolesteremik pada tempe [Observations on the hypocholesterolemic effects of tempeh]. In: Hermana and Karyadi, eds. 1985. Simposium Pemanfaatan Tempe Dalam Peningkatan Upaya Kesehatan dan Gizi [Proceedings of the National Symposium on Tempeh]. 148 p. See p. 114-27. Held 15-16 April 1985 in Jakarta. [22 ref. Ind]
• ***Summary:*** This study showed that the inclusion of tempeh in the diet of hyperlipidemic patients will produce a hypercholesterolemic response, this reducing their blood serum cholesterol level. Address: Fakultas Kedokteran Hewan–UGM.

2125. Sadli, Saparinah. 1985. Persepsi masyarakat mengenai tempe [What the people think about tempeh]. In: Hermana and Karyadi, eds. 1985. Simposium Pemanfaatan Tempe Dalam Peningkatan Upaya Kesehatan dan Gizi [Proceedings of the National Symposium on Tempeh]. 148 p. See p. 60-68. Held 15-16 April 1985 in Jakarta. [3 ref. Ind]
Address: Prof. Dr., Fakultas Psikologi–UI.

2126. Sayogyo (Sajogyo), -. 1985. Tempe di dalam pola makanan Indonesia tahun 1981 [Tempeh in the Indonesian dietary pattern in the year 1981]. In: Hermana and Karyadi, eds. 1985. Simposium Pemanfaatan Tempe Dalam Peningkatan Upaya Kesehatan dan Gizi [Proceedings of the National Symposium on Tempeh]. 148 p. See p. 85-96. Held 15-16 April 1985 in Jakarta. [3 ref. Ind]
• ***Summary:*** Figures from the Central Bureau of Statistics show the average, urban, and rural consumption level of tempeh in 13 provinces in grams/person/day. Consumption is highest in Java. Provinces with the highest average consumption are Yogyakarta (34.2 gm), Central Java (24.7), Jakarta (19.5), East Java (19.4), Lampung (16.2), East Kalimantan (11.0), West Java (9.3), and Bali (8.4). The higher consumption in urban compared with rural communities is probably due to the higher purchasing power and also the easy access to soybean supply for home industries. Tempeh is popular among people in both high- and low-income groups. Address: Fakultas Pertanian–IPB.

2127. Siagian, Uhum L.; Sofia, Gustina. comp. 1985. Tempe: Bibliografi beranotasi [Tempeh: An annotated bibliography]. Indonesia: Pusat Penelitian dan Pengembangan Gizi; Badan Penelitian dan Penembagan Kesehatan; Departemen Kesehatan RI. 80 p. April. Author index. 28 cm. [273 ref. Ind]
• ***Summary:*** By far the best bibliography of Indonesian-language publications on tempeh, compiled by Mr. Siagian

and Ms. Sofia, and published jointly by the Nutrition Research & Development Center, The Institute for Health, Research and Development, and the Indonesian Ministry of Health. 200 copies were printed, and distributed by the Nutrition Research and Development Center (Jalan Dr. Sumeru, Bogor). The publication was sponsored by the World Health Organization (WHO), the Institute of Health, Research and Development, and the Center for Health and Medical Information Network and Scientific Documentation (Jaringan Informasi dan Dokumentasi Ilmiah bidang Kesehatan Kedokteran, Pusat). All entries have an Indonesian summary / abstract.

Contents: Preface by Dr. Darwin Karyadi (1 April 1985). Directions for use of the book. Abbreviations. 1. Preparation of tempeh from peanut presscake (onchom), velvet beans *(benguk),* rubber seeds *(biji karet),* coconut presscake *(bongkrek),* mixed ingredients *(campuran),* okara or soy pulp *(gembus),* Cajanus cajan *(Kacang gude),* Vigna radiata *(Kacang hijau* [mung bean]), winged bean *(kecipir),* soybean *(kedelai),* Canavalia ensiformis *(Koro pedang;* [jack bean]). Leucaena leucocephala *(lamtoro),* Lupinus angustofolius *(Lupinus),* and soy flour *(Tepung).* 2. Tempeh microorganisms and inocula. 3. Nutritional value: Iron, lipids, protein, vitamins, tempeh formula (Vitempo). 4. Toxins: Aflatoxin, cyanide, bongkrek toxins, others. 5. Preservation. 6. Inhibitors: Phytic acid, antioxidant, trypsin inhibitors. 7. History. 8. Standards. 9. Consumption. 10. Author index. 11. Names and addresses of major tempeh-related research organizations in Indonesia.

This bibliography contains references for 85 Indonesian-language documents relating to soybean tempeh, from 1962 to 1985; some 43 of these were published after 1979.

Page 80 lists 17 Indonesian libraries in seven cities (Bandung, Bogor, Jakarta, Semarang [Central Java], Surabaya, Yogyakarta) that contributed to this bibliography of tempeh.

We are indebted to this fine bibliography for many of our Indonesian language tempeh records. Our thanks to Peter Ananda of the University of California, Berkeley, South & Southeast Asia Library. Address: Bogor, Indonesia.

2128. Soetrisno, Uken S.S. 1985. Beberapa prinsip alternatif penggunaan tempe dalam peningkatan status gizi golongan rawan gizi. 3. Tempe dalam pemenuhan kebutuhan gizi ibu menyusi [Several alternative principles in the utilization of tempeh to improve the nutritional status of those in critical nutritional condition]. In: Hermana and Karyadi, eds. 1985. Simposium Pemanfaatan Tempe Dalam Peningkatan Upaya Kesehatan dan Gizi [Proceedings of the National Symposium on Tempeh]. 148 p. See p. 44-52. Held 15-16 April 1985 in Jakarta. [8 ref. Ind]
Address: Pusat Penelitian dan Pengembangan Gizi, Bogor, Indonesia.

2129. Steinkraus, K.H. 1985. Trends and current knowledge in tempe research. In: Hermana and Karyadi, eds. 1985. Simposium Pemanfaatan Tempe Dalam Peningkatan Upaya Kesehatan dan Gizi [Proceedings of the National Symposium on Tempeh]. 148 p. See p. 138-48. Held 15-16 April 1985 in Jakarta. [20 ref. Eng]
• ***Summary:*** Contents: Introduction. Indonesian tempe kedelai (with 10 essential steps for tempe production). Traditional tempe fermentation (the basic traditional process). Industrial production of tempe (details of the commercial process and improvements made during the past 25 years, many originating in the USA by Steinkraus, Martenelli and Hesseltine, plus Gandjar, etc. Summary of the tempeh industry and market in the USA {Shurtleff & Aoyagi 1984}. Summary of the tempeh industry and market in the Indonesia, with Table 1 {Winarno 1976}). Acidification–An essential step in the tempe fermentation (without this step, tempe makers in temperate climates are taking a risk of food spoilage and/or toxin development). Research needs (study differences between traditional acidified and non-traditional non-acidified tempeh fermentation processes). Address: New York State Agric. Exp. Station, Geneva, New York 14456.

2130. Sumantri (Soemantri), Ag.; Sudigbia, I. 1985. Upaya penanggulangan diare kronik dengan mempergunakan formula makanan dengan tempe [Management of chronic diarrhea with a tempe-based formula]. In: Hermana and Karyadi, eds. 1985. Simposium Pemanfaatan Tempe Dalam Peningkatan Upaya Kesehatan dan Gizi [Proceedings of the National Symposium on Tempeh]. 148 p. See p. 128-33. Held 15-16 April 1985 in Jakarta. [5 ref. Ind]
• ***Summary:*** Tempeh was shown to be effective in controlling diarrhea. Address: 1. Lembaga Penelitian–UNDIP; 2. Rumah Sakit Dr. Karyadi–UNDIP.

2131. Surjaningrat, Suwardjono. 1985. Sambutan menteri kesehatan Republik Indonesia [Opening remarks by the Minister of Health, Republic of Indonesia]. In: Hermana and Karyadi, eds. 1985. Simposium Pemanfaatan Tempe Dalam Peningkatan Upaya Kesehatan dan Gizi [Proceedings of the National Symposium on Tempeh]. 148 p. See p. 3-5. Held 15-16 April 1985 in Jakarta. [Ind]
• ***Summary:*** Surjaningrat noted that this Symposium on Tempe, which he inaugurated, was an important historical event in the progress of research and development of tempeh. Address: Minister of Health, Indonesia.

2132. Tarwotjo, -; Suaspendi, -; Martini, -. 1985. Tempe dalam program kesehatan dan gizi nasional [Tempeh in the national health and nutrition program]. In: Hermana and Karyadi, eds. 1985. Simposium Pemanfaatan Tempe Dalam Peningkatan Upaya Kesehatan dan Gizi [Proceedings of the

National Symposium on Tempeh]. 148 p. See p. 53-59. Held 15-16 April 1985 in Jakarta. [7 ref. Ind]
Address: Direktorat Bina Gizi Masyarakat.

2133. Tjiptoherijanto, Prijono. 1985. Aspek ekonomi dari usaha tempe tradisional: Pendekatan usaha tani kedelai [Economic aspects of the traditional tempeh producer: An appraisal from the soybean producer]. In: Hermana and Karyadi, eds. 1985. Simposium Pemanfaatan Tempe Dalam Peningkatan Upaya Kesehatan dan Gizi [Proceedings of the National Symposium on Tempeh]. 148 p. See p. 97-113. Held 15-16 April 1985 in Jakarta. [7 ref. Ind]
• ***Summary:*** This article contains the following graphs: Soybean exports from Indonesia (1977-82); Soybean imports to Indonesia (1978-82); Production and consumption of soybeans and soyfoods in Indonesia (1971-82; soyfoods given for only 1978 and 1980); Per-capita consumption of soybeans, tofu, tempeh, and soy sauce (kecap) by province and total, 1978 and 1980. In 1980 the figures for Indonesia as a whole were soybeans 0.16 kg per capita, tofu 4.66 kg, tempeh 4.87 kg, soy sauce 1.61 bottles. The average consumption of tempeh for Indonesia as a whole was 11.6 grams/person/day in 1978 and 13.3 gm in 1980. Source: Central Bureau of Statistics. Address: Dr., Lembaga Demografi–UI.

2134. Watanabe, Tadao. 1985. The tempe technology in Japan. In: Hermana and Karyadi, eds. 1985. Simposium Pemanfaatan Tempe Dalam Peningkatan Upaya Kesehatan dan Gizi [Proceedings of the National Symposium on Tempeh]. 148 p. See p. 134-37. Held 15-16 April 1985 in Jakarta. [2 ref. Eng]
• ***Summary:*** Contents: The tempe industry in Japan (no statistics or details are given). The manufacture of tempe in Japan. Cooking of tempe for marketable products (sold in blocks, minced, or sliced and flavored). Some biochemical properties of tempe: Antioxidative activities, volatile compounds in tempe, triglyceride profiles of Tempe Chips (from Indonesia). Address: Kyushu Univ., Japan.

2135. Winarno, F.G. 1985. Tempe–Peningkatan mutu dan statusnya di masyarakat [Tempeh–Improvements in quality and in its public status]. In: Hermana and Karyadi, eds. 1985. Simposium Pemanfaatan Tempe Dalam Peningkatan Upaya Kesehatan dan Gizi [Proceedings of the National Symposium on Tempeh]. 148 p. See p. 69-84. Held 15-16 April 1985 in Jakarta. [23 ref. Ind]
Address: Prof. Dr., Pusat Penelitian dan Pengembangan Teknologi Pangan–IPB.

2136. Abon, C.C.; Pandey, R.K.; Irabagon, J.A. 1985. Studies on cultural management of soybean (Glycine max) planted under lowland rice-based cropping systems. Paper prepared for the 16th annual scientific meeting of the Crop Science Society of the Philippines. Held 8-10 May 1985 at Muñoz, Nueva Ecija, Philippines. *

2137. Shurtleff, William; Aoyagi, Akiko. 1985. History of tempeh: A fermented soyfood from Indonesia. 2nd ed. Lafayette, California: Soyfoods Center. 91 p. May. 28 cm. [402 ref]
• ***Summary:*** A slightly revised and updated version of the July 1984 edition.
Scanned by Google Books, full view (April 2010). Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549.

2138. STS–Soya Technology Systems. 1985. Containers for soymilk (Brochure). 11 Dhoby Ghaut #11-06, Cathay Building, Singapore 0922. 4 p. Also published in Chinese. [Eng; Chi]
• ***Summary:*** Color photos show carton containers (Tetra Brik, Combibloc, Pure Pak), plastic bottles (incl. Remy/Serac Aseptic UHT), glass bottles, cans, and plastic bags (Prepac/UHT, Doypack/Toyo Seikan standing pouch/retort sterilized). Brands include Granose, Marigold, GranoVita, Soy Moo, Magnolia, No Cow, Vegemil, Vitamilk, Amofood, Milho Verde, PureHarvest, Yeo's. Address: Singapore.

2139. Hesseltine, C.W.; Featherston, C.L.; Lombard, G.L.; Dowell, V.R., Jr. 1985. Anaerobic growth of molds isolated from fermentation starters used for foods in Asian countries. *Mycologia* 77(3):390-400. May/June. [18 ref]
• ***Summary:*** Ragi (in Indonesia), murcha (in north India and Nepal), look pang (in Thailand), bubod (in the Philippines), and Chinese yeast or chiu-chu (in Taiwan and China) are used as starters for a number of fermentations based on rice and cassava in the Orient. The starter consists regularly of certain species of *Mucor, Rhizopus,* and *Amylomyces* and not of other molds, even though the production of starters is often made under unsanitary conditions. The peculiar ability of these molds to grow under anaerobic conditions is found to explain why these starters can be made to be so free of contaminating molds even though the conditions under which they are made are so unsanitary. Address: 1-2. NRRC, Peoria, Illinois, 61604; 2-3. Anaerobic Baceteria Branch, Center for Infectious Diseases, Centers for Disease Control [CDC], Atlanta, Georgia, 30333.

2140. Karyadi, Darwin. 1985. Cornell menyelidiki tempe [Research on tempeh at Cornell University]. *Intisari (Indonesia).* June. p. 57-60. [Ind]
Address: Bogor, Indonesia.

2141. Sutardi, -; Buckle, K.A. 1985. Phytic acid changes in soybeans fermented by traditional inoculum and six strains of *Rhizopus oligosporus. J. of Applied Bacteriology* 58(6):539-43. June. [12 ref]

• ***Summary:*** "Tempeh was prepared from Delmar variety soybeans inoculated with the traditional Indonesian inoculum *(usar)* and 6 pure culture strains of *Rhizopus oligosporus*. The strains BTU3K1 and CT11K2 produced the best quality tempeh. The phytic acid content of soybeans was reduced from 1.07% in whole dry soybeans to 0.67-0.75% in tempeh. Most mould strains did not have a significantly different effect on reducing the phytic acid content in tempeh." Address: School of Food Technology, The Univ. of New South Wales, P.O. Box 1, Kensington, NSW 2033, Australia.

2142. *Asahi Shinbun (Asahi Daily News, Tokyo).* 1985. "Mirai shoku"–nattô: Tsukuba de kokusai shinpojiumu [Food of the future–Natto: International symposium in Tsukuba]. July 13. [Jap]
• ***Summary:*** While focusing on the international symposium on non-salted fermented soybean foods, held in Tsukuba, Japan, this article discusses tempeh as a type of natto. A map shows the natto–kinema–thua nao–tempeh triangle joining Japan, Nepal, Thailand, and Indonesia. Address: Japan.

2143. *Yomiuri Shinbun (Yomiuri Daily News, Tokyo, Evening ed.).* 1985. "Nattô"–sekai ni shinshutsu ["Natto" is spreading out across the world]. July 24. [Jap]
• ***Summary:*** About the international symposium on non-salted fermented soybean foods held in Tsukuba, Japan. Discusses tempeh as well as natto. Photos show: (1) A man making tempeh in Indonesia. (2) A Japanese woman holding a plate of tempeh snacks. Address: Japan.

2144. Willan, Anne. 1985. The spice is right: Feasting on Indonesian ingenuity. *Washington Post.* July 28. p. G1, G4.
• ***Summary:*** Last year the writer discovered that Indonesia is "a land of extraordinarily good food. She gives the menu of an Indonesian feast for 12. The recipes do not use hard-to-find Indonesian flavorings and spices. However, "Indonesian soy sauce, for which regular dark soy sauce can be substituted, was used"–in part because it is fairly widely available.

The recipe for Coconut with peanuts (Serundeng) calls for "1 teaspoon Indonesian soy sauce." Address: Special to the Post.

2145. Asian Symposium on Non-Salted Soybean Fermentation: Tempe, Kinema, Tua-nao, Natto. The roots of biotechnology in monsoon Asia (Abstracts). 1985. Tsukuba, Japan: Tsukuba Center for Institutes. 85 p. Held 15-17 July 1985 at Tsukuba, Japan. 26 cm. [Eng]
• ***Summary:*** For each paper there is a Japanese-language abstract (p. 1-38), and an English-language abstract (p. 43-85). On pages 39-41 are full-page ads for Kume-Natto, Marusan Sukoyaka Tenpe [Tempeh], and Torigoe Tenpe. Address: Japan.

2146. Haumann, Barbara Fitch. 1985. Trends of processing, consumption around the world. *J. of the American Oil Chemists' Society* 62(7):1070-76. July. Address: JAOCS.

2147. Karyadi, Darwin. 1985. Nutritional implications of tempe in Indonesian rural community. Paper presented at Asian Symposium "Non Salted Soybean Fermentation." 18 p. Held 15-17 July 1985 at Tsukuba, Japan. [22 ref]
• ***Summary:*** A valuable discussion of numerous recent studies which show that tempeh consumption is increasing in Indonesia, that it lowers blood cholesterol, aids in rehabilitation and recovery from chronic diarrhea and diarrheal diseases, and has a protein complementary effect as a food supplement. The production of second generation products is encouraged to help tempeh reach more people, especially nutritional target groups, preschool children, and pregnant and lactating women. Concludes that tempeh has considerable untapped potential for developing countries.

Table 1 shows the per capita consumption of tempeh (in grams per person per day) in 13 Indonesian provinces (Source: Central Bureau of Statistics, 1981). Yogyakarta has the highest consumption (34.3 gm), followed by Central Java (27.7 gm), Jakarta (19.6), and East Java (19.4). Address: Nutritional Research & Development Centre, Ministry of Health, Indonesia.

2148. Willan, Anne. 1985. The challenge of creating an Indonesian feast to feed an even dozen. *Los Angeles Times.* Aug. 1. p. OC_40 or SD_40 or SE40 or SG40 or WS40.
• ***Summary:*** This article is basically the same as the one by the same author that appeared in the *Washington Post* on July 28 (p. G1).

The recipe for Toasted coconut with peanuts (Serundeng) calls for "1 teaspoon Indonesian soy sauce." Address: Special to the Post.

2149. Kidd, Kenneth. 1985. Tofutti causes Big Apple stir... Marketing. *Toronto Star (Ontario, Canada).* Aug. 11. p. F4.
• ***Summary:*** As company directors sit around a board room table, eating Tofutti, the chairman suddenly exclaims: "Has the world gone totally tofutti?"

One director leaps onto the table and starts dancing, while the music of Little Richard's 1955 hit song "Tutti Frutti" (All Rooty) swelled in the background. Note: This was Tofutti's first TV ad and Little Richard's first hit record.

The ad, now airing in New York City, has been quite a hit. David Mintz, inventor of Tofutti, says its "infectious." By making an ice cream out of tofu, Mintz has found an ingenious way of getting around kosher dietary laws and of parlaying this idea into a multi-million dollar business.

There are now more than 50 flavors of Tofutti, a tofu hamburger (almost ready; tentative name Tofutti MacFuttie), and even a chain of Tofutti Gourmet shops on the drawing boards. It all started in 1972. Tells the story of how Mintz says he invented Tofutti.

Tofutti is presently available at 36,000 outlets across the USA, and a worldwide launch is immanent. Mintz has just shipped his second order to Hong Kong. His next plans are for Singapore and Japan.

"William Nielson Ltd. has now started importing Tofutti into Canada in both hard 'ice-cream' take-home tubs and larger soft-serve containers for restaurants." However advertising claims about cholesterol content are not allowed by Health and Welfare Canada, so Neilson is asking for an amendment to the rules.

2150. Mahmud, Mien K.; Hermana, -; Karyadi, D. 1985. A preliminary study on the use of tempeh-based formula in the dietary treatment of chronic diarrhea. *Majalah Kedokteran Indonesia* 35(8):443-46. Aug. 31. [10 ref. Eng; Ind]

• ***Summary:*** 75 children under the age of 5 with chronic diarrhea (80% of whom were malnourished) were treated using a tempeh-based formula and compared with 32 children treated using a milk-based infant formula. The tempeh based formula consisted of 58% tempeh, 23% wheat flour, 15% sugar, 2% coconut oil, 1.5% salt (sodium chloride plus sodium bicarbonate), and 0.5% emulsifier. As used, it contained 16.2% protein and 12.0% fat, with 429 calories/100 gm. The milk based formula consisted of 77% rice, 12.5% skim milk, 10.5% oil, plus a little vitamins and minerals. As used, it contained 12% protein, 10% fat, and 430 calories/100 gm.

The results showed that the children with the tempeh based formula had a significantly shorter duration of recovery (2.39 days) from diarrhoeal disease than those fed with the milk based formula (2.94 days). Intake of the formulas was similar for the two groups, indicating no difference in acceptability by the children.

Note: This study indicates that tempeh may contain natural antibiotics that help to safeguard the intestinal tract from diarrhea. Address: Nutrition Research & Development Center, Bogor.

2151. Escueta, E.E.; Bourne, M.C.; Hood, L.F. 1985. Effect of coconut cream addition on the composition, texture, and sensory properties of tofu. *J. of Food Science* 50(4):887-90. July/Aug. [13 ref]

Address: 1&3. Cornell Univ., Ithaca, New York, NY, 14850; 2. Inst. of Food Science & Technology, Univ. of the Philippines at Los Baños, College, Laguna 3720, Philippines.

2152. Pulver, E.L.; Kueneman, E.A.; Ranga-Rao, V. 1985. Identification of promiscuous nodulating soybean efficient in nitrogen fixation. *Crop Science* 25(4):660-63. July/Aug. [10 ref]

• ***Summary:*** "Many developing countries lack the facilities to produce and distribute high quality rhizobia inoculants for farmers who are interested in planting soybeans. If soybean varieties were available that could nodulate effectively with the ubiquitous, cowpea-type rhizobia, farmers could successfully grow soybeans without inoculation or fertilizer Nitrogen. When 400 diverse soybean lines were tested at five sites in Nigeria for the ability to nodulate with indigenous rhizobia, only 10 were highly promiscuous, that is, capable of forming an effective symbiosis [symbiotic relationships with the soil rhizobia] at all sites... These results indicate that by genetically incorporating promiscuity into varieties with high yield potential one would not necessarily reduce yield potential."

The five sites in Nigeria were Onne, Yandev, Ibadab, Mokwa, and Funtua. Of the ten highly promiscuous selections, three are unimproved cultivars grown in Africa: Malayan from Nigeria, Obo from the Central African Republic, and Hernon 237 from Tanzania. Four of the entries from Indonesia (Indo 180, Indo 216, Indo 226, and Orba) were also rated as compatible at all sites, but more than 70 accessions from Indonesia failed to nodulate consistently. Two other promiscuously nodulating accessions (TGm 119 and TGm 120) were collected in East Africa but their exact origins are unknown.

Other varieties used in crossing were Jupiter and Bossier. Address: Grain Legume Improvement Program, IITA, Ibadan, Nigeria.

2153. *Sunday Times (Singapore).* 1985. Fowl play with the soya bean. Sept. 15.

• ***Summary:*** William Soh runs Kiat Lim vegetarian stall at #01-563 Blk 91, Whampoa Hawker Centre, Whampoa Drive, Singapore. He makes meatless entrees, such as goose, fish, chicken, and five spice roll from *tau kee* (bean curd skin [yuba]), which is molded and stuffed. He also uses gluten flour to make vegetarian pork. A photo shows Soh with his meatless meats.

2154. Martin, Bradley K. 1985. You have to be crazy–or Japanese–to eat natto. *Wall Street Journal.* Sept. 25. p. 35.

• ***Summary:*** One American who thought he could eat anything was not prepared for "his confrontation with *natto.* That fermented soybean product proved to be 'gooey and flesh-colored.' It 'sort of smelled like peanut butter that had been out in the sun for a month.' The appearance was vile, 'just the sort of stuff you imagine when you hear the word 'ooze.'

"Worst of all was the taste. The American struggled, vainly, to swallow." Veteran expatriates and Japanese proclaim with near unanimity: "Foreigners can't stand natto.

"Japanese await with smiling anticipation the horrified reaction of a foreigner trying natto for the first time, starting with the first whiff, and then the daunting sight of the whitish, cobweb-like trails that the sticky beans form between bowl and chopsticks."

But now ethnologist Shuji Yoshida of Osaka's national museum has developed a "natto triangle" theory, which says that similar fermented soybean products are eaten inside a triangle having as its corners Japan, Indonesia, and the India-Burma border. *Pe-bout* is eaten in the Shan states of Burma, *akuni* in India's Nagaland, and *kinema* in Eastern Nepal. He theorizes that all of these products trace their roots to a fermented soybean product developed in southern China in ancient times. The folk history of natto in Japan is then discussed.

2155. Jackobs, Joseph A.; Smyth, C.A.; Erickson, D.R. 1985. International soybean variety experiment: Tenth report of results, 1983. *INTSOY Series* No. 28. xiv + 113 p. Sept. (College of Agric., Univ. of Illinois at Urbana-Champaign).

• ***Summary:*** In the ISVEX trials, soybeans were tested in the following regions and countries (For the year 1983): Algeria, Argentina, Bangladesh, Bolivia, Burma, Cameroon, Chile, Colombia, Costa Rica, Cuba, Dominica, Ecuador, Egypt, El Salvador, Gabon, Gambia, Ghana, Guatemala, Guinea-Bissau, Honduras, Indonesia, Korea, Laos, Madagascar, Mali, Mexico, Morocco, Nepal, Pakistan, Paraguay, Peru, Philippines, Portugal, Puerto Rico, Saint Lucia, Senegal, Somalia, South Africa, Sri Lanka, Sudan, Thailand, Turkey, United States, Upper Volta, Venezuela, Yugoslavia, Zaire, Zambia, Zimbabwe.

(For the year 1982): Brazil, Burma, Cuba, Italy, Peru, Turkey, Zaire.

In Dominica, on 19 Nov. 1983, with Plenty Canada serving as the cooperator, 16 varieties of soybeans were planted at the Royal Botanical Gardens, Roseau. Jupiter gave the highest yield, 676.8 kg/ha.

2156. Kotzsch, Ronald E. 1985. Macrobiotics: Yesterday and today. Tokyo and New York: Japan Publications Inc. 292 p. Sept. Illust. Index. 26 cm. [144* ref]

• ***Summary:*** Contents: 1. Ekken Kaibara: The grandfather of macrobiotics. 2. Sagen Ishizuka: The founder of modern macrobiotics. 3. George Ohsawa: The early years (1893-1929; Yukikazu Sakurazawa, later known as George Ohsawa was born on 18 Oct. 1893 in a western suburb of Kyoto, Japan, the family's eldest child). 4. George Ohsawa: The first sojourn in the west (1929-1936). 5. George Ohsawa: Return to Japan in crisis (1936-1939).

Photographic interlude for *Macrobiotics Yesterday.* Illustration (line drawing) of Ekken Kaibara. Photos of Ishizuka, Nishibata, Ohsawa's parents, George Ohsawa (many from 1901-1966). 6. George Ohsawa: The war years (1940-1945). 7. George Ohsawa: Hope for a new Japan and a new world (1945-1953). 8. George Ohsawa: The world journey of the penniless samurai (1953-1966; George and Lima visited India [Nov. 1953-July 1955]; Africa [Aug. 1955-Feb. 1956, incl. Kenya, and 3½ months with Albert Schweitzer at Lambarene, Gabon]; Paris, France and Brussels, Belgium; New York City, USA [late 1959-Oct. 1961]; France [around 1961 he met Louis Kervran]; Tokyo [most of 1963-64]; Vietnam 1965; Tokyo, where he died on 23 April 1966, probably of filarial parasites contracted in Lambarene, and smoking). 9. George Ohsawa: The man and the legacy. 10. After the master: Part one: America.

Photographic interlude for *Macrobiotics Today.* Photos are given of Toshi Kawaguchi, Michi Ogawa, Hiroshi Maruyama, Kaoru Yoshimi, Francoise Riviere, Cecile Levin, Dr. Kikuo Chishima, Dr. Moriyasu Ushio, Michio and Aveline Kushi, Herman and Cornellia Aihara, the Kushis, Aiharas, and Shizuko Yamamoto, William Dufty, Bill Tara, Aveline Kushi and Wendy Esko, Alex Jack, Dr. Marc van Cauwenberghe, Edward Esko, Murray Snyder, Noboru Muramoto, Jacques and Yvette de Langre, Jerome Carty, Duncan Sim, Lima Ohsawa, Shuzo Okada, Hideo Ohmori, First European Congress of Macrobiotics in London, Nov. 1978, Lenk summer camp, Switzerland, July 1984, Jan Lansloot, Peter Doggen, Rik Vermuyten, Georges Van Wesenbeeck, Roland Keijser, Mayli Lao Shun, Tomio Kikuchi (in Brazil).

11. After the master: Part two: Japan. 12. After the master: Part three: Europe and elsewhere. 13. The gospel according to Kushi. 14. Macrobiotics in western culture. 15. Prospects for the future. Bibliography.

This is the best and most objective available history of macrobiotics. The author, an excellent historian and writer, with a delightful sense of humor and light touch, began his study and practice of macrobiotics under Michio Kushi in Boston in Jan. 1967. This book is based on his doctoral dissertation titled "Georges Ohsawa and the Japanese Religious Tradition," submitted on 1 April 1981 for a PhD degree in History of Religions from Harvard University. Pages 185-86 discuss briefly the role of the macrobiotic movement in introducing soyfoods (especially miso, shoyu, and tofu) and natural foods to America. Address: The New North Church, Hingham, Massachusetts (18 Mar 1985).

2157. Doyle, M.J.; Brown, A.H.D. 1985. Numerical analysis of isozyme variation in *Glycine tomentella. Biochemical Systematics and Ecology* 13(4):413-19. Oct. [12 ref]

• ***Summary:*** Isozyme variation among 114 accessions of *Glycine tomentella* were analysed. These came from seven regions: New South Wales, southern and central Queensland, Cumberland and Whitsunday Islands, northern Queensland, Northern Territory and Kimberley Ranges, Western Australia, Papua New Guinea, and South East Asia.

The diploid accessions fell into six distinct groups which conformed with differences in chromosome number (2n = 38 or 2n = 40) or in geographic origin. The majority of the tetraploid accession belonged to a large, geographically dispersed group, predominantly aneuploid (2n = 78) group. The remaining four tetraploid groups were distinct on the basis of morphology or geographic distribution.

The subgenus *Glycine* currently consists of seven perennial species and represents a major potential source of germplasm for soybean improvement. Address: 1. Dep. of Agricultural Genetics and Biometry, Univ. of Sydney, Sydney, NSW, Australia; 2. CSIRO, Div. of Plant Industry, Canberra, ACT, Australia.

2158. International Institute of Tropical Agriculture. 1985. Proceedings of Tropical Soybean Workshop. IITA, Oyo Rd., PMB 5320, Ibadan, Nigeria. 164 p. Held 30 Sept. to 4 Oct. 1985 at IITA, Ibadan, Nigeria. Unpublished manuscript. Pages are generally numbered only within each chapter. No index. 28 cm.

• ***Summary:*** The proceedings of this conference were heavily edited by Singh, Rachie, and Dashiell, and published in 1987 as "Soybeans for the tropics: Research, production and utilization." Contents: Tropical Soybean Workshop Program (p. 1-11, in English and French). Soybean breeding at IITA–1985, by K.E. Dashiell and W.R. Root (p. 12-17). Soybean breeding and research in Latin America, by Eric A. Kueneman and Luis Camacho (p. 18-30). Soybean production, utilization, current status of research and needs in Asia, by P.K. Pandey, Sumarno, Nark Potan, R. Navarro, C. Dharmasena, and Akthar Beg (p. 31-68). Soybean household utilization in south western Nigeria, by Ute Latzke-Begemann and Judith Walker (p. 69-91). INTSOY's changing role in international soybean research and development activities, by Harold Kauffman (p. 92-99). INTSOY's soybean utilization program, by A.I. Nelson (p. 100-09). International soybean observation trial [ISVEX]–1984: An abstract, by J.A. Jackobs (p. 110-21). Soybean pathology, by J.B. Sinclair (p. 122-31). Soyabean improvement, production and utilization in Zimbabwe, by J.S. Tichagwa (p. 132-56). IITA policy and program strategy for soybean utilization in Africa (incl. HYVT project, p. 157-64).

Bound at the back of the proceedings (p. 165-91) is additional information about the workshop, a photocopy of an issue of *IITA Research Briefs* (March 1985) concerning the conference, and various notes. Address: Ibadan, Nigeria.

2159. STS–Soya Technology Systems Ltd. 1985. STS–Soya Technology Systems Limited. 11 Dhoby Ghaut #11-06, Cathay Building, Singapore 0922. 4 p. Oct. Manufacturer's catalog. 30 cm.

• ***Summary:*** A glossy green and gold brochure with the STS symbol on the cover. Contents: Who are STS? Who do STS do? Why a turnkey project? The DDS Group. STS Services. Soymilk Processing (steps in process). Merits of soymilk. Shows model of plant. STS was incorporated in 1982. A Chinese-language edition of this was also published in Oct. 1985.

2160. Whitman, Joan. comp. 1985. Craig Claiborne's The New York Times food encyclopedia. New York, NY: Times Book (div. of Random House). 496 p. [120* ref]

• ***Summary:*** The soy-related entries are as follows: Kecap (ketjap, p. 237): The Indonesian name for soy sauce in its basic form. "Kecap, with its broad uses in Indonesia, became simply 'table sauce' to English-speaking foreigners. By extension, ketchup became the national table sauce in America. See *also* Ketchup."

Ketchup (p. 238): *The New York Times* prefers to spell it ketchup, but catchup and catsup are generally accepted. The late Tom Stobart, in his *The Cook's Encyclopedia,* says that the word came into English 'from the Orient, perhaps from the Malay or Chinese.'

"'You find ketjap benteng or ketjap manis in Indonesian recipes and that is a form of sweet soy sauce,' he wrote. 'Cookbooks of the last century abound with recipes–oyster ketchup (oysters with white wine, brandy, sherry, shallots and spices), mussel ketchup (mussels and cider), pontac or pontack ketchup (elderberries), Windermere ketchup (mushrooms and horseradish), wolfram ketchup (beer, anchovies and mushrooms).'

"There are also ketchups made with walnuts, cucumbers, and many other items that caught some cook's imagination.

"A New Jersey man wrote to me that 'catchup is a Chinese invention and is still called in Cantonese *fan-kei cheop. Fan-kei* is the name for tomato, literally "foreign vine-vegetable" and *cheop* is juice as in *chang-cheop* (orange juice). The truncated word *kei-cheop* or catchup is obtained by dropping *fan.*

Soy Sauce (p. 419-20): Among Chinese soy sauces, dark/black soy sauce is thicker than thin/light because the former contains molasses.

Tofu (p. 451-52): There are said to be 7 kinds of tofu in Japan. "The best book on tofu making I know is *The Book of Tofu,* by William Shurtleff and Akiko Aoyagi. Published in paperback, it contains not only detailed instructions but also five hundred recipes." Note: This book is also listed in the bibliography.

Worcestershire Sauce (p. 483-86): Contains an extensive discussion of the history of Worcestershire sauce. "There are certain names in the world of wine and food that are inextricably linked... indelibly inscribed on the gastronomic roster is Lea and Perrins, makers of the original Worcestershire sauce, 'the original and genuine, from the

recipe of a nobleman in the county,' as it reads on the label. The county in question, of course, is Worcestershire, England. The label does not reveal the name of the nobleman nor to this day will the producers of the sauce reveal it.

"The saga of the sauce dates back to the first years of the 1800s, when the governor general of Bengal returned from his post to his native England. He had in his possession a formula for a sauce that had been created in India. One that he had relished at his table and offered to his guests.

"At that time there were two chemists in the English Midlands named John Lea and William Perrins, partners in a then novel enterprise, a 'chain' of chemists shops. Their association had begun in the 1820s. Their main office was in the town of Worcester, in the shire, or county, of the same name.

"The governor general took the recipe to Mr. Lea and Mr. Perrins with a request that they try to reproduce it as closely as possible. The story goes that the chemists produced a concoction that was to their noses and tastes unpalatable. They stored it in the cellar and forgot it.

"Months, perhaps years, later they sampled it once more and found it not only acceptable but haunting in its flavor. Within a short while they were bottling the stuff, and it is a matter of genuine historical record that, without any kind of advertising as it is known today, in a few short years the Worcestershire sauce of Mr. Lea and Mr. Perrins was known and coveted in kitchens throughout the world...

"The incredible haste with which the fame of Worcestershire sauce spread is generally credited to the fact that the manufacturers loaded cases of the sauce on all the ocean liners that plied in and out of English waters. The stewards of the ocean-going liners were 'encouraged' with a few shillings here, a few pounds there, to offer the sauce to the passengers."

Today Lea & Perrins sauce is made at Fair Lawn, New Jersey.

Note: This is the earliest English-language document seen (Jan. 2006) that contains the term "mussel ketchup." Address: East Hampton, New York.

2161. Shurtleff, William; Aoyagi, Akiko. 1985. History of fermented tofu. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549. 36 p. Nov. 22. Unpublished typescript.

• ***Summary:*** A comprehensive history of the subject. Contents: Introduction: Two basic types. Part I: History of Chinese-style fermented tofu. Introduction: General description, how it's made. Basic types and varieties of fermented tofu. Etymology. Western mold-ripened dairy cheeses. History of fermented tofu in China. History of fermented tofu in Taiwan. History of fermented tofu in Japan and Okinawa. Japan 1912 to the 1980's. History of fermented tofu in East and Southeast Asia. History of fermented tofu in Europe. History of fermented tofu in the United States. Part II: History of fermented tofu cheeses. Cheeses. Address: Lafayette, California. Phone: 415-283-2991.

2162. Wenzel, John S. 1985. Re: Work with soy at Griffith Laboratories Ltd. in Canada and developing countries. Letter to William Shurtleff at Soyfoods Center, Nov. 22–in response to inquiry of Nov. 12. 1 p. Typed, with signature on letterhead.

• ***Summary:*** "You ask about my work with soya in Canada. Most of the work before retirement in 1982 from the Griffith Laboratories Ltd concerned: (1) Manufacture of textured soy protein and allied texturized products using soy and other protein materials; e.g. peas, meat, etc. (2) Investigation and manufacture of other products; e.g. soya concentrate, soya milk, spray dried full fat soya flour.

"Since July 1982 I have had a variety of consulting jobs with the Canadian International Development Agency and the Canadian Executive Service Organization on: (1) utilization of soybeans in Sri Lanka to make T.S.P. [textured soy protein] and full fat soya flour. (2) development of a T.S.P. industry in Thailand. (3) manufacture of soya milk in Sri Lanka."

"Over the years I have been interested in the utilization of soya in developing countries more from the standpoint of industrial processing... but more on smaller scale processing which is where some of the countries must start.

"I do hope that our paths will cross in the future." Address: J. Wenzel Food Technology Associates Inc., 14 MacDonnell St., Kingston, Ontario K7L 4B6, Canada. Phone: (613) 546-6826.

2163. Okada, Noriyuki; Hariantono, Jimmy; Hadioetomo, Ratna Siri; Nikkuni, S.; Itoh, H. 1985. Survey of vitamin B-12-producing bacteria isolated from Indonesian tempeh. *Shokuhin Sogo Kenkyujo Kenkyu Hokoku (Report of the National Food Research Institute)* No. 47. p. 49-56. Nov. [9 ref. Eng]

• ***Summary:*** "Identification tests were performed on those bacteria which were isolated from Indonesian tempeh and produced more than 10 nanograms/(cells in 5 ml of culture) of vitamin B-12. Thirteen out of 33 isolates were identified as *Klebsiella pneumoniae.* Two isolates were identified as *K. pneumoniae* subspecies *ozaenae* and *Enterobacter cloacae.* Twelve isolates closely resembled either *K. terrigena* or *K. planticola.* Others included gram-positive rods (4 isolates), Gram-negative, oxidase-positive rod (1 isolate) and Gram-negative, oxidase-negative rod (1 isolate)." This work was sponsored by the Joint Japan-Indonesia Project on the Development of Tropical/ Subtropical Microbial Resources, under the direction of the Science and Technology Agency of Japan and BPPT of Indonesia.

Note: A gram-positive bacterium is one that holds the purple dye when stained by Gram's stain. Address: National Food Research Inst. (Shokuhin Sogo Kenkyujo), Kannondai 2-1-2, Yatabe-machi, Tsukuba-gun, Ibaraki-ken 305, Japan.

2164. Shanmugasundaram, S.; Toung, T.S.; Chen, Li-Fen. 1985. AVRDC Soybean Evaluation Trial (ASET): 1980-1981 first report of cooperator's results. Shanhua, Tainan, Taiwan: AVRDC. iv + 62 p. Dec. 28 cm.

• ***Summary:*** In 1980 soybean varieties were tested in India, Pakistan, Philippines, Taiwan, Guatemala, and Argentina. In 1981 they were tested in Upper Volta [Burkina Faso], Sudan, India, Indonesia, Korea, Malaysia, Philippines, Thailand, Guatemala, Nicaragua, and Argentina.

Note: This is the earliest document seen giving the results from the international network of AVRDC Soybean Evaluation Trial (ASET) cooperators from 1980-81. Address: Shanhua, Tainan, Taiwan.

2165. **Product Name:** Amofood Soya Bean Drink (Boisson au Soja).
**Manufacturer's Name:** Amoy Canning Corp.
**Manufacturer's Address:** 254 Bukit Timah Rd, 13 km, Singapore.
**Date of Introduction:** 1985.
**Wt/Vol., Packaging, Price:** Can.
**New Product–Documentation:** STS. 1985. Containers for Soymilk. Shows can, red and white on green.

Alfa-Laval. 1988, June. Soyfoods: Old traditions with new potentials. p. 9. Shows a color photo of the front of tbe can. Same colors as above.

2166. FAO RAPA. 1985. Agriculture in Asia–Pacific Region: A pictorial profile. *RAPA Monograph (Bangkok, Thailand)* 1985/8. *

• ***Summary:*** RAPA stands for "Regional Office for Asia and the Pacific."

2167. **Product Name:** Nutrisoy (Soy Beverage).
**Manufacturer's Name:** Fraser & Neave (Singapore) Pte. Ltd.
**Manufacturer's Address:** 475 River Valley Rd. Singapore 1024, Singapore.
**Date of Introduction:** 1985.
**New Product–Documentation:** Soya Bluebook. 1985. p. 85; 1986. p. 104. Soya Bluebook Plus. This company (the name is unchanged) is now located at 457 Jalan Ahmad Ibrahim, Singapore 2263, Singapore. Phone: +65 861-7600. Fax: 861-2652. They make soymilk beverages, tofu and tofu products. Contact: Kalin S. Kwok, R&D Manager.

2168. **Product Name:** Hui Ming Tofu.
**Manufacturer's Name:** Fraser & Neave (Singapore) Pte. Ltd.
**Manufacturer's Address:** 475 River Valley Rd. Singapore 1024, Singapore.
**Date of Introduction:** 1985.
**New Product–Documentation:** Soya Bluebook. 1985. p. 100.

2169. Harper, Judson M.; Jansen, G. Richard. 1985. Production of nutritious precooked foods in developing countries by low-cost extrusion technology. *Food Reviews International* 1(1):27-97. [53 ref]

• ***Summary:*** Contents: Introduction: Importance of weaning foods, centrally processed weaning foods, transition from imported to locally processed weaning foods. Manufacturing alternatives: Extrusion processing, roller drum drying process, spray drying process, baked products line, milling process, selection of alternative processes, production capacity range, capital costs, operating costs, type of weaning food product, type of packaging, local equipment, energy, skill requirements, sanitation requirements, summary. Capabilities and limitations of LECs: Characteristics of low-cost extrusion cookers, Brady extruder (M&N Distributors, Torrance, California; or CIATECH, Chihuahua, Mexico), Insta-Pro extruder (Div. of Triple "F" Feeds, Des Moines, Iowa), Anderson extruder (Cleveland, Ohio), summary of LEC characteristics. Cost associated with LEC plants: Elements of a LEC plant, plant costs, manufacturing costs, project planning and implementation, preliminary study, project implementation. Cereal/legume blends: Specifications, energy, protein, dietary fiber, vitamins and minerals, ingredients, storage stability, calorie density, protein quality evaluation (corn/soy blends, corn/sorghum blends with cottonseed), metabolic studies in human infants and preschool children (extruded corn/soy blends, extruded sorghum). Full-fat soy flour: Storage studies, protein nutritional value, rat growth evaluation, baking study, potential utility of extrusion processed full-fat soy flour. Applications in developing countries: Sri Lanka (1976, Thriposha). Costa Rica (1976, 1979, Frescorchata). Tanzania (May 1978, Lisha). Guyana (1979, Cerex). Mexico (CIATECH 1978, many products), other commercial applications (Pro-Nutre in San Jose, Costa Rica; Maisoy in Santa Cruz, Bolivia), miscellaneous developments (INCAP in Guatemala, Meals for Millions in Korea, PINFST in the Philippines, Thailand, Leche Arroz in Ecuador). Technology transfer (Colorado State University). Discussion. Summary. Sources of funding for this publication. Address: Colorado State Univ., Fort Collins, Colorado.

2170. Modesto, R.R. 1985. Current uses of soybean in the Philippines. Paper presented at the Second National

Soybean Consultative Meeting, Los Banos, Laguna, Philippines. 27 p. *

2171. Mudjisihono, Robertus; Kusman, Nur; Rivai, A. 1985. Pengaruh suhu ekstraksi dan varietas kedelai terhadap mutu yang dihasilkan [The effects of extraction temperature and soybean varieties on the quality of tofu]. *Media Penelitian Sukamandi (Indonesia)* 1:26-32. [Ind]*
• ***Summary:*** This journal is published by the Sukamandi Research Inst. for Food Crops (Balai Penelitian Tanaman Pangan Sukamandi).

2172. **Product Name:** Bango Soy Sauce.
**Manufacturer's Name:** Perusahaan Kecap Cap Bango.
**Manufacturer's Address:** Jalan KHA Wahid Hasyim 177, Jakarta 10240, Indonesia.
**Date of Introduction:** 1985.
**New Product–Documentation:** Soya Bluebook. 1985. p. 99; 1986. p. 105.

2173. **Product Name:** Kecap Maya (Indonesian Style Sweet Soy Sauce).
**Manufacturer's Name:** P.T. Inkenas Agung.
**Manufacturer's Address:** Pulo Kambing 11, 20 Kawasan Industrial Estate Pulogadung, Jakarta-Timur, Indonesia.
**Date of Introduction:** 1985.
**New Product–Documentation:** Soya Bluebook. 1985. p. 99; 1986. p. 105.

2174. Shanmugasundaram, S.; Tschanz, A.T. 1985. Breeding for mungbean and soybean disease resistance. Presented at Workshop on Varietal Improvement of Upland Crops for Rice-based Cropping Systems. Held at IRRI, the Philippines. *
• ***Summary:*** This paper was never published.

2175. Siagian, Uhum L. 1985. Data konsumsi rata-rata tempe dan oncom di berbagai daerah di Indonesia menurut Susenas 1980 dan 1981 [Average consumption data for tempeh and onchom in different regions in Indonesia according to the National Socio-Economic Survey (Susenas) in 1980 and 1981]. Bogor: Pusat Penelitian dan Pengembangan Gizi. 2 p. [Ind]*
Address: Bogor, Indonesia.

2176. Singapore Institute of Standards & Industrial Research. 1985. Specification for soya bean milk and soya bean drink. Singapore. 21 p. SS 302. [Eng]
• ***Summary:*** The drink contains less protein and fat than the milk. Both are made from either soybeans, full-fat soybean meal, or defatted soybean meal, and are sterilized. They may contain optional sugar, colorings, flavorings, emulsifiers, stabilizers, or added vitamins and minerals. Requirements for soy milk and soybean drink respectively include: minimum protein (N x 6.25), 2.0 and 1.0%; minimum total solids less added sugar, 4.0 and 2.0%; minimum fat 1.0 and 0.5%; and pH, 6.5 to 7.0 for both. Tests methods are described in appendixes. Address: Singapore.

2177. **Product Name:** Breakfast Foods, Desserts or Snacks.
**Manufacturer's Name:** Universal Robina Corporation (CFC).
**Manufacturer's Address:** E. Rodriguez Ave., Pasig, Metro Manila, Philippines.
**Date of Introduction:** 1985.
**New Product–Documentation:** Soya Bluebook. 1985. p. 102.

2178. **Product Name:** L-S-N, Yeo's, and Printz Meat Analogs.
**Manufacturer's Name:** Yeo Hiap Seng Ltd.
**Manufacturer's Address:** 950 Dunearn Rd., Singapore 2158.
**Date of Introduction:** 1985.
**New Product–Documentation:** Soya Bluebook. 1985. p. 82. "Other locations: Petaling Jaya and Shah Alam, Selangor; Jawa Barat, Indonesia; Johore Bahru."

2179. **Product Name:** Soy Flour.
**Manufacturer's Name:** Yeo Hiap Seng Ltd.
**Manufacturer's Address:** 950 Dunearn Rd., Singapore 2158.
**Date of Introduction:** 1985.
**New Product–Documentation:** Soya Bluebook. 1985. p. 90. "Other locations: Petaling Jaya and Shah Alam, Selangor; Jawa Barat, Indonesia; Johore Bahru."

2180. Affandi, Erwin; Mahmud, Mien K. 1985. Pengujian aktifitas antibakterial pada tempe terhadap bakteri penyebab diare [Tests of the antibacterial activity of tempeh against bacteria causing diarrhea]. *Penelitian Gizi dan Makanan* 8:46-56. [3 ref. Ind]

2181. Al-Jibouri, H.A. 1985. The Food and Agriculture Organization's soybean program. In: R. Shibles, ed. 1985. World Soybean Research Conference III: Proceedings. Boulder, Colorado: Westview Press. xxiii + 1262 p. See p. 1221-25. [3 ref]
• ***Summary:*** Contents: Country projects. Consultancies. Regional networks and projects. Seed exchange. Genetic resource activities. Biological nitrogen fixation. Training. Workshops. Meetings. Informational services. Assistance available. References. Address: Senior Officer, Plant Production and Protection Div., FAO of the UN, Via delle Terme di Caracalla, Rome 00100, Italy.

2182. Aman, D.; Sultoni, A.; Hidajat, N.; Dauphin, F.; Morooka, Y.; Rachim, A.; Bottema, Taco (chief editor). 1985. The soybean commodity system in Indonesia. *CGPRT* No. 3. xvi + 83 p. 25 cm. Includes 40 tables and 19 figures. [32 ref. Eng]

• ***Summary:*** Contents: Forward; Summary; 1. Introduction; 2. Trends in Soybean Production; 3. Farm Production Practices; 4. Input and Output Relations; 5. Marketing and Price Situation; 6. Utilization and Processing (Indonesian soybean foods; Traditional processing industry; Function and role of KOPTI; The feed industry); 7. Demand and Consumption; 8. Government Policy, Regulations and Support Programmes; 9. Discussion and Conclusion; Appendix; Glossary; References. Address: Regional Co-ordination Centre for Research and Development of Coarse Grains, Pulses, Roots and Tuber Crops in the Humid Tropics of Asia and the Pacific, Jalan Merdeka 99, Bogor 16111, Indonesia.

2183. Ang, H.G.; Kwik, W.L.; Theng, C.Y. 1985. Development of soymilk–A review. *Food Chemistry* 17(4):235-50. [48 ref]
Address: 1-2. Chemistry Dep., National Univ. of Singapore, Kent Ridge, Singapore 0511.

2184. Barrau, Enrique M. 1985. Production constraints and soil erosion in the humid tropics of densely populated Java. In: R. Shibles, ed. 1985. World Soybean Research Conference III: Proceedings. Boulder, Colorado: Westview Press. xxiii + 1262 p. See p. 1145-50. [7 ref]

• ***Summary:*** Contents: Major constraints to soybean production. Soil erosion, the greatest threat to agriculture production. Programs in conservation. Production as an incentive to achieve conservation. References. Address: U.S. Agency for International Development (USAID) / AGR, Jakarta, Indonesia.

2185. Bhatnagar, P.S. 1985. Soybeans in India–Research and development. In: H.C. Srivastava, et al, eds. 1985. Oilseed Production: Constraints and Opportunities. New Delhi: Oxford & IBH Publishing Co. xix + 700 p. See p. 205-18. [11 ref]

• ***Summary:*** Contents: Introduction. Scope in India. Production potential. Soybean in India. Returns to farmers. Place in cropping systems. Research. Constraints and strategies. Acknowledgements.

Tables show: (1) Increase or decrease in total hectarage, mean yield, and total production of soybean in Asia in 1983 (base year 1974-76). Source: Shanmugasundaram 1984. After each country listed in the table are figures. The 1st is change in hectarage (1,000 ha), the 2nd is change in yield (kg/ha), and the 3rd is change in production (1,000 metric tons). Burma (6, 144, 8). China (900, 153, 2,133), India (610, 235, 623). Indonesia (-25, 64, 24). Iran (-2, 564, 26). Japan (55, 68, 87). Kampuchea [Cambodia] (-3, 0, -3). Korea DPR [north] (19, 227, 90). Korea Rep. [south] (-64, -7, -75). Laos (2, 206, 1). Malaysia (-, 171, -). Philippines (4, 347, 7). Sri Lanka (1, 12, 1). Taiwan (based on 1982 data) (-39, 12, -48). Thailand (22, -76, 13). Turkey (25, 497, 52). Vietnam (65, 526, 88). Asia–total (1,647, 141, 3,080). USA (4,334, -40, 6,659). Brazil (2,342, 125, 4,927). World (11,272, 49, 19,741).

(2) Oil yields of the mail oilseeds as field crops. Source: FAO Production Yearbook (1972). In total yield worldwide in 1,000 tones the ranking is: 1. Soybean 8,749. 2. Groundnut (in hulls) 5,066. 3. Cotton 4,339. 4. Sunflower 3,308. 5. Rapeseed 2,525. 6. Sesame 965. 7. Flax 964. 8. Castor 385. 9. Safflower (N). Yet in terms of oil yield in kg/ha, the top three are: 1. Sunflower 376. 2. Safflower 280. 3. Castor 278. And... 6. Soybean 216.

3. Estimated area potentially available for soybean in Madhya Pradesh and Uttar Pradesh. Source: Williams 1974.

4. Targetted and actual cultivation (ha) as well as production (tonnes) in India under the centrally sponsored scheme for soybean development, from 1978-79 to 1983-84. The soybean states are Madhya Pradesh, Uttar Pradesh, Karnataka, Bihar, Himchal Pradesh, Rajasthan, Gujarat.

5. Identified / released varieties of soybean for different agro-climatic zones. The four zones are: Northern hill zone. Northern plain zone. Central zone. Southern zone.

6. The salient production technology of soybean for different agro-climatic zones in India.

7. Performance of some promising advanced breeding lines of soybean developed in India. 8. Composition of defatted soy flour. Address: Project Co-ordinator, All India Co-ordinated Research Project on Soybean (ICAR), G.B. Pant University of Agriculture and Technology, Pantnagar (Nainital), Uttar Pradesh, India.

2186. Bull, S.M.; Yong, F.M.; Wong, H.A. 1985. The production of aroma by *Aspergillus oryzae* during the preparation of soy sauce koji. *Food Chemistry* 17(4):251-64. [14 ref]
Address: Dep. of Biochemistry, National Univ. of Singapore, Lower Kent Ridge, Singapore 0511.

2187. Djauhari, A.; Malian, A. Husni. 1985. Analisis usahatani kedelai [Analysis of soybean farming]. In: Kedelai [Soybeans]. Bogor: Badan Penelitian dan Pengembangan Pertanian Bogor (Agency for Agricultural Research and Development, Bogor). [Ind]*

2188. Hermana, -. 1985. Pengelolaan kedelai menjadi berbagai bahan makanan [Management of soybean for foods]. In: Kedelai [Soybeans]. Bogor: Badan Penelitian dan Pengembangan Pertanian Bogor (Agency for Agricultural Research and Development, Bogor). [Ind]*

2189. Hume, D.J.; Shanmugasundaram, S.; Beversdorf, W.D. 1985. Soyabean *(Glycine max* (L.) Merrill). In: R.J. Summerfield and E.H. Roberts, eds. 1985. Grain Legume Crops. London: Collins. xvi + 859 p. See p. 391-432. Illust. Index. 24 cm. [192 ref]

• ***Summary:*** Contents: Introduction: History, current status and future projections. Principal economic yield and uses of crop products. Principal farming systems. Botanical and agronomic features: Symbiotic nitrogen fixation potential. Principal limitations to production and yield: Developing countries, developed countries. Fertiliser requirements. Quality of seed constituents. Germplasm resources. Principal breeding strategies: Adaptation to new geographic areas, breeding methodology, breeding objectives, seed quality, pest and disease tolerances, current trends in soyabean breeding. Avenues of communication among researchers (INTSOY, AVDRC, IITA, FAO). Prospects for larger and more stable yields.

Tables: (1) Area (1000 ha), yield (kg per ha), and production (1000 tonnes) of soyabeans from 1969-71 to 1982. (2) Maturity durations and productivity potentials of soyabeans in selected countries. (3) *Glycine* species collections around the world. (4) Sources of resistance among soyabeans to selected insect pests. (5) Sources of resistance among soyabeans to selected diseases.

Table 9 shows that there are soybean germplasm collections in 15 countries. This table has 4 columns: Country, location (city), curator, and no of accessions. AVRDC in Taiwan has the largest germplasm collection in one location (10,400 accessions, Tainan), followed by USA (9,648, Illinois and Mississippi), India (4,000, Pantnagar; 1,800 Amravati), Japan (3,541, Tsukuba; 200, Morioka), USSR (3,000, Leningrad), China (3,000 Jilin; 3,000 Hubei; 2,930 Shadong [sic, Shandong {W.-G. Shantung}]; 2,500 Beijing; 960 Heilungjiang [Heilongjiang]). Also: Australia 400, France 500, Nigeria 1,300, Indonesia 600, South Korea 2,833, North Korea 300, South Africa 600, Sweden 1,200, and Thailand 1,686. Address: 1&3. Univ. of Guelph, Dep. of Crop Science, Guelph, Ontario N1G 2W1, Canada; 2. Asian Vegetable Research and Development Centre (AVRDC), PO Box 42, Shanhua, Tainan 741, Taiwan, Republic of China;.

2190. *IITA Research Highlights.*1985. On-farm performance of a new soybean and the use of soybeans in treatment of protein malnutrition in infants. p. 6-8. For the year 1984.

• ***Summary:*** A new soybean line–TGx 536-02D–has been developed by IITA to meet the increasing demands of farmers in the central and northern Guinea savannas of Nigeria, which are outside the traditional soybean growing areas. This new line, with a maturity of 105 to 110 days, is higher yielding and earlier maturing than the widely grown Malayan variety, which was introduced into Nigeria in the early 1900s and which matures in about 140 days.

"An expanding market for soybean is due largely to the popularity of soybeans to prepare 'dawadawa,' a fermented paste used as a flavoring. There is also a growing interest in using soybean milk and flour as an important for feeding babies and young children."

"An outstanding example of the promotion and use of soybeans to combat infant protein malnutrition (kwashiorkor) in a Nigerian rural area was recently brought to the attention of IITA scientists. A children's home near Ogbomosho specializes in treating infants with severe symptoms of malnutrition, e.g. swollen bellies and skeletal limbs... The infants are admitted to the children's home with their mother or guardians who prepare all the food for themselves and their babies under the supervision of the staff. Soybeans are prepared as a milk substitute by boiling, grinding, straining, and recooking this liquid. This "milk" contains about 35 gm of protein per serving. It is especially important because about 40% of the infant 'patients' are intolerant to cow's milk. Also, soybeans are prepared as a wet-milled full-fat flour added to a cereal pap. A normal ration for a one to two year-old child is the equivalent of about 200 gm of whole soybeans per day at a cost of approximately 20 cents (U.S.).

"Not only are staff members of the children's home concerned with the infants brought to them, but they visit villages near Ogbomosho to promote the cultivation and use of soybeans and teach women how to prepare them in local dishes. Several farmers–both men and women–in the area are now growing the crop and soybeans are being sold in local markets.

"Women in other African countries including Ghana, Cameroon, Uganda, Rwanda, and Zaire, are also using soybeans in local dishes. A village with small-scale equipment can provide soybean oil and meal for partially defatted soybean flour."

Photos show: Nigerian mothers preparing soybean milk for their babies at the children's home near Ogbomosho, Nigeria. A mother bottle-feeding soybean milk to her baby. A mother preparing soybean/cereal pap for her infant. Address: Ibadan, Nigeria.

2191. Juvik, Gail A.; Bernard, R.L.; Kauffman, H.E. 1985. Directory of germplasm collections. 1. II. Food legumes (Soyabean). Rome, Italy: International Board for Plant Genetic Resources. 53 p. Co-sponsored by INTSOY. [11 ref]

• ***Summary:*** Soybean germplasm collections worldwide are listed (with address and number of accessions) in the following countries: Argentina, Australia, Austria, Bangladesh, Bolivia, Brazil (2 collections), Bulgaria, Canada, China (14 collections), Taiwan (3), Colombia, Czechoslovakia (2), France (4), Germany (East), Germany (West), Greece, Hungary (2), India (8), Indonesia (3), Italy, Japan (5), Korea (South, 2), Malaysia, Nepal, Nigeria,

Papua New Guinea, Paraguay, Philippines, Poland, Portugal, Romania, Spain, Sri Lanka, Thailand (2), Turkey, USSR, United Kingdom, USA (5), Uruguay, Venezuela, Vietnam (2), Yugoslavia, Zambia, Zimbabwe.

The world's largest soybean germplasm collections are as follows: AVRDC, Tainan, Taiwan (12,200 accessions), National Seed Storage Laboratory (NSSL), Fort Collins, Colorado, USA (10,880), Univ. of Illinois, Urbana, IL, USA (8,368), Jilin Academy of Agricultural Sciences, Jilin, China (4,800), N.I. Vavilov All-Union Institute of Plant Industry (VIR), Leningrad, Moscow (4,700), All-India Coordinated Research Project on Soybean, G.B. Pant Univ. of Agriculture and Technology, Pantnagar, India (4,022), Suweon, South Korea (4,020), Tsukuba, Japan (3,741). USDA, Stoneville, Mississippi, USA (3,000).

A world map (p. 9-10) shows (1) The sites of all soybean germplasm collections, (2) the range of ancient cultivation of the soyabean (East and Southeast Asia), (3) range of the wild soybean (Glycine soja; in China and Japan), and (4) range of perennial Glycine (Australia, Papua New Guinea, Philippines, Taiwan, Melanesia, and Micronesia).

This document is "Available free to developing countries, but restricted distribution to developed countries." Address: 1&3. INTSOY, Univ. of Illinois at Urbana-Champaign; 2. USDA-ARS, Dep. of Agronomy.

2192. Kasryno, Faisal; Darmawan, Delima H.; Rusastra, I Wayan; Erwidodo, -; Rasahan, Chairil A. 1985. Pemasaran kedelai di Indonesia [Soybean marketing in Indonesia]. In: Kedelai [Soybeans]. Bogor: Badan Penelitian dan Pengembangan Pertanian Bogor (Agency for Agricultural Research and Development, Bogor). [Ind]*

2193. Kedelai [Soybeans]. 1985. Bogor: Badan Penelitian dan Pengembangan Pertanian Bogor (Agency for Agricultural Research and Development, Bogor). [Ind]*

2194. Lantican, Ricardo M. 1985. Soybean production in Asia. In: R. Shibles, ed. 1985. World Soybean Research Conference III: Proceedings. Boulder, Colorado: Westview Press. xxiii + 1262 p. See p. 1203-06.

• ***Summary:*** Contents: Production statistics. Production systems in Asia: Humid equatorial belt, middle to high latitudes (25° to 50°N). Present and future research needs.

Asia, the ancestral home of the soybean, has become a net importer of soybeans, requiring an annual average of 2.67 million tons of raw beans, 1.26 million tons of oil, and 0.94 million tons of cake and meal. In the humid equatorial belt, where rainfall is the chief limiting factor to yields, the yield potential is 2 tonnes/ha. Address: Prof. of Agronomy and Director, Inst. of Plant Breeding, Univ. of the Philippines at Los Baños, College, Laguna, Philippines.

2195. Lembaga Kimia Nasional–LIPI (National Chemistry Institution). 1985. Membuat tempe [Preparation of tempeh]. Bandung, Indonesia: Kerja Sama, LIPI-INKUD. 22 p. Undated. [Ind]

• ***Summary:*** An informative, practical booklet, with illustrations (line drawings) on every page, showing how to make tempeh and tempeh starter in Indonesia. With an introduction by Ig. Suharto, director of LKN–LIPI. LIPI is an acronym for Lembaga Ilmu Pengetahuan Indonesia. Address: Bandung, Indonesia.

2196. Lotong, Napha. 1985. Koji. In: B.J.B. Wood, ed. 1985. Microbiology of Fermented Foods. Vol. 1. Essex, England: Elsevier Science Publishing Co. xx + 371 + 14 p. See p. 237-70. [180 ref]

• ***Summary:*** Definition and scope. Soybean koji: Raw materials, koji preparation, koji enzymes, application of soybean koji. Rice and similar products: Mould enzymes used in the fermentation of alcohol containing foods and beverages, miso rice koji. Seed inocula: Tane koji, production of seed inocula for soybean koji in South-east Asia, dry starter cakes, spore mass produced on rice adhering to inside surfaces of flasks. Conclusion. Address: Dep. of Microbiology, Kasetsart Univ., Bangkok, Thailand.

2197. Ontario Soya-Bean Growers' Marketing Board. 1985. Soybeans: Nature's miracle–teaching unit. Chatham, Ontario, Canada: OSGMB. 33 p. Undated. 28 cm.

• ***Summary:*** This interesting portfolio of materials is designed to teach children in Ontario, Canada, about the growth development of a soybean from seed to mature plant, soybean cultivation, soybean processing and products, the importance of soybeans to Ontario's economy, and the Ontario Soya-Bean Growers' Marketing Board.

Contents: Introduction to teacher's unit. 1. From seed to pod: A brief history of soybeans in Canada, biology of the soybean seed, its germination and seedling growth, soybean nodules and rhizobia bacteria, parts of a young soybean plant, reproductive stages from flowering to maturity, corn heat units, tillage, word scramble.

2. Soybeans–Nature's miracle: A brief history of soybean utilization, ways that soybeans are used, soy oil, meal and soyfoods, recipes, word search. 3. Imports and exports: Importance of soybeans to the economy of Canada and Ontario, how soybeans get to market, The Ontario Soya-Bean Growers' Marketing Board.

A table on page 20 shows "Soymeal consumption by Ontario's livestock and poultry." Hogs consume 45% of the total (the total is 503,000 tonnes), poultry 34%, dairy cattle 20%, and beef cattle 1%. Page 22 notes that the bulk of Ontario's soybean exports (77%) are sold to East Asia–especially Japan, Hong Kong, Singapore, Malaysia, Indonesia, and Korea. Soyfoods are listed and discussed in a positive way, with recipes for: Bran muffins (with soy flour

and soy oil). Tofamole (tofu guacamole). Tofu fruit pudding. Tofu shake.

Note: This is the earliest English-language document seen (Dec. 2003) that contains the term "Tofu shake."

The three largest farm crops in Ontario in terms of total area are hay (1,050,000 ha), grain corn (902,000 ha), and soybeans (425,000 ha). Address: Chatham, ONT, Canada.

2198. Publications of the international research and development centers. 1985. Manila, Philippines: International Rice Research Institute (IRRI). vii + 691 p. Index. 22 cm.

• ***Summary:*** This book was prepared for the 1985 exhibition at the Frankfurt Book Fair. It was sponsored by: Duetsche Gesellschaft für Technische Zusammenarbeit (GTZ) Gmb H (German Agency for Technical Cooperation) (GTZ). Consultative Group on International Agricultural Research (CGIAR). International Rice Research Institute (IRRI, Philippines).

Organizations with publications on soybeans include: IBPGR (International Board for Plant Genetic Resources; Rome, Italy. p. 129, 138). IITA (International Institute of Tropical Agriculture; Ibadan, Nigeria. p. 227, 233). AVRDC (Asian Vegetable Research and Development Center; Shanhua, Taiwan. p. 393, 396-98, 400). INTSOY (International Soybean Program; University of Illinois, Urbana, Illinois. p. 510-18).

2199. Shurtleff, William; Aoyagi, Akiko. 1985. When major soybean producing nations reached "takeoff" of 10,000 metric tons (Document part). In: Shurtleff and Aoyagi. 1985. Soyfoods Industry and Market: Directory and Databook. 5th ed. Lafayette, CA: Soyfoods Center. 202 p. See p. 168.

• ***Summary:*** Pre-1850 China proper, Manchuria, Korea, Japan, Taiwan, Indonesia. 1912 United States. 1925 USSR. 1942 Canada. 1946 Brazil, Thailand. 1955 Nigeria. 1956 Colombia. 1958 Vietnam (North and South combined). 1959 Yugoslavia. 1961 Argentina. 1962 Mexico. 1963 Paraguay. 1966 Romania. 1968 India. 1969 Turkey. 1971 Bulgaria. 1972 Iran, Nepal, Australia. 1974 South Africa, Hungary, Burma. 1975 Uruguay, Bolivia, Zimbabwe. 1976 Egypt. 1979 France. 1980 Philippines. Address: Lafayette, California. Phone: 415-283-2991.

2200. Somaatmadja, Sadikin. 1985. [Soybeans]. Bogor, Indonesia: Pusat Penelitian dan Pengembangan Tanaman Pangan. 509 p. [Ind]*

2201. Wannapee, P.; Gregg, B.; Jongvanich, S. 1985. Soybean seed production in Asia. In: R. Shibles, ed. 1985. World Soybean Research Conference III: Proceedings. Boulder, Colorado: Westview Press. xxiii + 1262 p. See p. 1188-92. [4 ref]

• ***Summary:*** Contents: Seed requirements and supply. Organization to supply seed. Problems of seed supply. Potentials and recommendations for resolving problems. References. Address: 1. Director; 2. Senior Seed Specialist (MSU); 3. Quality Control Specialist, Seed Div., Dep. of Agricultural Extension, Ministry of Agriculture and Cooperatives, Bangkok, Thailand.

2202. Winarno, F.G. 1985. Pengolahan kedelai menjadi minyak dan bahan-bahan industri [Soybean processing for oil and industrial materials]. In: Kedelai [Soybeans]. Bogor: Badan Penelitian dan Pengembangan Pertanian Bogor (Agency for Agricultural Research and Development, Bogor). [Ind]*

Address: Prof. Dr., Pusat Penelitian dan Pengembangan Teknologi Pangan–IPB.

2203. Yokotsuka, T. 1985. Fermented protein foods in the Orient, with emphasis on shoyu and miso in Japan. In: B.J.B. Wood, ed. 1985. Microbiology of Fermented Foods. Vol. 1. Essex, England: Elsevier Science Publishing Co. xx + 371 + 14 p. See p. 197-247. [146 ref]

• ***Summary:*** This book chapter is very similar to Yokotsuka (1982), "Industrial application of proteinous fermented foods." However it contains some new, additional, and very interesting information, especially concerning history, on pages 198-209 as follows: Introductory definitions of eznymatic hydrolysis, *Aspergillus* molds, miso (whose per capita consumption in Japan is about half that of shoyu by weight), saké, mirin, amasaké. Table 1 shows "Per capita annual consumption of fermented foods prepared from *Aspergillus* moulds in Japan (1981)." Shoyu 10.1 litres. Miso 4.9 kg, sake 12.3 litres, mirin 0.6 litres, shochu 2.2 litres, rice vinegar 0.25 litres, (vinegar) 2.5 litres. Note: Beer 39.5 litres. Whiskey and other foreign alcoholic beverages 3.7 litres. Japanese population 117.85 million on 1 Oct. 1981.

History: History of fermented proteinous foods in China: Chu (koji), chiang, shi or tou-shi [soy nuggets], chiang-yu (soysauce), shi-tche (the extracted juice of soy nuggets). History of shoyu and miso in Japan: Hishio, sho, soya or soy, miso or misho, tamari, miso-damari, tare-miso and usudare, shoyu, miso of today.

Shu [Qu; koji] was first mentioned in the *Shu-Ching* [pinyin: *Shujing]* written 3,000 years ago during the Chou [Zhou] dynasty (1121-256 BC), which stated that chu is essential for making alcoholic beverages. Two different colors of chu were described: yellow and white. "The most popular one, which had a yellow colour indicating perhaps *Aspergillus oryzae,* was called yellow robe. The white one is presumed to be *Rhizopus* or *Mucor* and was called white robe." Originally, chu was made in granular form and called *san-chu.* But by about AD 947-79 chu was developed in

cake form called *ping-chu.* Address: Kikkoman Inc., Noda, Japan.

2204. Lembaga Kimia Nasional–LIPI (National Chemistry Institution). 1985? Membuat tahu [Preparation of tofu]. Bandung, Indonesia: Kerja Sama, LIPI-INKUD. 18 p. Undated. [Ind]

• ***Summary:*** An informative, practical booklet, with illustrations (line drawings) on every page, showing how to make tofu in Indonesia. With an introduction by Ig. Suharto, director of LKN–LIPI. Address: Director LKN-LIPI, Indonesia.

2205. Cook, Anne. 1986. Soybean farms look East for big profits from shrimp. *News-Gazette (Champaign, Illinois).* Jan. 11.

• ***Summary:*** Karl Sera, a native of Japan, has managed the American Soybean Association's Tokyo office for 15 years. Japan now imports about 174 million bushels of soybeans, 88% of them from the USA. Ten million cakes of tofu are sold each day in Japan. Sera believes the biggest growth area for soybean use in Japan is in feeding livestock. Japanese poultry and dairy cows are not presently getting the optimum amount of protein; the poultry need the protein from 20 million more bushels of soybeans and the dairy cows from 11 million more bushels. Though fish presently accounts for less than 1% of the feed industry, Sera thinks it has huge potential–especially in feeding shrimp. Dan Akiyama, a native of Hawaii and recent Texas A&M graduate, will soon leave for Singapore to tell industry representatives about a better, faster way to grow shrimp. Akiyama said the high cost of shrimp is linked to 4 main factors: low survival rates in the wild (less than 1%), increasing demand, decreasing supplies, and the expensive diet shrimp farmers now feed their 'livestock.' The current feed now costs $1,000 to $4,000 per ton; with more soy it will cost $400 to $600 a ton. It takes about 100 days for a crop of shrimp to mature for market. Akiyama stresses that raising shrimp is just like any other livestock business, but its under water.

In Asia and South America, where shrimp farming is growing the most rapidly, producers use about 7,500 tonnes/year of soybean meal for shrimp feed. Akiyama believes that when industry leaders see the advantages of feeding more soy, that market is likely to expand to 375,000 tonnes.

In Japan, it takes longer for new agricultural ideas to be put into practice because they do not have an agricultural extension system as we do in the USA. Address: Staff writer.

2206. *Soybean Update.*1986. ASA export promotion efforts pay off. Jan. 27. p. 3.

• ***Summary:*** In La Laguna, Mexico, poultry producers are using about 3,000 tonnes/week of full-fat soybeans as feed. In Nigeria workshops on poultry nutrition, management and disease are being conducted. In Indonesia, 6 years ago ASA began an education program to build consumer demand for soyfoods. In the UK, the American Soybean Assoc. began 4 years ago to promote soybean oil identified with the Soyasign. Today 18 brands of soybean oil in the UK are identified with this mark. Address: American Soybean Assoc.

2207. **Product Name:** Nutriline (Non-Dairy Soy Ice Cream) [Chocolate, Strawberry, Coconut].
**Manufacturer's Name:** Fraser & Neave (Singapore) Pte. Ltd.
**Manufacturer's Address:** 475 River Valley Rd., Singapore 1024.
**Date of Introduction:** 1986. January.
**How Stored:** Frozen.
**New Product–Documentation:** *Journal of the American Oil Chemists' Society.* 1986. 63(1):60. Jan. "Soy Dessert." Fraser & Neave plant to establish a plant to make a soy ice cream in Singapore. The firm estimates that about 45% of the Chinese residing in Singapore are lactose intolerant. The marketing will stress that the product does not contain lactose, cholesterol, or preservatives. Soya Bluebook. 1987. p. 92.

2208. Hermana, -. 1986. Pemanfaatan jagung dan kedelai dalam pengolahan bahan makanan campuran [The use of corn and soybean in processing of mixed foodstuffs]. Paper presented at Konsultasi Teknis Pengembangan Industri Pengolahan Jagung dan Kedelai. Held 24-215 March 1986 at Puslitbang Gizi, Bogor, Indonesia. [Ind]*

2209. Katoh, Kiyoaki; Ohta, Teruo. 1986. Quality assessment of tempe products–Triglyceride profile of tempe and onchom chips of Indonesia: Notes. *Shokuhin Sogo Kenkyujo Kenkyu Hokoku (Report of the National Food Research Institute)* No. 48. p. 86-90. March. [4 ref. Eng; jap]

• ***Summary:*** "Eight samples of tempe and oncom chips were collected in Java, and the crude fat contents and triglyceride profiles of extracted oil were examined. Tempe chips samples included famous souvenir brands of Sri Umbi (No. 1) and Zogor Sari (No. 2) from Bandung, and other three samples purchased in Pasar Bogor (Nos. 6, 7 and 8). Oncom chips tested were Souvenir brands Reno (No. 4) and Gouw (No. 5). Sambel Goreng (No. 3) was a specialty product of mixed fries of tempe and hot chilli." Address: Tsukuba, Japan.

2210. Senboku, Toshihiro; Kittipakorn, K.; Kiratiyp-Angul, S.; Srithongchai, W.; Thongmeearkom, P.; Deema, N. 1986. Soybean yellow vein, a new virus disease of soybean.

*Tropical Agriculture Research Series* No. 19. p. 101-07. March. [7 ref]

• ***Summary:*** The virus was isolated from soybean plants showing yellow vein symptoms. The plants were grown in central Thailand in 1982. This new soybean virus was designated soybean yellow vein virus (SYVV). Address: 1. Plant Pathologist, Tropical Agricultural Research Center, Ministry of Agriculture, Forestry and Fisheries, Tsukuba Science City, Yatabe, Tsukuba, Ibaraki 305, Japan; 2-6. Plant Virology Group, Div. of Plant Pathology and Microbiology, Dep. of Agriculture, Bangkhen, Bangkok 10900, Thailand.

2211. STS–Soya Technology Systems Ltd. 1986. Turnkey Soymilk Plant. First in Europe (Brochure). 11 Dhoby Ghaut #11-06, Cathay Building, Singapore 0922. 6 p. March. Also published in Chinese in March 1986. [Eng; Chi]

• ***Summary:*** Contains 15 color photos with descriptions showing key parts of the DE-VAU-GE soymilk plant in Germany.

2212. Forman, Gail. 1986. The foreign exchange: A recipe for learning English from the world's worth of cuisines. *Washington Post.* April 27. p. K1, K4-K5.

• ***Summary:*** The writer is a professor in the English as a Second Language program at Montgomery College, Rockville, Maryland. For their first essay in English, she asks her students: "'Suppose I were visiting your native land–what dish would you tell me to be sure not to miss?'" She is looking for a description or story, not a recipe.

However recipes are given at the end of the article. The recipe for Indonesian nasi goreng [fried rice] calls for "4 tablespoons Javanese soy sauce (or Chinese soy sauce) combined with ¼ teaspoon brown sugar." Address: Special to the Post.

2213. Ho, Coy Choke. 1986. Identity and characteristics of *Neurospora intermedia* responsible for *oncom* fermentation in Indonesia. *Food Microbiology* 3(2):115-32. April. [25 ref]

• ***Summary:*** Seventy-one *Neurospora* cultures were isolated from *Oncom tahu* [okara onchom] based on soybean residues [okara] the in Jakarta-Bogor and from Onchom based on peanut presscake in the Lembang-Bandung regions of West Java. Tests for meiotic sterility of hybrids showed the onchom cultures to be *Neurospora intermedia* Tai and not *N. sitophila* as previously assumed and reported.

First presented at the IFS-UNU workshop on 'Development of indigenous fermented foods and food technology in Africa." Held 14-18 Oct. 1985 at Douala, Cameroon.

"Went (1901), based on asexual hyphal and conidial characteristics, named the *oncom* fungus as *Monilia sitophila* (Mont.) Sacc. Shear and Dodge (1927) discovered the sexual ascospore state of *Monilia* and thus named it as a new genus, *Neurospora.* Furthermore, the old *Monilia sitophila* was not a monospecific species but can be divided into four species namely, *Neurospora crassa, N. erythraea, N. sitophila* and *N. tetrasperma.*

"Since the classical investigations of Went, there have been little detailed studies on the *oncom* fungus and it has appeared erroneously as *N. sitophila* in current literature (Dwidjoseputro 1961). This paper describes the traditional process of *oncom* fermentation and the isolation of the responsible *Neurospora* from *oncom* from numerous sites in West Java." Address: Dep. of Genetics and Cellular Biology, Univ. of Malaya, Kuala Lumpur, Malaysia.

2214. *Soybean Update.*1986. Southeast Asia's appetite for soy foods is growing. May 19.

• ***Summary:*** Susani Karta, nutritionist with the American Soybean Assoc. in Singapore, links interest in nutrition and traditional food. In 1984 Thailand consumed 65,000 tonnes of beans; In 1986 this increased to 100,000. Indonesia uses about 1 million tonnes for traditional soyfoods, such as tofu and tempeh. A company there is developing a new soy ice cream.

2215. Agricultural Research Centres: A world directory of organizations and programmes. 8th ed. 2 vols. 1986. Essex, England: Longman. 1138 p. 28 cm.

• ***Summary:*** Vol. 1 is A to M, and Vol. 2 is N to Z. Within each volume, the organizations are listed by country. There is a "title of establishments" index and a subject index. In the subject index, under soya beans (p. 1134) we find listings for organizations that are conducting soybean research in the following countries: Australia (6), Belgium (1), Bolivia (1), Brazil (5), Burkina Faso (1), Cameroon (1), Canada (4), French Overseas Departments (1) France (1), Honduras (1), Indonesia (1), Mexico (1), Peru (1), Romania (1), Sri Lanka (1), Swaziland (1), Taiwan (2), Thailand (2), United Kingdom (1), USA (4), Venezuela (1), Zambia (2), Zimbabwe (1).

2216. Escueta, Elias E.; Bourne, M.C.; Hood, L.F. 1986. Effect of boiling treatment of soymilk on the composition, yield, texture and sensory properties of tofu. *Canadian Institute of Food Science and Technology Journal* 19(2):53-56. May. [23 ref. Eng; fre]

• ***Summary:*** Soymilk was boiled for 0, 12, 30, and 60 minutes before coagulation with calcium sulfate to make tofu. A texture profile and analysis was performed on the product obtained. Hardness and gumminess increased slightly up to 12 minutes of boiling but decreased significantly after 30 and 60 minutes of boiling. Chewiness decreased significantly after 30 and 60 minutes of boiling. Springiness was not affected by boiling. Cohesiveness increased slightly after 12 minutes boiling and then

decreased slightly but not significantly after 30 and 60 minutes of boiling. Composition and sensory qualities of tofu were not significantly affected by the length of time soymilk was boiled prior to coagulation. Address: Inst. of Food Science, Cornell Univ., Geneva, New York 14456.

2217. Hara, Toshio; Chetanachit, Charan; Fujio, Y.; Ueda, S. 1986. Distribution of plasmids in polyglutamate-producing *Bacillus* strains isolated from "natto"-like fermented soybeans: "thua nao," in Thailand. *J. of General and Applied Microbiology* 32(3):241-49. June. [25 ref]

• ***Summary:*** "Four polyglutamate (PGA)-producing *Bacillus* strains were isolated from 'thua nao' in Thailand. Three of these did not require biotin for growth. All four produced high activities of gamma-glutamyltranspeptidase (gamma-GTP). Each of these strains carried a single plasmid species."

"Apparently a 'natto' plasmid is distributed widely in PGA-producing *Bacillus.*" It may have developed from a common ancestral molecule. "Therefore, the distribution of 'natto' plasmids in PGA-producing *Bacillus* strains may help to distinguish *B. subtilis* from *B. subtilis (natto).*

Thua nao is a traditional fermented soyfood in northern Thailand. It is produced by aerobic spore-forming rods, similar to the natto *Bacillus,* growing on steamed soybeans. It is an adhesive fermented soyfood with a noticeable odor of ammonia, "and so is considered to be the same as Japanese 'natto'" (S. Nakao 1972, *Ryori no Kigen,* p. 121). Address: 1. Dep. of Food Science & Technology, Faculty of Agriculture, Kyushu Univ., Hakozaki, Fukuoka 812, Japan; 2. Dep. of Microbiology, Faculty of Science, Kasetsart Univ., Bangkok 10210, Thailand; 3. Dep. of Applied Microbial Technology, Kumamoto Inst. of Technology, Ikeda, Kumamoto 860, Japan.

2218. Owen, Sri. 1986. Indonesian food and cookery. 2nd edition, revised and enlarged. Prospect Books, 45 Lamont Rd., London SW10 0HU. 268 p. First edition was 1976. Illust. by Thao Soun. Index. 23 cm. [20 ref]

• ***Summary:*** In the chapter titled "Essential ingredients" are sections on "Kecap or soya sauce" (p. 42-43) and tauco (p. 44). Also contains a chapter titled "Tahu and tempeh" (p. 216-28) with good information and recipes on tofu and tempeh. Address: Mustika Rasa, 96 High St., Wimbledon Village, London SW19 5EG. Phone: 01-946-7649.

2219. American Soybean Association. 1986. Soya Bluebook '86. St. Louis, Missouri: American Soybean Assoc. 278 p. July. Index (bold face type indicates advertiser). 22 cm.

• ***Summary:*** Contents: Index of advertisers (p. 4). Soybeans: Your profit opportunity, by Dr. Kenneth L. Bader, CEO, ASA (p. 5). Organizations (by country, within each country alphabetically): For each gives the name, address, contact person, year founded, number of members, objectives and activities, publications. Countries are: USA, Australia, Austria, Bangladesh, Belgium, Brazil, Canada, England, Germany (Federal Republic of), Finland, France, Hungary, India, Indonesia, Italy, Ivory Coast, Japan, Malaysia, Mexico, Netherlands, Norway, Philippines, Portugal, Senegal, Spain, Sweden, Taiwan, Turkey, Yugoslavia, Zaire, Zimbabwe. U.S. agricultural education, research & extension (by state; mainly state agricultural / land-grant colleges), ASA international offices and world regions (colored world map and photo of each country director), government trading agencies.

Soy directory: Oil extraction plants / refineries (alphabetically by state in USA, then by country), soyfoods / edible soy products manufacturers (lecithin, soy flour, soy grits, soy protein concentrates & isolates, textured soy protein, binders, extenders, simulated meat products, soy oil products {margarine, shortening, cooking / salad oil, salad dressings}, soyfoods–beverages [soymilk], frozen desserts, soy sauce, tempeh, tofu, whole soybean snacks {soynuts}, other soy-based foods), within each product by country, producers of soy products for industrial manufacturers (by products, etc.): Industrial lecithin, industrial soy flour / soy protein, industrial soy oil, soy sterols and tocopherols, soybean fatty acids.

Soybean manufacturing support industries: Manufacturing equipment & supplies, soybean processing equipment & supplies, manufacturing services. Marketing and auxiliary services: Brokers, financial services, forwarding agents, marketing consultants, trading companies, transportation, warehousing–export / import.

Soy statistics (tables & graphs): Soya conversions [weights & measures], metric conversions, temperature conversions. U.S. soybean planting and harvesting dates (by state). U.S. soybean acreage, yield and production, 1925–1985 (by year). U.S. soybean planted acreage by state (1970–1985). U.S. soybean harvested acreage by state (1970–1985). U.S. soybean yield by state (1970–1985). U.S. soybean production by state (1970–1985). U.S. soybean production major crops (1920–1985): One graph each for soybeans, corn, wheat, and cotton. U.S. harvested acreage of major crops (1920–1985): One graph each for the big 4. U.S. yield per acre of major crops (1920–1985): One graph each for the big 4. Argentine soybean area, yield and production by province (1975-1986). Brazilian soybean area, yield and production by province (1975-1986). Canadian soybean production: Acreage, yield, production, farm price and value (1950-51–1984-85). Canadian soybean production and utilization (1950-1984, year beginning Aug. 1): Production, imports, supplies, exports of beans, processed for oil and meal, soy oil produced, soybean oilcake produced. World soybean production: Area and production in specified countries and the world total (1980/81–1985/86). Soybean production by major countries (one graph, 1925-1985): U.S., Brazil, PRC [China], Argentina.

Share of world soybean production [percentage] by major countries (one graph, 1925-1985): Big 4. Soybean acreage by major countries (one graph, 1925-1985): Big 4. Share of world soybean acreage [percentage] by major countries (one graph, 1925-1985): Big 4. U.S. soybeans: Supply, disposition, acreage, yield and price (1970–1986). Soybean usage in the U.S. for crush and exports (one graph, 1925-1985, million bushels). U.S. soybean exports: Percent of total usage (one graph, 1925-1985). Argentine soybeans and products (oil and meal): Supply and disposition (1975/76–1986/87). Brazilian soybeans and products (oil and meal): Supply and disposition (1975/76–1986/87). Prices of U.S. soybeans, No. 1 yellow: Average price per bushel, Illinois country shipping points (by year and month, 1950–1984, dollars). Prices of U.S. soybeans received by farmers: Average price per bushel (by year and month, 1950–1984, dollars). U.S. soybean price support operations (1945-1985, incl. CCC). U.S. soybean crop value: U.S. and major producing states (1925-1985): Illinois, Iowa, Indiana, Ohio, Missouri, Minnesota, Arkansas. Fold-out color map of U.S. soybean acreage by county. U.S. farm marketings of soybeans: Percent of open market farm sales by month (1975/76–1984/85). Map of U.S. soybean processing plants. Value of U.S. soybean products per bushel and crush margin (1950-1984): Soy oil, soybean meal, soybean price (received by farmers, No. 1 yellow Illinois), margin (ditto). U.S. soybean meal: Prices paid by farmers–44% protein, dollars per 100 lbs, by year and month (1950-1984). U.S. soybean meal: Average wholesale price–44% protein, dollars per ton, bulk Decatur, Illinois, by year and month (1950–1984). U.S. soybean meal: Beginning stocks, production, exports and domestic disappearance, by year and month, thousand short tons (1978/79–1984/85). U.S. soybean cake and meals: Supply, disposition and price (1977-1985): Soybean, cottonseed, linseed, peanut. Major world protein meals: Supply and utilization (1981/82–1985/86; Production, exports, imports, consumption, ending stocks): Soybean, cottonseed, rapeseed, sunflowerseed, fish, peanut, copra, linseed, palm kernel. World major oilseeds: Supply and utilization (1981/82–1985/86). World major vegetable and marine oils: Supply and utilization (1981/82–1985/86). Prices of U.S. soybean oil: Soy oil, domestic crude, average cents per pound in tank cars at Midwestern mills, by year and month (1950/51–1984/85). U.S. soybean utilization, by year (1960-1984): Food–Shortening, margarine, cooking and salad oils, other edible, total. Nonfood–Paint and varnish, resins and plastics, fatty acids, other inedible (incl. soap), total. Total domestic utilization. U.S. soybean oil value as percent of total soybean value (1930–1985). Note: Peaked at about 55% in 1930, fell to about 32% in 1980-81. U.S. soybean oil: Supply, disposition and price (1960-1985). U.S. edible fats and oils: Supply and disappearance (1978-1985): Coconut, corn, cottonseed, lard, palm, peanut, soybean, sunflower, tallow (edible). U.S. exports of soybeans, by year and month (1953–1984). U.S. soybean exports by port and country of destination (Sept. 1984–Aug. 1985): Ports are–St. Lawrence Seaway, Lakes, Atlantic, Gulf (by far the largest), Pacific, Interior. U.S. exports: Soybeans–Volume of exports by country of destination (in metric tons) and total value (1981–1985). U.S. exports: Soybean oil–Volume of exports by country of destination (in metric tons) and total value (1981–1985). U.S. exports: Soybean oilseed cake and meal–Volume of exports by country of destination (in metric tons) and total value (1981–1985). Map of U.S. soybean exports by port areas: Sept. 1984–Aug. 1985 (1,000 bushels). U.S. exports of soybean, cottonseed and sunflowerseed oils: U.S. commercial and P.L. 480 exports–Volume of exports by region and country of destination (in metric tons) and total value (1979/80–1984/85; year beginning in October). U.S. exports: Soybean oil–P.L. 480, Title I and III, volume (in metric tons) and value (in $1,000) by country of destination (FY 1981–1985). U.S. exports of soybean and cottonseed oils: U.S. commercial and P.L. 480 exports (1950–1984, million lbs; incl. P.L. 480 as a percentage of the whole). Brazilian exports of soybeans and products to major countries (1,000 metric tons; 1976-1984). Graph of soybean & product exports by major countries (U.S., Brazil, Argentina) (soybean equivalent; 1970-1985). Graph of world share of soybean & product exports by major countries (U.S., Brazil, Argentina) (1970-1985). Note: U.S. share has fallen from 95% in 1970 to about 50% in 1984.

Glossary: General terms, soy protein terms. Standards & specifications: NSPA, Association of American Feed Control Officials (AAFCO), USDA (definitions and grades). Index. Address: P.O. Box 27300, St. Louis, Missouri 63141.

2220. *LEC Newsletter.*1986. Extrusion meetings in Indonesia. July. p. 2.
• ***Summary:*** International Soyfoods Symposium: Processing, Application and Utilization is being organized by The Food Technology Development Center, Bogor Agriculture University (IPB Campus Darmaga, P.O. Box 61, Bogor, West Java, Indonesia) in collaboration with the American Soybean Association. The three-day meeting will be 16-18 September 1986 in Yogyakarta, Indonesia.

2221. Shurtleff, William; Aoyagi, Akiko. 1986. Tempeh production: A craft and technical manual. Lafayette, California: Soyfoods Center. 176 p. Illust. by Akiko Aoyagi Shurtleff. Index. July. 28 cm. [28 ref]
• ***Summary:*** The table of contents of this edition is the same as that of the original 1980 edition. Major changes have been made in the ads at the back of the book and small changes in several other parts of the book.

Print history: Pre-publication: 100 photocopy copies. 1980 March 15: 1,021 paperback and 150 hardcover. 1986

July: 330 paperback. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549.

2222. *Economist (London).* 1986. The Yong recipe. Food flavors. Aug. 16. p. 58.
• ***Summary:*** Dr. Leslie Yong is a biochemist at the National University of Singapore. Having invented a speedier way to make soy sauce, he is trying to make fungi turn out food flavors. He was able to cut the soy sauce fermentation time for 90 days to 9 days by altering the enzymes and yeasts, temperature and pH in the moromi. He has sold his technique to Chuen Cheong Industries, a soy sauce manufacturer in Singapore. Address: Biochemist, National Univ., Singapore.

2223. Boon-Long, Narudom. 1986. Traditional technologies of Thailand: Traditional fermented food products. In: V.H. Potty, et al. eds. 1986. Traditional Foods: Some Products and Technologies. 292 p. See p. 114-33. Aug. Presented at the UN University Workshop on "Traditional Food Technologies: Their Development and Integrated Utilisation with Emerging Technologies." Held June 1983 at CFTRI, Mysore, India. [23 ref]
• ***Summary:*** "Products such as soy sauce, soy paste *(Tao-Jeow),* fermented soybean curd [Sufu] and *Thua-nao* constitute the major traditional fermented foods [of Thailand]. The first three are common throughout the country. Thua-nao is popular in northern Thailand." Flowcharts and details are given concerning the production of each of these products. Address: Dep. of Food Science & Technology, Kasetsart Univ., Bangkok, Thailand.

2224. Ho, C.C.; Ten, S.K.; Chuah, B.H.; Lee, G.S.; Kok, C.H.; Chen, Y.F. 1986. Microbiology of traditional fermented food in Malaysia and surrounding countries. In: V.H. Potty, et al. eds. 1986. Traditional Foods: Some Products and Technologies. 292 p. See p. 134-35. Aug. Presented at the UN University Workshop on "Traditional Food Technologies: Their Development and Integrated Utilisation with Emerging Technologies." Held June 1983 at CFTRI, Mysore, India.
• ***Summary:*** "Soy sauce, tempeh, ontjom, tapai and ubi are the fermented foods on which laboratory studies and extensive field work have been carried out in Malaysia. Tempeh and tapai are traditional fermented foods of Malaya and also the Indonesians. Soy sauce manufacture is the largest fermentation industry in Malaysia, technology for which was introduced by the Chinese...

"Offensive odour development in the fermentation process results in spoilage of tempeh and tapai. *Bacillus subtilis* causes this problem. A strain of *B. subtilis* (H4052) has been isolated. It has been found that it inhibits the growth of *Rhizopus oligosporus* and *R. oryzae* through the likely production of antimycotic antibiotics." Address: Univ. of Malaya, Kuala Lumpur, Malaysia.

2225. Myo Thant Tyn. 1986. Traditional food of Burma, Nga-pi. In: V.H. Potty, et al. eds. 1986. Traditional Foods: Some Products and Technologies. 292 p. See p. 97-113. Aug. Presented at the UN University Workshop on "Traditional Food Technologies: Their Development and Integrated Utilisation with Emerging Technologies." Held June 1983 at CFTRI, Mysore, India. [38 ref]
• ***Summary:*** "Among the several traditional foods consumed in Burma the favorite ones are *Nga-pi* (fermented shrimp and fish paste), *Ngan-pya-ye* (fermented fish and shrimp sauce), *Ponye-ye-gyi* (fermented horsegram paste),... *Pe-poke* (boiled, pounded and dried soybean cake)..." It is believed that Nga-pi has been an important element in the Burmese diet since the first century A.D. No details are given on Pe-poke. Address: Development Centre for Food Technology Project, Food Stuff Industries Corp., Rangoon, Burma.

2226. Potty, V.H.; Shankar, J.V.; Ranganath, K.A.; et al. eds. 1986. Traditional foods: Some products and technologies. Mysore, India: Central Food Technological Research Inst. (CFTRI). 292 p. Aug. Papers presented at the UN University Workshop on "Traditional Food Technologies: Their Development and Integrated Utilisation with Emerging Technologies" held June 1983 at CFTRI, Mysore. 25 cm.
• ***Summary:*** This publication contains 27 papers presented by scientists from countries of Asia, Africa, Europe, and the Americas. Chapters related to soy are cited separately. The traditional foods of the following countries are discussed specifically: Ethiopia, Nigeria*, Sudan, Senegal, Pakistan*, India, Nepal*, Burma*, Thailand*, Malaysia*, Indonesia*, Philippines, Korea*, China*, Japan*, and Mexico*. Countries with foods related to soy are followed by an asterisk (*). Address: Central Food Technological Research Inst. (CFTRI), Mysore–570 013, India.

2227. Winarno, F.G. 1986. Traditional technologies of Indonesia with special attention to fermented foods. In: V.H. Potty, et al. eds. 1986. Traditional Foods: Some Products and Technologies. 292 p. See p. 136-47. Aug. Presented at the UN University Workshop on "Traditional Food Technologies: Their Development and Integrated Utilisation with Emerging Technologies." Held June 1983 at CFTRI, Mysore, India. [24 ref]
• ***Summary:*** Contents: Introduction. Tempe. Oncom. Tauco and soy sauce. Tape (tapeh) and its products. Brem wine. Brem cake. Terasi. Salted eggs and pindan. Pindang (made from salted fish). Address: Food Technology Development Centre, Bogor Agricultural Univ., Indonesia.

2228. Lee, Geok Boi. 1986. Soya bean milk packs more water than flavor. *Sunday Times (Singapore).* Sept. 7. [Eng]
• ***Summary:*** A comparison of five soymilk varieties sold in Singapore: Drinho (made in Malaysia), Magnolia (Singapore), Marigold (Singapore), Vitasoy (Hong Kong), and Yeo's (Singapore). Magnolia was considered the best buy because "it was the only brand with a hint of soya bean flavour."

2229. Abdul Rahman, Hussein. 1986. An update in the manufacturing of traditional fermented and non fermented soyfoods in Malaysia. In: F.G. Winarno, ed. 1986. International Soyfoods Symposium. xiv + 403 p. See p. 59-73. Held 16-18 Sept. 1986 in Jogyakarta, Indonesia. [38 ref]
• ***Summary:*** Contents: Abstracts. Introduction. Present status of soybean utilization in Malaysia. Manufacture of traditional fermented soyfood in Malaysia. Manufacture of traditional non-fermented soyfood in Malaysia. Research and development of soyfood in Malaysia. Conclusion. Address: Extension Services, Food Technology Div., Malaysian Agricultural R&D Inst., P.O. Box 202, Serdang, Selangor, Malaysia.

2230. Babji, Abdul Salam Hj; Abdullah, Aminah. 1986. The use of soy protein and other food additives in locally processed meat products in the ASEAN region. In: F.G. Winarno, ed. 1986. International Soyfoods Symposium. xiv + 403 p. See p. 233-52. Held 16-18 Sept. 1986 in Jogyakarta, Indonesia. [15 ref]
• ***Summary:*** Contents: Abstract. Introduction. Nutritional consideration. Materials and methods. Results and discussion. Product formulation and ingredients. Conclusion. References. Address: 1. Dep. of Food Science & Nutrition, Faculty of Life Sciences, National Univ. of Malaysia, 43600 Bangi, Selangor.

2231. Dauphin, F.; Rachim, A. 1986. The role of socio-economic factors in low soybean production yields in Garut, West Java. Presented at the Workshop on Food Legume Improvement for Asia Farming Systems. Held 1-5 Sept. 1986, ACIAR, Khon Kaen. *

2232. Dulyapach, Poungpit. 1986. Soyfood extension at the Thai village level. In: F.G. Winarno, ed. 1986. International Soyfoods Symposium. xiv + 403 p. See p. 355-67. Held 16-18 Sept. 1986 in Jogyakarta, Indonesia. [7 ref]
• ***Summary:*** Contents: Introduction. Extension system. Major activities of DOAE [Department of Agricultural Extension] in the national project. Soyfood utilization promotion in the village. Soyfood extension impact. Soyfood extension constraints. Conclusion. References. Address: Home Economic Dep., Dep. of Agricultural Extension, Bangkhen, Bangkok 10900, Thailand.

2233. Jackobs, Joseph A.; Smyth, C.A.; Erickson, D.R. 1986. International soybean variety experiment: Eleventh report of results, 1984. *INTSOY Series* No. 29. xvi + 168 p. Sept. (College of Agric., Univ. of Illinois at Urbana-Champaign).
• ***Summary:*** "This is the final report of the International Soybean Variety Evaluation Experiments (ISVEX)... ISVEX has been the major component of INTSOY's genetic development program since 1973." Joseph A. Jacobs provided leadership to the ISVEX trial program. Pages viii–xvi contain a complete listing of about 65 cooperating centers and researchers worldwide.

During 1984, soybeans were grown at 96 sites (the name of each site is given) in the following countries: Antigua, Argentina, Bangladesh, Burma, Cameroon, China, Colombia, Costa Rica, Cyprus, Dominican Republic, Ecuador, Egypt, El Salvador, Ethiopia, French Guiana, Ghana, Honduras, Indonesia, Iran, Ivory Coast, Korea, Laos, Liberia, Madagascar, Malaysia, Mexico, Nepal, New Caledonia, Pakistan, Paraguay, Philippines, Portugal, Rwanda, Saint Vincent, Somalia, South Africa, Sri Lanka, Sudan, Swaziland, Tanzania, Turkey, United States, Venezuela, Vietnam, Yugoslavia, Zambia, Zimbabwe.

In 1982, soybeans were grown in Morocco. In 1983 soybeans were grown in Brazil and Rwanda.

In 1985, soybeans were grown at 43 sites in China, Ecuador, Ethiopia, Gabon, Ghana, Guatemala, Iran, Jamaica, Korea, Mexico, Nepal, Pakistan, Paraguay, Philippines, Portugal, Sri Lanka, Thailand, Turkey, United States, Venezuela, Yugoslavia, Zaire, and Zimbabwe.

2234. Karta, Susani K. 1986. Product development for soy frozen dessert. In: F.G. Winarno, ed. 1986. International Soyfoods Symposium. xiv + 403 p. See p. 205-13. Held 16-18 Sept. 1986 in Jogyakarta, Indonesia. [3 ref]
• ***Summary:*** Contents: Introduction. Systematic product development process. Developing soy frozen dessert. Marketing soy frozen dessert in product development. References. Address: American Soybean Assoc., 541 Orchard Rd. #11-03, Liat Towers, Singapore 0923.

2235. Karyadi, Darwin. 1986. Health significance of traditional fermented soybean, tempe. In: F.G. Winarno, ed. 1986. International Soyfoods Symposium. xiv + 403 p. See p. 333-47. Held 16-18 Sept. 1986 in Jogyakarta, Indonesia. [31 ref]
• ***Summary:*** Also published as an internal report, Nutrition Research and Development Center, Ministry of Health, Indonesia.

Contents: Introduction. Trends of consumption level in rural and urban communities. Historical notes on the use of tempeh and its health significance. Nutritional and health consideration. Hypocholesterolemic effect. Nutritional rehabilitation of diarrheal diseases. Complementarity effect

for food supplementation. Summary. References. Address: Nutrition Research Development Center, Jl. Dr. Semeru, 26348, Bogor, Indonesia. Phone: 21763, 26348.

2236. Leufstedt, Goran. 1986. Continuous process for low beany taste soybean products. In: F.G. Winarno, ed. 1986. International Soyfoods Symposium. xiv + 403 p. See p. 79-93. Held 16-18 Sept. 1986 in Jogyakarta, Indonesia. [2 ref]
• ***Summary:*** Contents: Abstract. Introduction. Continuous process systems. Continuous soyfood processes. Soy extraction line: Soybean grinding, deactivation of lipoxygenase enzymes, fiber separation, trypsin inhibitor deactivation, deaeration/deodorization. Aseptic soy beverages. Ultrafiltration of soy extract. Soy-yogurt. Frozen desserts. Tofu. Prepared foods–forming, frying. Residue–okara. Conclusion.

In the dairy industry ultrafiltration (UF) of cow's milk has long been used for continuous concentration of protein. UF is also common in the cheese industry for continuous production of soft cheese. "As far as I know, no UF plant in commercial operation has been reported on soy, but two applications are described in the literature: Concentration of the protein and diafiltration, i.e. washing out anti-nutritional compounds." Address: Alfa-Laval South East Asia Pte. Ltd., 11-Joo Koon Circle, Singapore 2262.

2237. Nurhani, H. Ahmad. 1986. Economic benefit of soybeans and soybean products. In: F.G. Winarno, ed. 1986. International Soyfoods Symposium. xiv + 403 p. See p. 369-77. Held 16-18 Sept. 1986 in Jogyakarta, Indonesia. [9 ref]
• ***Summary:*** Contents: Introduction. Soybean and soybean products. Domestic utilization of soybeans and soybean products. Economic benefits. Conclusion and recommendation. References. Address: Indonesia.

2238. Nuri, Rashid. 1986. Economics of soybean processing plants. In: F.G. Winarno, ed. 1986. International Soyfoods Symposium. xiv + 403 p. See p. 145-55. Held 16-18 Sept. 1986 in Jogyakarta, Indonesia.
• ***Summary:*** Contents: Introduction. Soybean processing methods. Economics of soybean processing. Crushing economics in Indonesia. Address: Cargill Southeast Asia Ltd., 1 Scotts Rd., #22-10, Shaw Centre, Singapore 0923.

2239. Oei Ban Liang; Soemitro, Soetijso; Tjahjadi, Carmencita. 1986. Functional properties of soy proteins. In: F.G. Winarno, ed. 1986. International Soyfoods Symposium. xiv + 403 p. See p. 219-32. Held 16-18 Sept. 1986 in Jogyakarta, Indonesia. [13 ref]
• ***Summary:*** Contents: Abstract. Introduction. Chemical and physical properties of soy proteins. Biological activity of soy protein components. Soy protein products as food ingredients: Soy flour and protein concentrate. Soy protein isolate. Soy proteins in human nutrition. A comparison of soybean milk with cow and human milk. Use of soybean products as protein supplement. References. Address: 2. Departmen of Chemistry, FMIPA, Universitas Pajajaran, Bandung, Indonesia; 3. Faculty of Agriculture, Padjadjaran Univ., Jl. Bukit Dago, Bandung 40135, Indonesia.

2240. Tanpaichitr, Vichai; Leelahagul, P.; Summasur, R.; Kulapongse, S.; Songchitsomboon, S. 1986. Nutritional aspects of soybean and soybean products: Metabolic study. In: F.G. Winarno, ed. 1986. International Soyfoods Symposium. xiv + 403 p. See p. 323-31. Held 16-18 Sept. 1986 in Jogyakarta, Indonesia. [20 ref]
• ***Summary:*** Contents: Abstract. Objective. Materials and methods. Result. Conclusion. References. Address: 3. Div. of Nutrition and Biochemical Medicine, Faculty of Medicine, Ramathibodi Hospital, Rama 6 Rd., Bangkok 10400, Thailand.

2241. Wiedermann, Lars H. 1986. Soybean processing for preparation of traditional defatted soyfood protein intermediates. In: F.G. Winarno, ed. 1986. International Soyfoods Symposium. xiv + 403 p. See p. 125-44. Held 16-18 Sept. 1986 in Jogyakarta, Indonesia. [5 ref]
Address: American Soybean Assoc., 541 Orchard Rd. #11-03, Liat Towers, Singapore 0923.

2242. Winarno, F.G. ed. 1986. International Soyfoods Symposium. Organized by Food Technology Development Center, Bogor Agricultural University, Bogor, Indonesia. xiv + 403 p. Held 16-18 Sept. 1986 at the Hotel Garuda, Yogyakarta, Indonesia. No index. 29 cm. [Eng]
• ***Summary:*** This document contains 23 papers organized under the following subject headings: Symposium organizing committee: Chairman, F.F. Winarno. Table of contents. Foreword by F.G. Winarno. Welcome address by F.G. Winarno. Opening address by Susani K. Karta of American Soybean Assoc., Singapore. Inaugural address at the opening of International Soyfoods Symposium. Traditional soyfoods I. Traditional soyfoods II. Extrusion technology. Processing soy protein & oil. Application of soy proteins I. Application of soy proteins II. Preservation of soy products. Soy supplementary and weaning foods. Nutrition. Utilization: Economic benefit & marketing strategy. Address: Bogor, Indonesia.

2243. Winarno, F.G. 1986. Traditional fermented soyfoods. In: F.G. Winarno, ed. 1986. International Soyfoods Symposium. xiv + 403 p. See p. 3-19. Held 16-18 Sept. 1986 in Jogyakarta, Indonesia. [36 ref]
• ***Summary:*** Contents: Introduction. Tempe. Some tempe products. Flavor and color of tempe. Tempe and wholesomeness. Tauco. Kecap (soy sauce).

"Tempe was formerly considered an inferior food in part because of its costs, compared to other protein foods such as meats, fish and eggs. Over the last 15 years the attitude towards tempe has changed. Today, more attention has been given to tempe because it is an inexpensive source of proteins, vitamins and calories. The total annual production of Indonesian tempe is about 500,000 tons. However, tempe production is still a household art. Most of the 41,000 small cottage industries that make fresh tempe daily are family run and employ about 128,000 workers. Each small cottage industry employs about 3 workers, and uses approximately 11 pounds (5 kg) of dry soybeans per day to produce 21 pounds (10 kg) of fresh tempe. The larger cottage industries employ 10 to 20 workers and use 600 to 1,000 pounds (500 kg) of dry soybeans per day to produce tempe. The average retail price of tempe is about US $0.25 per kg in 1985."

Figures: 1. Usar made using traditional Hibiscus leaves. 2. Flow sheet: Indonesian tempe process. 3. Material balances in pilot plant process for production of tempe. 4. Flow sheet of tauco processing. 5. Flow sheet of kecap processing. Address: Food Technology Development Center, Bogor Agricultural Univ., P.O. Box 61, Bogor, Indonesia.

2244. *Soybean Update.*1986. Palm oil saturating the U.S. market. Oct. 6.
• ***Summary:*** Since 1983 palm oil imports to U.S. have doubled, at expense of U.S. soybean farmers.

2245. Dauphin, Francois; Bottema, J.W.T.; Rachim, A. 1986. Soybean yield constraints: Socio-economic or technologic? *Palawija News (Bogor, Indonesia)* 3(2):1-2, 11.
• ***Summary:*** SYGAP (Soybean Yield Gap Analysis Project) investigates the discrepancy in yields between farmers' yields and research station yields of soybean in Java, Indonesia. The SYGAP methodology takes into account location specific conditions and comprises 3 major components: 1. Studying the farmers' resources, strategies and perceived needs, with special attention to cultivation practices; 2. Testing and assembling technology to build a proven reference package, and 3. Adjusting this package, together with the farmer, so that he can make practical use of it. Address: CGPRT Centre, Bogor.

2246. Hegsted, D.M. 1986. Calcium and osteoporosis. *J. of Nutrition* 116(11):2316-2319. Nov. [36 ref]
• ***Summary:*** Osteoporosis is largely a disease of affluent, western cultures. The author showed a cross-cultural association between total dietary protein intake and hip fracture, and suggested it might be due to protein-induced damage of renal calcitriol regulation. The real issue, he argues, is "whether or not calcium intake is related to the development of osteoporosis." "It seems quite clear that we do not understand the etiology of osteoporosis."

Graphs show: (1) Incidence of hip fractures per 100,000 vs. per capita calcium consumption (mg/day). The three countries with the highest hip fracture rate are the USA, New Zealand, and Sweden. The four countries with the highest calcium consumption are Finland, Sweden, New Zealand, and the USA. The three countries with the lowest hip fracture rate are Singapore, Hong Kong, and Yugoslavia. The three countries with the lowest calcium consumption are Hong Kong, Singapore, and Yugoslavia.

(2) Incidence of hip fractures per 100,000 vs. per capita protein consumption (mg/day). The three countries with the highest hip fracture rate are the USA, New Zealand, and Sweden. The four countries with the highest protein consumption are New Zealand, USA, Jerusalem (Israel) and Yugoslavia. The three countries with the lowest hip fracture rate are Singapore, Hong Kong, and Yugoslavia. The three countries with the lowest protein consumption are Hong Kong, Singapore, and Sweden. Address: Dep. of Nutritional Sciences, Univ. of Wisconsin, Madison, WI 53706.

2247. Rumney, Thomas. 1986. Soybeans: A new world supercrop. *Focus* 36:29-30. Fall.
• ***Summary:*** A map shows world soybean production in 1985. "The estimated value of 1982 U.S. [soybean] production was nearly $12.5 billion, with exports of soybeans and soybean products exceeding $3 billion." Also discusses the rapid growth in soybean production in Brazil, Argentina, and Paraguay. "In 1965, these three countries grew some 558,000 metric tons of soybeans (2% of world production); by 1985, that figure had increased to 23,050,000 metric tons (26% of the world's total)."

"As recently as 1969 India grew no soybeans, yet by 1985 the Indian output was 750,000 metric tons annually. Less spectacular, although quite substantial, are production increases in Taiwan, North and South Korea, Indonesia, and Malaysia." Address: State University College, Plattsburg, New York.

2248. Wynstra, Robert J. 1986. The soybean solution: Meeting world food needs. INTSOY, University of Illinois, 113 Mumford Hall, 1301 W. Gregory Dr., Urbana, IL 61801. 28 p. Nov.
• ***Summary:*** The best overview to date of INTSOY's pioneering work during the past 13 years. Contents: 1. Preface. 2. Soybeans: Food for a hungry world. The INTSOY solution. 3. INTSOY: Building a cooperative network. The beginning of INTSOY. The ISVEX Testing program. The soybean's genetic potential. A program of mutual benefits. ISVEX Results for selected countries: India, Sri Lanka, Peru, Mexico and Costa Rica, Ethiopia, Indonesia, Egypt and Turkey. 4. Fulfilling the soybean's promise. The INTSOY research effort. New products and

techniques. The need for continued cooperation. Appendix: Performance of soybean cultivars included 2 or more years in ISVEX trials.

This report marks the end of INTSOY's work with soybean variety development for Third World countries and the beginning of its focus on soybean utilization. Address: Urbana, Illinois. Phone: 217-333-6422.

2249. Aida, Kô; Ueda, Seinosuke; Murata, Kiku; Watanabe, Tadao. eds. 1986. Ajia no muen hakkô daizu shokuhin [Proceedings of the Asian Symposium on Non-Salted Soybean Fermentation]. Japan: Takeshima Shigeru. 319 p. Held July 1985 in Tsukuba, Japan. Illust. (some color). No index. 27 cm. [400 ref. Eng; Jap]

• ***Summary:*** A pioneering symposium featuring tempeh and natto. About 70% of the book is in English and 30% in Japanese. A number of chapters are in Japanese with no English translations. Contains many typographical errors in the English sections.

Those interested in the early history of natto and other East-Asian fermented foods will find the discussion (in Japanese) on pages 174-78 to be very interesting. Address: Tsukuba, Japan.

2250. Hesseltine, C.W. 1986. Genus *Rhizopus* and tempeh microorganisms. In: Kô Aida, et al. eds. 1986. Proceedings of the Asian Symposium on Non-Salted Soybean Fermentation. Japan: Takeshima Shigeru. 319 p. See p. 20-26. Held July 1985 at Tsukuba, Japan. [12 ref]

• ***Summary:*** The genus *Rhizopus* belongs to the family Mucoraceae of the order Mucorales in the subclass Zygomycotina of the class Zygomycetes. The order mucorales is a group of filamentous, typically saprophytic fungi. The members of the Mucorales are among the most common fungi encountered. Address: NRRC, Peoria, Illinois.

2251. Jutono, -. 1986. The microbiology of usar, a traditional tempe inoculum. In: Kô Aida, et al. eds. 1986. Proceedings of the Asian Symposium on Non-Salted Soybean Fermentation. Japan: Takeshima Shigeru. 319 p. See p. 50-60. Held July 1985 at Tsukuba, Japan. [8 ref]

• ***Summary:*** The traditional tempeh inoculum, usar is still widely used for tempeh preparation in Indonesia (Java). Usar prepared from the leaves of *Hibiscus similis* is considered the best, followed successively by those of *Hibiscus tiliaceus, Tectona grandis,* and *Bambusa species. Rhizopus* species are the dominant organisms. Address: Faculty of Agriculture, Gadjah Mada Univ., Yogyakarta, Indonesia.

2252. Karki, Tika. 1986. Microbiology of kinema. In: Kô Aida, et al. eds. 1986. Proceedings of the Asian Symposium on Non-Salted Soybean Fermentation. Japan: Takeshima Shigeru. 319 p. See p. 39-49. Held July 1985 at Tsukuba, Japan. [Eng; Jap]

• ***Summary:*** The best publication seen on Kinema up to this time. Kinema is a traditional, non-salted fermented soybean food product widely consumed by the Kirat ethnic population of the eastern hills of Nepal, and into Darjeeling and Sikkim. This product, thought to have originated in Nepal, greatly resembles natto of Japan and thua-nao of Thailand. It is usually produced during the winter; dried kinema is used mainly for flavoring purposes. It, is consumed in soup along with green vegetables. There is good potential for expanding the production of soybeans in Nepal. In most of the hilly areas, soybeans are grown as a mixed crop with maize, yet it is only in the far eastern part of Nepal that they are used to make kinema. The dominant organism in this fermentation was found to be *Bacillus subtilis.*

To make kinema in the traditional way, soybeans are washed, soaked overnight, boiled until softened, cracked by pounding lightly, and mixed thoroughly by hand with about 0.5% ash. It is then fermented overnight in bamboo baskets covered with banana leaves at about 25ºC. The fresh kinema is then sun dried for about 3 days and stored for 6 months to yield dried kinema. The typical composition is moisture 8.9%, protein 46.2%, fat 18.1%, ash 5.2%. Kinema is less sticky than natto and possesses some acidity.

Tables: (1) Different types of kinema collected from different localities in Nepal. (2) Chemical composition of Kinema.

Figures: (1) An excellent map of Nepal shows the "Kinema producing area of Nepal"–which is in the northeastern part of the country. (2) Flow chart–Traditional process for making kinema. (3) Flow chart–Preparation of kinema starter. (4) Flow chart–Preparation of kinema using selected strains. (5) Bar chart–Distribution of 4 types of bacteria in 4 samples of traditional kinema. (6) Graph–Change in cell propagules, temperature and moisture during the fermentation of kinema. (7) Change in the growth rate of selected microbes during kinema fermentation.

The paper is followed by 3 pages of discussion, in Japanese. Address: Central Food Research Lab., Babar Mahal, Kathmandu, Nepal.

2253. Karyadi, Darwin. 1986. Nutritional implications of tempe in Indonesian rural community. In: Kô Aida, et al. eds. 1986. Proceedings of the Asian Symposium on Non-Salted Soybean Fermentation. Japan: Takeshima Shigeru. 319 p. See p. 112-24. Held July 1985 at Tsukuba, Japan. [22 ref]

• ***Summary:*** Tempeh consumption in both rural and urban communities in Indonesia is increasing. Its use should be popularized to nutritionally at-risk groups such as preschool children, and pregnant and lactating women. Address:

Nutrition Research and Development Center, Ministry of Health, Komplek Gizi, Jl. Dr. Sumeru, Bogor, Indonesia.

2254. Ko Swan Djien. 1986. Some microbiological aspects of tempe starters. In: Kô Aida, et al. eds. 1986. Proceedings of the Asian Symposium on Non-Salted Soybean Fermentation. Japan: Takeshima Shigeru. 319 p. See p. 101-09. Held July 1985 at Tsukuba, Japan.
• ***Summary:*** Discusses the tempeh mold; traditional tempeh starters made of tempeh cake or mold culture on leaves, or small cakes of mainly rice flour; starters developed in laboratories (semi-pure culture and pure culture); and role of bacteria in tempeh fermentation. Address: Bandung Inst. of Technology, Indonesia; Agricultural Univ., Wageningen, Netherlands.

2255. Kozaki, Michio. 1986. Monsuun Ajia no hakkô shokuhin [The fermented foods of monsoon Asia]. In: Kô Aida, et al. eds. 1986. Proceedings of the Asian Symposium on Non-Salted Soybean Fermentation. Japan: Takeshima Shigeru. 319 p. See p. 5-8. Held July 1985 at Tsukuba, Japan. [Jap]
• ***Summary:*** A general review, including many fermented foods not containing soy. Address: Dep. of Agriculture, Tokyo Univ. of Agriculture.

2256. Nakao, Sasuke. 1986. Minzokugaku-sha to shite deatta koto domo [An ethnologist's recollections (on fermented soyfoods)]. In: Kô Aida, et al. eds. 1986. Proceedings of the Asian Symposium on Non-Salted Soybean Fermentation. Japan: Takeshima Shigeru. 319 p. See p. 179-83. Held July 1985 at Tsukuba, Japan. English-language summary in Symposium Abstracts, p. 64. [Jap]
• ***Summary:*** In 1962 the author was first introduced to kinema, a non-salted fermented soybean food, in eastern Nepal. Before that time on trips he had noticed that soybeans were commonly planted on the levees of paddy fields in Nepal, Sikkim, and Bhutan. In 1972 he proposed the hypothesis of the "triangular distribution" of non-salted fermented soybean foods, also known as the "natto triangle." Since proposal of the hypothesis, many other examples of non-salted fermented soybean foods in the area have been reported. They are "Soeda" of Bhutan, "Pe-Boutsu" of Burma, "Thua-nao" of northern Thailand and many other examples in China proper (PRC) and in the Miao Tribe of Kweichow (Guizhou) Province of China. "In these examples, the local names are much different and no common word is found. This may suggest that the existence of fermented soybeans is not the result of recent dispersals from a central place of origin, but may have happened in rather ancient times. Then I came to the further assumption that within the triangular area there may have been a complex common human culture from olden times.

"In processing the non-salted fermented soybean, the artificial inoculation of the boiled soybean is sometimes practiced like in tempe. In Bhutan it is reported that the starter for fermentation is the same one which is prepared for the fermentation of alcoholic beverages. The fundamental method of making alcoholic beverages in the Himalaya and southeastern Asia is to inoculate the boiled cereals with the starter and then the main fermentation takes place in solid state, not in water. The process in making the non-salted fermented soybean and the alcoholic beverages can be understood to be a similar one. So they must have originated from the similar culture complex."

Note: This is the earliest document seen (Dec. 2001) concerning "Soeda" of Bhutan, or "Pe-Boutsu" of Burma, both non-salted fermented soyfoods. Address: Professor Emeritus, Osaka Prefectural University.

2257. Soewito, Agustina. 1986. The cooking of tempe–Indonesia. In: Kô Aida, et al. eds. 1986. Proceedings of the Asian Symposium on Non-Salted Soybean Fermentation. Japan: Takeshima Shigeru. 319 p. See p. 270-73. Held July 1985 at Tsukuba, Japan. [4 ref. Eng]
• ***Summary:*** Discusses and classifies ways tempeh is used in Indonesian cookery: Fried tempeh as a snack or side dish, Tempeh soups, Stewed Tempeh, Tempeh Barbecue, and Sambel. Gives a recipe for Sambal Goreng Tempe. Address: Indonesian Embassy.

2258. Steinkraus, K.H. 1986. Manufacture of tempe–Tradition and modern. In: Kô Aida, et al. eds. 1986. Proceedings of the Asian Symposium on Non-Salted Soybean Fermentation. Japan: Takeshima Shigeru. 319 p. See p. 9-19. Held July 1985 at Tsukuba, Japan. [14 ref]
• ***Summary:*** Largely a summary of existing literature. Address: Prof. of Microbiology, Inst. of Food Science, Cornell Univ., Geneva, New York 14456.

2259. Suwana-adth, Malee; Daengsubha, Wanchern; Suyanandana, Puangpen. 1986. The microbiology of Thua-nao in Thailand. In: Kô Aida, et al. eds. 1986. Proceedings of the Asian Symposium on Non-Salted Soybean Fermentation. Japan: Takeshima Shigeru. 319 p. See p. 31-38. Held July 1985 at Tsukuba, Japan. [8 ref]
• ***Summary:*** Describes the traditional production method, microbiology of natural fermentation, keeping quality of thua-nao, chemical composition and nutritional value. Address: 1. National Center for Genetic Engineering and Biotechnology; 2-3. Thailand Inst. of Scientific and Technological Research, Bangkok.

2260. Tanuwidjaja, Lindajati. 1986. Large scale tempe inoculum production. In: Kô Aida, et al. eds. 1986. Proceedings of the Asian Symposium on Non-Salted Soybean Fermentation. Japan: Takeshima Shigeru. 319 p.

See p. 305-09. Poster session. Held July 1985 at Tsukuba, Japan. English summary in Conference Abstracts. [7 ref. Eng]

• ***Summary:*** Contents: Abstract. Introduction. Methods and materials: Microorganism, substrate, starter preparation, inoculum production, viable microorganism ("The viable mold propagule and bacterial count were determined by plate count method"), analysis. Results and discussion.

Making a large quantity of starter / inoculum accelerated mold growth and minimised contamination. Varying the pH of the starter from 3.0 to 6.0 had no effect on the quality of starter produced. To dry the starter down to 10% moisture took 15 hours at either 40ºC or 50ºC.

Tables show: (1) Total mold propagules and total bacterial count in the inoculum. (2) Growth of *Rhizopus oligosporus* LKN M3 on rice substrate. (3) Mold contamination during tempe inoculum production.

Figures show: (1) Effect of drying temperature (40ºC or 50ºC) on the moisture of the inoculum. (1) Effect of drying temperature (40ºC or 50ºC) on the drying rate of the inoculum. Address: National Inst. for Chemistry, Indonesian Inst. of Sciences, Bandung, Indonesia.

2261. Ueda, Seinosuke. 1986. Nattô-kin no "purasumido" kaiseki [Analysis of natto bacillus plasmids]. In: Kô Aida, et al. eds. 1986. Proceedings of the Asian Symposium on Non-Salted Soybean Fermentation. Japan: Takeshima Shigeru. 319 p. See p. 81-91. Held July 1985 at Tsukuba, Japan. English-language summary in Symposium Abstracts. p. 55. [Jap]

• ***Summary:*** "The unique feature of Japanese natto, a traditional fermented food, is the formation of mucous materials by the Bacillus, namely levan-like polysaccharides and gamma-polyglutamic acid, the latter being the chemical principle of mucous appearance of natto. It was discovered that the gene that is responsible for the formation of gamma-polyglutamic acid can be transferred into *Bacillus subtilis* Marburg strains that are incapable of forming gamma-polyglutamic acid, by means of genetic transformation technique at high frequencies...

"The isolation of this small plasmid from more than ten starter strains of natto *Bacillus* was conducted in order to assess the homology of the plasmid isolation... In order to look further into the function of the small plasmid of natto *Bacilli,* many spore-forming aerobic rods that are recognized as natto *Bacillus*-like microorganisms were isolated from Japanese natto-like fermented soybean foods that are popular in the daily diet of East Asia, namely Chinese To-chi, Nepalese Kinema and Thai Thua-nao, and plasmids of each isolate were compared. Every isolate tested contained small plasmids of 5.7-9.6 kb [kilobase molecular weight] all of which demonstrated quite a high degree of homology with natto *Bacilli* plasmid pUHl of 5.7 kb, which codes gamma-glutamyl transpeptidase gene controlling the formation of gamma-polyglutamic acid.

"The comparative studies on these plasmids derived from natto *Bacilli* and *Bacilli* from natto-like fermented foods of East Asia may reveal the origin and evolution of natto *Bacillus* plasmid and may ultimately clarify the history of dissemination of such fermentation technologies." Address: Kumamoto Kogyo Daigaku [Kyushu Univ.].

2262. Winarno, F.G. 1986. Tempe making on various substrates–including unconventional legumes. In: Kô Aida, et al. eds. 1986. Proceedings of the Asian Symposium on Non-Salted Soybean Fermentation. Japan: Takeshima Shigeru. 319 p. See p. 125-43. Held July 1985 at Tsukuba, Japan. [42 ref]

• ***Summary:*** Discusses tempeh made from soybeans, winged beans, *Mucuna puriens* [velvet beans], *Canavalia ensiformis* [jack bean], *Leucaena,* sweet lupine, yellow peas, broad beans, cowpeas, horse beans, chickpeas. From bean fractions: okara, mungbean starch. From cereals: wheat, barley. And mixtures of the above. Also discusses oncom (onchom) and *usar* (traditional inoculum). There is a discussion in Japanese at the end. Address: Director, Food Technology Development Center–IPB, P.O. Box 61, Bogor, Indonesia.

2263. Yoshida, Shuji. 1986. Minzokugaku kara mita muen hakkô daizu to sono shûhen [The origin of non-salted fermented soybeans from the viewpoint of ethnology]. In: Kô Aida, et al. eds. 1986. Proceedings of the Asian Symposium on Non-Salted Soybean Fermentation. Japan: Takeshima Shigeru. 319 p. See p. 166-78. Held July 1985 at Tsukuba, Japan. English-language summary in Symposium Abstracts, p. 62-62. [20 ref. Jap]

• ***Summary:*** "Two of the earliest kinds of fermented soybeans were *shì* and *dòu-jiàng.* The former antedates the latter, because *shì* can be traced to the Han Dynasty (206 BC-A.D. 200), whereas *dòu-jiàng* does not emerge until the description in *Qimin Yaoshu* (A.D. 536-550). Good descriptions of *shì* and *dòu-jiàng* are given in *Qimin Yaoshu. Shì* is made as follows: A yellow mold is permitted to grow on boiled beans, which are then washed and wetted, after which they are fermented in a cellar for 10-12 days. *Shì* was eaten as a condiment.

"However, *shì* as a food would have appeared prior to *shì* as a condiment. *Sake* which was made from grain through mold fermentation, was originally not for drinking, but rather for eating. Such a primitive *Sake* is still used in Yúnnán. I suppose that a primitive *shì* also was eaten, and that the place of origin of *shì* was South China, according to the description in *Bencao Gangmu (shì* was commonly made in South China), and *Bówùzhì (shì* was exotic).

*"Dòu-jiàng,* which may have been first mentioned in *Bencao Gangmu* (1596), was a simple mold bean and was

technologically more primitive than *shì,* although the existence of *dòu-jiàng* or a similar substance cannot be traced in the literature before *Qimin Yaoshu.* It seems that the first product of fermented beans would be *dòu-jiàng,* or a similar substance, and that its making would have been influenced by *sake* production. Later, *shì* as a food would have appeared and then *shì* as a condiment was produced, as we see from the *Qimin Yaoshu.*

"On the other hand, *dòu-jiàng* was developed from *ròu-jiáng,* preserved meat... *Natto, kinema* and *tempeh* would be identified as a substance similar to *dòu-jiàng,* which was a primitive fermented soybean product. Boiled beans became *dòu-jiàng* if they were covered by *Imperata cylindrica* grass, *kinema* if covered by certain leaves, *tempeh* if covered by leaves of *Hibiscus tiliaceus* or banana leaves, and *natto* if covered by ricestraw.

"We know that various kinds of plants are used for making *sake* or mold bran. The species used varies by place. Fermented soybeans occur within the *sake*-making area and only at the margin of the distribution. That means several new fermented soybean products like *shì* and *dòu-jiàng* were made in the center of the fermented soybean distribution, and the area gradually expanded toward the margins. They were accepted in areas close to the center, but the most primitive forms would have remained only in the marginal places, where new ones were not accepted."

A large chart (p. 169) shows the relatives and development of soy nuggets *(shi);* it includes the names of various unsalted fermented soyfoods and soy condiments (with their geographical area in parentheses). Relatives (fermented soyfoods made from yellow soybeans): Akuni (Sema Naga, in the Himalayas in northeast India), kinema (Limbu, in eastern Nepal), pe-bout (Shan, in eastern Burma), itohiki natto (Japan), and tempeh (Indonesia). Stage 1. Itohiki natto became Chon Kujjiang [perhaps *chungkuk jang,* Korean-style natto] of the Zhanguo Warring States period (475-221 BC) in China. Stage 2A: Unsalted soy nuggets were originally used as a food, rather than as a seasoning. To these unsalted soy nuggets, koji was added to create homemade unsalted soy nuggets *(doushi,* of China), Stage 2B: Salt was added to the unsalted soy nuggets to make various salted foods (each with a firm texture like raisins): Daitokuji natto (Japan; with wheat flour added), *pe-ngapi* (upper Burma), and *seang* (Cambodia). Stage 3. Unsalted soy nuggets *(doushi)* developed into closely related danshi. Koji was added to danshi to make *rul-kre* (of Bhutan). Cooked soybeans were shaped into balls and fermented naturally to make miso-dama ("unsalted miso balls" [meju], Korea and Japan). Then salt was added to the miso-dama to make various seasonings (each with a consistency like applesauce or paste / miso): Korean soybean jang *(doen jang),* Korean soy sauce *(kan jang),* or soybean miso *(mamé miso,* Hatcho miso, Japan). Stage 4. Salt was added to unsalted soy nuggets *(shi)* to make salted soy nuggets, from which developed inyu (a fermented soy sauce made with black soy beans, in Taiwan), *inshi* (meaning unclear, of Taiwan), and taucho *(tauco,* of Indonesia). Stage 5. Koji was added to salted soy nuggets to make *shi* for food use, and *doushi* (of Sichuan, China). Stage 6. Flour was added to salted soy nuggets to make red pepper jang *(kochu jang,* Korea) and spicy soy nuggets *(doubanshi,* China).

Note: This chart may be easier to understand when viewed in chart form, however the logic and some of the products seem a bit unclear. It is also unclear which products are fermented with bacteria (like natto). Soyfoods Center has an English-language translation of this chart. Address: National Museum of Ethnology, Osaka (Kokuritsu Minzokugaku Hakubutsukan).

2264. Yuan, Gwo-Fang; Jong, Shung-Chang. 1986. The new species *Rhizopus azygosporus* for manufacture of tempeh. In: Kô Aida, et al. eds. 1986. Proceedings of the Asian Symposium on Non-Salted Soybean Fermentation. Japan: Takeshima Shigeru. 319 p. See p. 311. Poster session. Held July 1985 at Tsukuba, Japan. Originally published in 1984 in Mycotaxon 20:397-400. [1 ref]

• ***Summary:*** ATCC 48018 is characterized by the abundance of azygospores, while zygospores are wholly lacking. It was originally isolated by J.N. Hedger in Bogor, Java, Indonesia in 1976 from tempeh. It is the first obligate azygosporus strain found in the genus *Rhizopus.* Address: Mycology Dep., America Type Culture Collection, Rockland, Maryland.

2265. Zakaria, Fransiska; Muchtadi, Tien Ruspriatin. 1986. The role of tofu processing in development and the alleviation of malnutrition in West Java. *Food and Nutrition Bulletin (United Nations Univ.)* 8(4):32-41. Dec. [16 ref]

• ***Summary:*** The contribution of tofu to the diet, especially of low-income families in West Java, is reviewed. Suggestions are made for technological improvements (sanitation, production efficiency, yield, and diversification of soy-cake [tofu] utilization, chiefly as a food supplement).

"In West Java, as is common in Indonesia, people first buy rice as their staple food. If they have money left, they then buy other foods. Those that are generally chosen, in order of price from the cheapest to the most costly, are salted fish, tofu and fermented soybean products such as tempe and oncom, vegetables, fresh fish and other seafoods, poultry, milk and milk products, and meat and meat products." In West Java, people with an income of less than $40/month consumed 20 gm/person/day of tofu; the amount increased to 50 gm for those earning $100-$200/month, but was about 45 gm for those earning $300-$400/month. In West Java, tofu contains an average of 10.45% protein, compared with 17.0% for tempeh. Tofu and tempeh contribute 53% of the protein from side dishes in the diet of

West Javanese people with incomes of less than $40/month, and 44% of the side dish protein for those with incomes of $100-$200/month. Address: Food Technology & Development Center (FTDC), Agricultural Univ., Bogor, Indonesia.

2266. Egounlety, M. 1986. Study of ogi supplemented with tempeh. Nutrition Research and Development Center, Ministry of Health, Indonesia. (Internal Report). *

2267. Hayford, A.E. 1986. Production and evaluation of cowpea tempe powder. Nutrition Research and Development Center, Ministry of Health, Indonesia. (Internal Report). *

2268. Kim, C.T. 1986. Preliminary studies on fermented sorghum and soyabeans for the development of a tempeh-based fabricated food. Nutrition Research and Development Center, Ministry of Health, Indonesia. (Internal Report). *

2269. Kuboye, Adunola O. 1986. The nutritive value of maize-soy tempe. Nutrition Research and Development Center, Ministry of Health, Indonesia. (Internal Report). *

2270. Matsuhashi, T. eds. 1986. Improvement of community level food processing: The development of 'kori-tofu,' a frozen and dried soybean curd in Japan. In: Jan Bay-Petersen and Norma V. Llemit, eds. 1986. Food Processing by Rural Families: Proceedings of the Seminar on Food Processing by Rural Families, 20-22 May 1985, PCARRD, Los Banos, Laguna, Philippines. Laguna: Philippine Agriculture and Resources Research Foundation, Inc. vi + 242 p. See p. 187-204. [24 ref]*
• ***Summary:*** The co-publisher was the Food & Fertilizer Technology Center for the Asian & Pacific Region, China.

2271. Pengembangan produksi kedelai [The development of soybean production]. 1986. Jakarta: Direktorat Bina Produksi Tanaman Pangan, BPTP (Research Institute for Food Crops). 152 p. [Ind]*

2272. Pramual, Setarat. 1986. Soybean production status in Thailand. In: Proceedings of the Asian Seminar on Soybean Production for Local Utilization. Dept. of Agric. Extension, Bangkok, Thailand. *

2273. **Product Name:** Yeo's (Soy Beverage).
**Manufacturer's Name:** PT Salim Graha Food & Beverage Industry. Affiliate of Yeo Hiap Seng, Singapore.
**Manufacturer's Address:** Jalan Raya Bekasi, Jawa Barat (West Java), Indonesia.
**Date of Introduction:** 1986.
**New Product–Documentation:** Soya Bluebook. 1986. p. 103. Soya Bluebook Plus. 1997. p. 150. PT Salim Graha, a maker of soy beverages, is located at Jalan Raya Bekasi, Km. 27, Pondok Ungu, P.O. Box 140 Bekasi, Bekasi 17132, West Java, Indonesia. Phone: +62 21 511258. Fax: 21 971929. Contact: Ario Mahendra, Marketing Director.

2274. Ravelomanana, Rahariosa. 1986. Essai d'amélioration de la valeur nutritionelle d'un regime à base de manioc par la technique du tempe-mixte: tempe manioc-soja [Attempt to improve the nutritional value of a diet based on manioc/cassava by the technique of mixed tempeh: manioc-soy tempeh]. Nutrition Research and Development Center, Ministry of Health, Indonesia. (Internal Report). [Fre]*

2275. Sebayang, K. 1986. Kebijaksanaan pemerintah dalam peningkatan produksi jagung dan kedelai [Government policy to increase production of maize and soybeans]. Universitas Gadjah Mada. Unpublished manuscript. [Ind]*

2276. Soegijatni, S.; et al. 1986. Evaluasi seleksi massa jagung komposit pada pertanaman monokultur dan tumpangsari dengan kedelai [An evaluation of two mass selection methods on maize composite planted in monoculture and intercropped with soybean]. *Penelitian Palawija* 1(2):87-95. [Ind]*

2277. Soegito, J.S.; Siemonsma, -; Sutrisno, -; Kuntyastuti, H. 1986. Soybean on-farm yield trials in Pasuruan. *Penelitian Palawija (Research on Secondary, Non-Rice Crops, Malang)* 1(1):16-25. *
• ***Summary:*** Note this new Indonesian journal.

2278. Soybean Yield Gap Analysis Project. 1986. Semi-annual report of soybean yield gap analysis project: Science and technology development. SYGAP, Indonesia. *

2279. Widowati, S.; Damardjati, D.S. 1986. Evaluasi mutu tempe gude dan kedelai dalam beberapa formula campuran [Evaluation of the quality of pigeon pea and soybean tempeh in several mixed formulas]. In: Seminar Hasil Penelitian Tanaman Pangan, Bogor. Vol. 1. Palawija. See p. 126-29. [Ind]*
Address: Indonesia.

2280. **Product Name:** Yeo's Soy Beverage.
**Manufacturer's Name:** Yeo Hiap Seng (Malaysia) Bhd. Affiliate of Yeo Hiap Seng, Petaling Jaya.
**Manufacturer's Address:** Pandan, Johor Bahru, P.O. Box 115, Johor Bahru, Malaysia.
**Date of Introduction:** 1986.
**New Product–Documentation:** Soya Bluebook. 1986. p. 103.

2281. **Product Name:** Yeo's Soy Beverage.

**Manufacturer's Name:** Yeo Hiap Seng (Sarawak) Sdn. Bhd. Affiliate of Yeo Hiap Seng, Petaling Jaya.
**Manufacturer's Address:** P.O. Box 238, Kuching, Sarawak, Malaysia.
**Date of Introduction:** 1986.
**New Product–Documentation:** Soya Bluebook. 1986. p. 103.

2282. Al-Jibouri, H.A. 1986. The FAO soybean development programme. In: S. Shanmugasundaram and E.W. Sulzberger, eds. 1986. Soybean in Tropical and Subtropical Cropping Systems. Shanhua, Taiwan: Asian Vegetable Research and Development Center. xv + 471 p. See p. 439-40.

• ***Summary:*** Country Projects: "Soybean (Glycine max) is being introduced and tested in hundreds of FAO field projects in Africa, Asia, Europe, and Latin America. Under the auspices of the United Nations Development Programme (UNDP), and recently under FAO's Technical Cooperation Programme (TCP), the organization has assisted member governments in the form of small-, medium-, and large-scale projects."

Consultancies: "Under FAO's "Regular Program," short-term consultancies have been commissioned to resolve technical problems, develop programs, and appraise the potential of and/or formulate suitable projects for soybean production and improvement."

Networks and Projects: "One of FAO's objectives is to promote regional and sub-regional cooperation on soybean research."

"In 1976 FAO established a European cooperative soybean network in which 14 countries now voluntarily exchange information and data."

"A regional project entitled 'Technical Cooperation Among Developing Countries for Research and Development of Food Legumes in the Tropics and Suptropics of Asia' is underway. Soybean is one of its mandate crops."

Seed Exchange: "Soybean cultivars obtained from a variety of sources are distributed to research technicians through the FAO Seed Exchange Laboratory. In 1983, 4,424 samples were distributed in 14 countries."

Training: "Another FAO objective is to train agronomists and extension workers."

Workshops: FAO workshops promote regional cooperation... FAO collaborated with INTSOY in organizing workshops for soybean breeders and agronomists in Latin America (1983) and in Asia (1984).

Meetings: "FAO has collaborated with INTSOY and USAID in organizing two international conferences. One was held in Egypt in 1979 on the subject of irrigated soybean production in arid and semi-arid regions; the other was held in Sri Lanka in 1981 and focused on soybean seed quality and stand establishment.

"Information: The collection and dissemination of information concerning new developments in crop production and improvement is one part of FAO's central assistance role. This function is carried out through the preparation of technical publications, reports, and other information materials. Some of the most recent publications and reports on soybean include: Soybean Production in the Tropics, 1982; Potential for Soybean Production in the Sudan, 1982; Soybean Production Development in Vietnam, 1982; Soybean Development in Mozambique, 1982; and Soybean Breeding for Selected Tropical Asian Countries (Indonesia, Malaysia, Philippines, Thailand), 1979." Address: Plant Production and Protection Div., FAO of the UN, Via delle Terme di Caracalla, Rome 00100, Italy.

2283. Ang, H.G.; Kwik, W.L.; Lee, C.K.; Theng, C.Y. 1986. Ultrafiltration studies of foods. I. The removal of undesirable components in soymilk and the effects on the quality of the spray-dried powder. *Food Chemistry* 20(3):183-99. [25 ref]

• ***Summary:*** Ultrafiltration (UF) can be used to remove low molecular weight antinutritional factors, especially the oligosaccharides, raffinose and stachyose (which cause flatulence), and phytic acid. Using a membrane with a 20,000 molecular weight cut-off, at 60% water removal, greater than 80% of each oligosaccharide was removed, but only 50% of the phytic acid (perhaps because phytic acid exists as phytates or is associated with native protein, and thus complete or near complete removal would be difficult to achieve even using multiple stage UF). 50% of the acid was detected in the soybean soak water. Thus the actual amount of phytic acid present in the soymilk was about 1/3 that originally present in the soybean.

In spray drying the UP soymilk concentrates, the nitrogen solubility index (NSI) of the spray dried powder improved with the percentage of water removed during UF, and also with the addition of sucrose to the concentrate before spray drying. There was hardly any detectable difference in taste and flavor. Address: Chemistry Dep., National Univ. of Singapore, Kent Ridge, Singapore 0511.

2284. Arifin, Sultoni. 1986. The economics of soybean in Indonesia. In: S. Shanmugasundaram and E.W. Sulzberger, eds. 1986. Soybean in Tropical and Subtropical Cropping Systems. Shanhua, Taiwan: Asian Vegetable Research and Development Center. xv + 471 p. See p. 403-08. [1 ref]

• ***Summary:*** From 1968 to 1979 soybean consumption in Indonesia has increased from 365,000 tonnes (3.2 kg/year/capita supplying 3.4 gm/day of protein) to 770,000 tonnes (5.3 kg/year/capita supplying 5.2 gm/day of protein).

"The area planted to soybean and selected major food crops in Indonesia are compared in Table 1. Since 1955, rice production has increased significantly because of

government policies aimed at self-sufficiency. There has also been a small but steady rise in soybean and peanut..."

Production and yield figures for soybeans from 1969 to 1981 are presented in Table 2. Production has grown from 388,900 tonnes in 1969 to 687,200 tonnes in 1981, while yield has grown from 0.70 tonnes/ha to 0.85 tonnes/ha during the same period. "Although average yields per hectare have increased, production levels are still quite low because of poor crop management practices and the absence of high yielding, disease resistant cultivars.

"In the early 1970s more than 80% of Indonesia's soybean was grown in Java, and more than half of that amount was grown in East Java... Annual production increased by 75,000 tonnes between the first and second five-year plan periods and by 66,000 tonnes between the second and third. In general, production grew more rapidly in areas outside of Java." Address: Agricultural Economist, Bogor Research Inst. for Food Crops, Bogor, Indonesia.

2285. Carangal, Virgilio R. 1986. Soybean in rice-based farming systems: The IRRI experience. In: S. Shanmugasundaram and E.W. Sulzberger, eds. 1986. Soybean in Tropical and Subtropical Cropping Systems. Shanhua, Taiwan: Asian Vegetable Research and Development Center. xv + 471 p. See p. 25-36. [8 ref]

• ***Summary:*** "Soybean is one of several upland crops that can be grown after rice... China, Indonesia. Thailand, and India each grow large areas of soybean after one or two rice crops."

"In the early 1970s IRRI began to study rice intercropping with soybean and corn...With an expansion of the program in 1974, the potential of soybean as an upland crop after puddled rice was also researched. Present studies concentrate on the identification of better soybean cultivars, optimum plant populations, inoculation and fertilization practices, establishment techniques after rice, intercropping, and drought and water-logging tolerance." Address: Head, Rice Farming Systems Program; Network Coordinator, Asian Farming Systems Network, International Rice Research Inst., Los Baños, Laguna, Philippines.

2286. *CGPRT.* 1986. Socio-economic research on food legumes and coarse grains: Methodological issues. No. 4. ix + 255 p. [50+ ref]

• ***Summary:*** Based on a workshop "Towards recommendations for research, policy and extension: Methodological issues in socio-economic analysis of food legumes and coarse grains," Held 18-23 Nov. 1985 in Bandung, Indonesia. Forty-seven researchers and policy makers from various Asian countries participated in the workshop. Address: Indonesia.

2287. Chang, Kwang-chih. 1986. The archaeology of ancient China. 4th ed. New Haven, Connecticut, and London: Yale University Press. xxv + 450 p. See p. 362. Illust. Index. 25 x 22 cm. [ soy ref]

• ***Summary:*** In Chapter 6, "The First Civilizations: The Three Dynasties," is a section titled "The rise of the Three Dynasties and their common characteristics." The three dynasties are Hsia (perhaps Erh-li-t'ou), Shang, and Chou, which existed from about 2000 B.C. to 207 B.C. The archaeological record shows that all three shared a number of common characteristics in both material culture and cultural processes. A map (p. 367) shows they were located in the area with the greatest distribution of copper and tin mines in ancient China; bronze is an alloy of copper and tin.

The author reviews the archaeological evidence and summarizes the shared characteristics. The people of all three civilizations were farmers of the millets: Foxtail millet *(Setaria italica)* and panic [broomcorn] millet *(Panicum miliaceum).* They used bone, stone, and shell hoes and sickles, and mortars and pestles. "We know that the Shang and Chou also planted soybeans, wheat, and some rice, but this we know only from inscriptions and texts, which are unavailable for Erh-li-t'ou."

Note: In other words, soybeans have not been found in archaeological sites in early China.

The soybean is also mentioned in a table titled "Principal cultivated plants of China" (p. 80), based on H.L. Li (1966). It states that the soybean *(Glycine max)* is the principal legume of north China and that red beans [azuki] *(Phaseolus angularis)* are the main legume of south China / Southeast Asia. The two main cereals of north China are broomcorn millet *(Panicum miliaceum)* and foxtail millet *(Setaria italica),* while rice and Job's tears *(Coix lacryma-jobi)* are the two main cereals of south China / Southeast Asia.

For an excellent history of "Modern and contemporary archaeology" in China, see p. 12-21. The modern period began after the revolution of 1911, and many important discoveries were made during the 1920s. "The Geological Survey of China, established in Peking in 1916, was the principal early instrument of the Western science of field work. The Western scientists working under it who exerted the strongest influence on China: A.W. Grabau (American), J.G. Andersson (Swedish), Davidson Black (Canadian), J.F. Weidenreich (German), and Pierre Teilhard de Chardin (French). Of these people, Andersson (fig. 5) undoubtedly exerted the strongest influence on Chinese archaeology (p. 13-14). He wrote: '1921 was a red-letter year: the Neolithic dwelling site at Yang Shao Ts'un, the Eocene mammals on the Yellow River, the Shao Kuo T'un cave deposit in Fengtien and the still more remarkable cave discovery at Chou K'ou Tien, which became world famous by the work of those who followed after us'" (p. 14). Address: Prof. of Anthropology, Yale Univ., New Haven, Connecticut.

2288. Committee for Soybean (The). 1986. The Philippines recommends for soybeans. Los Baños, Laguna, Philippines: Philippine Council for Agriculture and Resources Research and Development. 111 p. Technical Bulletin Series No. 14A. Revision of 1976 edition. [51 ref. Eng]

• ***Summary:*** Written by The Soybean Committee (Dr. Florendo C. Quebral, a plant pathologist at UPLB, chairman), this work focuses on recent technologies for soybean production. A foreword by Ramon V. Valmayor, Executive Director of PCARRD, notes: "The importance of soybean has been stressed continuously. To encourage its widespread production, the Ministry of Agriculture and Food (MAF) launched the Soybean Production Program in Mindanao. Likewise, PCARRD initiated and coordinated the implementation of Soybean Pilot Production Project in 1983 to demonstrate the feasibility of growing soybean profitably in Luzon."

Contents: Foreword. Acknowledgments. The Soybean Committee. Introduction. Production management. Marketing. Soybean cropping system. Crop protection. Seed production. Processing and utilization: Raw materials for industry, soybean as food. References. Appendixes. List of tables. Lists of figures.

Table 1 shows soybean production in the Philippines from 1974 to 1985. Area in hectares grew from 2,780 ha in 1974 to a peak of 11,250 ha in 1976 and was 8,479 ha in 1985. Production grew from 2,214 tonnes in 1974 to a peak of 11,466 tonnes in 1982 and was 8,430 tonnes in 1985. Yield grew from 0.80 tonnes/ha in 1974 to a peak of 1.05 in 1982 and was 0.99 in 1985. Local production does not begin to supply local demand. In 1984 380,691 tonnes of soybeans and products were imported. Most of the imports were soybean meal.

Table 2 shows imports and exports of tausi (salted, fermented soybeans), oil cake (huge imports), soy sauce (large exports), soy oil (refined; large imports), soybean paste, taho (soymilk curds, often sold topped with a little brown sugar), bean cheese (tokwa [tofu]), hypoallergenic soy food, crude soy oil. Page 50 shows all current uses of soybeans in the Philippines, and p. 51 gives the nutritional composition of Philippine soyfoods. Note the terms Geerligs cheese (Tahu; 92.7% moisture and 2.9% protein), Soybean curd (Tahuri; 61.3% moisture and 11.4% protein), Fermented soybean cheese (Tausi; 51.5% moisture and 13.8% protein), and Soybean cheese (Tokwa; 77.0% moisture and 12.9% protein).

Recipes are given for preparing soy sauce, miso, tahu (soymilk curds), tokwa (soybean cheese, or firm tofu), tao-si (salted, fermented soybeans), soybean milk, and soybean coffee. Descriptions are given for sufu, tempeh, soy flour and grits, soy protein concentrates and isolates.

Note: In the section on nutritional composition, two words are incorrectly defined. The term "Tahuri" actually refers to tofu in brine, and "tausi" refers to salted, fermented soybeans. Address: PCARR.

2289. Dashiell, K.E.; Keuneman, E.A.; Root, W.R.; Singh, S.R. 1986. Breeding tropical seed for superior seed longevity and for nodulation with indigenous rhizobia. In: S. Shanmugasundaram and E.W. Sulzberger, eds. 1986. Soybean in Tropical and Subtropical Cropping Systems. Shanhua, Taiwan: Asian Vegetable Research and Development Center. xv + 471 p. See p. 133-39. [7 ref]

• ***Summary:*** "In the early 1970s experimental soybean plots at IITA often suffered from poor seedling emergence. Subsequent research revealed that poor stand establishment was primarily due to reductions in seed viability that take place during storage." Research showed that the rate of decline in seed viability varied directly with seed moisture content; the higher the moisture, the shorter the viability. Seed-borne fungi played only a minor role in seed deterioration during storage. The Indonesian lines with excellent seed longevity proved to have poor agronomic characteristics. "In 1978 attempts were made to identify soybean lines that form effective symbiotic relationships with indigenous West African rhizobia. About 400 lines of diverse origin were evaluated for their ability to nodulate at six locations. Eight lines were found to be highly 'promiscuous', i.e. they formed an effective symbiosis with rhizobia native to all six sites." However all of these promiscuous lines proved to have poor agronomic characters, so in 1978 crosses were made to incorporate promiscuous genes into high yielding cultivars. Address: International Inst. of Tropical Agriculture, PMB 5320, Ibadan, Nigeria.

2290. Dauphin, Francois. 1986. Indonesia: Methodology of the Soybean Yield Gap Analysis Project (SYGAP). *CGPRT* No. 4. p. 181-84.

• ***Summary:*** "Soybean is an important traditional food in Indonesia, particularly in Java. Possibly because of the rising income of large segments of the population, the demand for soybean is increasing; however, production is stagnating. In response to the growing concern of the government in view of the rapidly increasing soybean imports, the CGPRT Centre has initiated a research project in collaboration with three Indonesian research institutes, CAER [Center for Agro-Economic Research], BORIF [Bogor Research for Food Crops] and MARIF [Malang Research Institute for Food Crops], and with CIRAD *[Centre de Cooperation International en Recherche Agronomique]* a French research Institute. Financial support was obtained from EEC for a two-year research and development project on soybean. The goal of the project is to investigate reasons for the low productivity of soybean in Java and to propose techniques or policies which could facilitate an increase in production.

"The potential for an extension of the soybean area in Java appears to be small, but a large yield gap exists between researchers' and farmers' levels, indicating a large potential for yield increase." Another concern is to understand the yield differences between different farmers and different farms. Address: Senior agronomist, ESCAP/ CGPRT Centre, Bogor, Indonesia.

2291. Dauphin, F.; Sumarno, -. 1986. Investigation on constraints of soybean productivity: Contribution to ESCAP Seminar, Bogor 5-6 December 1986. Bogor, Indonesia: CGPRT Centre. 100 p. *

2292. Dechates, Supote; Kulamongkon, Pinit. 1986. Thailand: Methodological aspects in the analysis of constraints to soybean production. *CGPRT* No. 4. p. 226-30. • ***Summary:*** The soybean is an important economic crop in Thailand. Although it constitutes only a small of national agricultural output, soybean affects Thailand's foreign exchange position.

The Thai government is concerned about the growing level of soybean imports and would like to see domestic production expanded to meet the demand. Because of limited available land, the government prefers to yield increases to expansion of area. Soybeans can be grown in two parts of Thailand: rain-fed or irrigated. In rain-fed areas, farmers usually plant soybeans as a major crop during the early rainy season, that is in May and June, and harvest the crop in August and September. "In the late rainy season, farmers grow soybean in the same plots of land from August to October after the early rainy season crop has been harvested, and the harvesting of the late rainy season crops takes place during November and January. The crops in the irrigated areas are usually grown in the paddy fields after the rice has been harvested, that is, December and January, and harvesting is done during March and April."

2293. Dutt, A.K. 1986. Soybean in rice-fallows in the Sunderbans [West Bengal, India]. In: S. Shanmugasundaram and E.W. Sulzberger, eds. 1986. Soybean in Tropical and Subtropical Cropping Systems. Shanhua, Taiwan: Asian Vegetable Research and Development Center. xv + 471 p. See p. 435-38. [5 ref]
• ***Summary:*** "Indian soybean research began in 1967 under the auspices of the all India Co-ordinated Research Project on Soybean at Pantnagar Agricultural University. The Project now has five main centers and 12 sub-centers covering different agro-climatic regions."

"Soybean processing factories have stimulated production throughout Madhya Pradesh."

"More than 80% of the defatted soymeal produced in India is exported to Southeast Asia, the Middle East, or Europe. The remainder is used by local industry, primarily for food processing. In 1980-81, the export value of defatted Indian soybean meal was more than US $35 million.

"In the Tarai region of Uttar Pradesh, at the foothills of the Himalayas, many rice growers are switching to soybean because of the crop's lower input requirements and the absence of yellow mosaic virus, one of India's most serious soybean diseases. Several soybean-based food products are being sold in India. However their market price is beyond the reach of the urban and rural poor."

"The target for soybean hectarage during the Sixth (national) Plan Period, which ends in 1986, is 2.5 million ha. Of this figure, 1,032,000 ha are targeted for the United Provinces and Madhya Pradesh." Address: Farming, Plantations, and Agro-chemicals Formulations Consultants, P-16, Darga Road, Calcutta 700017, India.

2294. Gandjar, Indrawati. 1986. Soybean fermentation and other tempe products in Indonesia. *Mycologia Memoir* No. 11. p. 55-66. Chap. 4. (C.W. Hesseltine and Hwa L. Wang, eds. Indigenous Fermented Food of Non-Western Origin. Berlin & Stuttgart: J. Cramer.) Previously published in 1981 in USDA Miscellaneous Publication FL-MS-333. [14 ref]
• ***Summary:*** Contents: Introduction. Kecap (Indonesian soy sauce). Taoco (Indonesian chiang, a yellowish-brown porridge that is very popular in Western Java). Soybean tempe *(tempe kedelai).* Tempe gembus (okara tempe). Non-soybean tempe–made from velvet beans *(tempe benguk),* jack beans *(tempe koro pedang),* winged bean *(tempe kecipir),* pigeon pea *(tempe gude),* wild tamarind *(tempe lamtoro),* peanut presscake *(tempe bungkil kacang),* and coconut presscake *(tempe bongkrek).*

"Tempe is an important source of protein in the Indonesian diet. At present the intake of soybean tempe per person per day is within the range of 40 to 50 g while the recommendation is 100 g per person per day... The awareness of the people that soybean tempe is nutritious results in a higher demand of this product. In the city of Jakarta, about 6000 tonnes of soybeans are processed monthly; 2500 tonnes for soybean tempe [tempeh], and 3500 tonnes for tahu [tofu]."

Table VI shows the nutritional composition of some leguminous seeds and tempe products. Table VII shows the amino acid content of the seeds and the tempeh of 4 non-soybean legumes. Address: Dep. of Biology, Faculty of Mathematics and Natural Sciences, Univ. of Indonesia, Jakarta, Indonesia.

2295. Guinness, Patrick. 1986. Harmony and hierarchy in a Javanese kampung. Singapore, New York: Oxford University Press. xvii + 191 p. Illust. Map. Index. 22 cm. *
• ***Summary:*** "... *(tahu kuning)* proved popular among neighbours and she began to leave her products with streetside shops for sale" (p. 54). When this too proved

successful Wahyono left his job in 1978 to concentrate on marketing his wife's cooking.

2296. Hesseltine, C.W.; Wang, H.L. 1986. Indigenous fermented foods of non-Western origin. *Mycologia Memoir* No. 11. 351 p. Berlin and Stuttgart: J. Cramer. Published for the New York Botanical Garden in Collaboration with The Mycological Society of America. Illust. Index. 24 cm.
• ***Summary:*** Contains 18 chapters by various authors. Each chapter that mentions soy is cited separately. Address: NRRC, Peoria, Illinois.

2297. Hesseltine, C.W. 1986. Microorganisms involved in food fermentations in tropical Asia. In: Susono Saono and F.G. Winarno, eds. 1986. Proceedings of International Symposium on Microbiological Aspects of Food Storage, Processing and Fermentation in Tropical Asia. x + 344 p. See p. 189-204. Held 10-13 Dec. 1979 at Cisaru, Bogor, Indonesia. Illust. 24 cm. [18 ref]
• ***Summary:*** Three pioneers of the taxonomy of molds used in fermented foods were Drs. R. Nakazawa, K. Saito, and C. Thom. Fermentations can be classified as Homofermentations (only one species of microorganism is necessary to produce the product; e.g. natto, onchom, tempeh, fermented tofu), Heterofermentations (more than one is required; e.g. Chinese yeast, or ragi), Homomultifermentations (two or more strains of the same species are used together; e.g. miso, shoyu, soy yogurt).

Tables show: (1) Representative strains of cultures in Oriental food fermentations: Miso–*Aspergillus oryzae, A. sojae, Saccharomyces rouxii, Pediococcus halophilus.* Tempeh–*Rhizopus oligosporus.* Sufu–*Actinomucor elegans, Mucor dispersus.* Address: NRRC, Peoria, Illinois.

2298. Hesseltine, C.W. 1986. Future of fermented foods. *Mycologia Memoir* No. 11. p. 303-16. Chap. 17. (C.W. Hesseltine and Hwa L. Wang, eds. Indigenous Fermented Food of Non-Western Origin. Berlin & Stuttgart: J. Cramer.) Previously published in 1981 in USDA Miscellaneous Publication FL-MS-333. [11 ref]
• ***Summary:*** Contents: Introduction. Positive factors for increased use of fermented foods. Trends in production of fermented foods. Factors that may effect the wider use of fermented foods in the West. Literature cited. Address: USDA/NRRC, 1815 N. University St., Peoria, Illinois 61604.

2299. Mak, C.; Yap, T.C. 1986. Soybean intercropping with rubber and oil palm. In: S. Shanmugasundaram and E.W. Sulzberger, eds. 1986. Soybean in Tropical and Subtropical Cropping Systems. Shanhua, Taiwan: Asian Vegetable Research and Development Center. xv + 471 p. See p. 61-65. [10 ref]
• ***Summary:*** Soybean is not indigenous to Malaysia.

"Soybean is not a commercial crop in Malaysia, but it could be in the future. Major production constraints include soybean's susceptibility to inspects and diseases and the lack of a dry season for harvesting.

"Most farmers feel that soybean is less profitable to grow than other crops." Address: 1. Dep. of Genetics and Cellular Biology, Univ. of Malaya, Kuala Lumpur, Malaysia; 2. Dep. of Agronomy and Horticulture, Univ. of Agriculture, Serdang, Selangor, Malaysia.

2300. Manuel, Paciencia C. 1986. Methodological aspects of the analysis of production constraints in soybean development in the Philippines. *CGPRT* No. 4. p. 185-208. Includes 13 tables and charts. [9 ref]
• ***Summary:*** In the Philippines, consumption of soybeans for human food is quite small. About 70-90% of the soybeans used in the Philippines go into animal feeds; that demand is usually met by imports–mostly of defatted soybean meal.

In 1983, imports of soybeans and of soybean meal amounted to U.S. $8.3 million (30,555 metric tons) and U.S. $63 million (260,954 metric tons), respectively, or a total import cost of $72.2 million. Soybean production in the Philippines is one of the smallest in Asia. In 1981 it contributed less than 1% of total Asian soybean production.

In 1969 the Philippine national soybean production programme began when the Department of Agriculture and Natural Resources (DANR, now the Ministry of Natural Resources and the Ministry of Agriculture and Food) harnessed 900 hectares for soybean and sorghum planting to meet the requirements of the local livestock and poultry industries. Address: Asst. Prof., UPLB-CDEM, Philippines.

2301. Morooka, Yoshinori; Rachim, Abdul. 1986. Indonesia: Methodology of the soybean-based farming system study in Garut. *CGPRT* No. 4. p. 233-43.
• ***Summary:*** "Background: In many cropping systems in Indonesia, soybean is frequently chosen for intercropping in the rotation systems practiced by farmers. The cropping systems which dominate in the lowland areas under rainfed conditions are primarily based on rice, whereas the dominant systems in upland areas are based on secondary crops (palawija), including soybean." Address: 1. Agricultural economist; 2. Research Asst., ESCAP CGPRT Centre, Bogor, Indonesia.

2302. Nataatmadja, Hidayat. 1986. Soybean economy in Indonesia: Problem and perspective. *Indonesian Agricultural Research and Development Journal* 8(1):16-19. [6 ref]
• ***Summary:*** Soybean is only a small part of the agricultural economic sector. It needs to be seen in a wider view." Indonesia is now in a difficult stage of transition from a

traditional agrarian economy to a more industrialized economy.

"Agriculture's contribution to Indonesia's relative GDP decreased from 4.0% in 1971 to 30.7% in 1980. The decrease was most serious in the food crop and fisheries subsectors. This was in spite of government support for rice sufficiency through the BIMAS program." "Indonesia reached self sufficiency in rice production in 1985..."

The soybean economy is characterized by very little growth, but within the food crop subsector the "palawija" ("secondary food crops") farmer is probably hurt the most by the process of development.

Table 1 shows Indonesian soybean harvested area, production, and yield for 1974 to 1983. Production increased from about 589,00 tons in 1974 to an estimated 683,000 tons in 1982. Address: Center for Agro Economic Research.

2303. Pasaribu, Djuber; McIntosh, Jerry L. 1986. Increasing tropical soybean production with improved cropping systems and management. In: S. Shanmugasundaram and E.W. Sulzberger, eds. 1986. Soybean in Tropical and Subtropical Cropping Systems. Shanhua, Taiwan: Asian Vegetable Research and Development Center. xv + 471 p. See p. 1-11. [10 ref]

• ***Summary:*** Contents: Introduction. Soybean in lowland rice areas: Common management practices. Soybean in upland rainfed areas: Common management practices, production prospects. Soybean in tidal swamps: Management practices, production prospects. In fresh water swamp areas: Common management practices, production prospects. Recent soybean research in Indonesia: Stand establishment, fertilizer management, rhizobium and nitrogen nutrition, intercropping ("In general, yield is reduced when soybean is planted as an intercrop with taller plants.").

In 1978 Indonesians consumed 4.85 kg/year of soybean, or 13.29 gm/day. This provided daily: 53 calories, 4.66 gm of protein and 1.35 gm of fat. By comparison, cereals provided 31.97 gm/day of protein, all pulses and oilseeds (incl. soybeans) provided 8.08 gm/day of protein, while meat, eggs, milk and fish together provided a total of 4.66 gm/day of protein, exactly the same as soybeans. Address: 1. Agronomist, Bogor Research Inst. for Food Crops; 2. Farming Systems Liaison Scientist, Cooperative CRIFC/IRRI Program in Indonesia, Agency for Agricultural Research and Development.

2304. Price, Edwin C.; Paris, Thelma R. 1986. The economics of small- and large-scale soybean production in the Philippines. In: S. Shanmugasundaram and E.W. Sulzberger, eds. 1986. Soybean in Tropical and Subtropical Cropping Systems. Shanhua, Taiwan: Asian Vegetable Research and Development Center. xv + 471 p. See p. 395-402.

• ***Summary:*** "The Philippines imports large quantities of soybean... and soybean meal. To meet increasing requirements, the government is encouraging the expansion of local soybean production. In doing so, a number of farm production models have been employed. This paper reviews the economic potential of the various models."

"For the purpose of discussion, soybean farms in the Philippines have been classified into four categories: Ordinary farms, demonstration or seed farms, financed farms, and cooperative farms."

"Soybean is grown for animal feed or for use as a coffee substitute. Ordinary farms are usually found in central Luzon." Address: Dep. of Agricultural Economics, International Rice Research Inst., Los Baños, Laguna, Philippines.

2305. Rachim, Abdul. 1986. Indonesia: Notes on the soybean food industry under producers' co-operatives in Indonesia. *CGPRT* No. 4. p. 244-54. Includes 7 tables and figures.

• ***Summary:*** Contents: Background. Indonesian soybean foods. Fermented products: Tempe, oncom, tauco, kecap. Non-fermented products: Tofu, soymilk. Function and role of Kopti (and BULOG). Traditional processing industry: Current situation of small-scale home industry, further studies on the food industry / marketing system.

The Food Balance Sheets of the Central Bureau of Statistics show that 90% of Indonesia's soybeans are used for food. Most of the human consumption is in the form of a variety of popular processed foods: tempe, tahu (tofu), tauco, and a number of other less popular foods: soybean sprouts (tauge), sere in Bali, yuba, soybean milk, fried soybeans (eaten as a snack), beans boiled in the pod (also a snack), and the beans cooked as a vegetable or as an ingredient in soups. Only one factory (Sari Hasuda, in Yogyakarta) produces soybean milk. It is enriched with nonfat dried milk, vitamins, and minerals.

To coordinate and improve the economic viability of the small tofu and tempeh producers, a cooperative system, called Kopti *(Koperasi Produsen Tempe dan Tahu Indonesia;* Indonesian Tempe / Tofu Processors' Co-operative) was founded in 1979. The main function of Kopti is to procure and distribute soybeans to its members, the number of which has increased from 25 in 1980 to 286 in May 1985. It handles about 407,160 tons/year. The purchase price of soybeans is as follows (Rupiah/kg): From USA 415, from China 425, from Indonesian farmers 475-80. Certificate [certified] seeds cost 550-75.

Tofu, tempe, kecap, tauco and oncom processing is primarily done in small factories. 3 studies have been made on the size of these factories and the quantities they process: as part of the 1974 Industrial Census of the Central Bureau

of Statistics (CBS); by Winarno, et al., in 1976; and by the study team on Soybean Commodity System (SCS) in the Garut area of West Java in 1984. The findings of these 3 studies are presented in Table 2.

"We should be cautious in comparing their results, however, because of biases in the collection of the information. The CBS study, for instance, was part of an industrial census, which divided processors into two categories: small-scale industries (5-19 labourers), and home factories (1-4 labourers, some of whom may be family members). However, there may also be wide variations in the industry in different parts of the country.

"Despite these limitations, it seems that the volume of soybean processed by each unit has increased appreciably, probably reflecting a favorable growth of the industry. Yet the number of labourers per unit has remained small, and is probably diminishing. This may be because of the use of mechanical crushers or hullers for both tempe and tofu productions." Address: Research Asst., ESCAP CGPRT Centre, Bogor, Indonesia.

2306. Sayogyo, -. 1986. Constraints in *palawija* [secondary, non-rice crop] production and demand: The case of corn and soya in Java, Indonesia. *CGPRT* No. 4. p. 175-80.
• ***Summary:*** Also published as a report by Institut Pertanian, Bogor. Address: Prof., IPB (Institut Pertanian Bogor), Bogor Agricultural University.

2307. Shanmugasundaram, S.; Sulzberger, E.W. eds. 1986. Soybean in tropical and subtropical cropping systems: Proceedings of a symposium, Tsukuba, Japan, 26 September–1 October 1983. Revised ed. Shanhua, Taiwan: Asian Vegetable Research and Development Center. xv + 471 p. Illust. Index. 26 cm. [500+ ref. Eng]
• ***Summary:*** Note: The first edition, hardcover, published Oct. 1985, was recalled and discarded, due to errors in the text. Contents: Section 1. Cropping systems. 2. Plant breeding. 3. Management. 4. Diseases and insects. 5. Plant nutrition. 6. Physiology. 7. Economics. 8. Related topics. 59 chapters total. Symposium participants. Author index. Subject index.

In the Foreword, G.W. Sellek, Director General of AVRDC, notes that the proceedings of this symposium were published in two sections. The proceedings of the first section, recently published by the Tropical Agricultural Research Center of Japan (TARC), cover country reports and special research projects. These proceedings cover cropping systems. "In the recent past, research was aimed almost exclusively at raising soybean yields rather than developing cropping systems that provide the stability needed to grow soybeans under high-risk conditions. There also seems to be a greater sense of urgency to integrate cropping systems research with disciplines such as plant breeding, crop management, pest control, and plant nutrition." There is a strong "need to ensure that scientists from a variety of disciplines and backgrounds work together so that their research efforts are well coordinated." Address: AVRDC, Taiwan.

2308. Tongdee, Amnuay. 1986. Minimum tillage soybean following rice in Thailand. In: S. Shanmugasundaram and E.W. Sulzberger, eds. 1986. Soybean in Tropical and Subtropical Cropping Systems. Shanhua, Taiwan: Asian Vegetable Research and Development Center. xv + 471 p. See p. 67-69.
• ***Summary:*** "Thailand's 1972 soybean crop totaled 72,000 tonnes produced from a land area of 83,000 ha. [This is an average yield of 0.86 tonnes/ha or 12.78 bu/acre.] By 1974 production reached 252,000 tonnes, and since then has remained relatively stable with some fluctuation due to prices and rainfall distribution. In the northern part of the central highlands, Thailand's largest soybean production area, the crop is usually grown following rice *(Oryza sativa [Oryzae sativa])* during the dry season with irrigation. The farmer's system is to plant soybean in rice stubble." Address: Director, Tak-Fa Field Crop Research Center, Tak-Fa, Nakornsawan province, Thailand.

2309. Tschanz, A.T.; Wang, T.C.; Tsai, B.Y. 1986. Recent advances in soybean rust research. In: S. Shanmugasundaram and E.W. Sulzberger, eds. 1986. Soybean in Tropical and Subtropical Cropping Systems. Shanhua, Taiwan: Asian Vegetable Research and Development Center. xv + 471 p. See p. 237-45. [17 ref]
• ***Summary:*** "Soybean yield losses due to rust range from 40 to 90% in Southeast Asia." Address: AVRDC, Tainan, Taiwan.

2310. Wang, H.L.; Hesseltine, C.W. 1986. Glossary of indigenous fermented foods. *Mycologia Memoir* No. 11. p. 317-44. Chap. 18. (C.W. Hesseltine and Hwa L. Wang, eds. Indigenous Fermented Food of Non-Western Origin. Berlin & Stuttgart: J. Cramer). [29 ref]
• ***Summary:*** The section titled "Fermented Legume Products" defines chao (Vietnamese fermented tofu), chiang-chu (Chinese koji), ch'ou-toufu and ch'ou-toufu-ru (fermented tofu), Damsuejang and doenjang (Korean miso), furu, sufu, hon-fan or red sufu (fermented tofu), in-shi ("Fermented black soybeans from China" [soy nuggets]), in-yu (Type of Chinese soy sauce made from black soybeans), kanjang (Korean soy sauce), kenima, ketjap or kecap (Indonesian soy sauce from black soybeans), meitauza or mei-tou-cha (fermented okara), meju (maiju or maeju; Korean soybean koji), natto, oncom (onchom or oncom), see-iu (see-iew; Thai soy sauce made from whole soybeans); soy sauce, soybean paste, tahuri (tahuli; Filipino fermented tofu. See sufu), tao-chieo (tao-jiao; Thai miso), taohu-yi (Fermented tofu from Thailand. See sufu), taokoan,

tempe (many types), thua-kab (dry thua-nao), thua-merk (wet and cooked thua-nao), thua-nao (Thai natto), tosufu (see sufu), toufu-ru (fermented tofu), tsue-fan (tsui-fan, chee fan; fermented tofu).

Note 1. This is the earliest English-language document seen (Oct. 2008) that uses the term "fermented black soybeans" or "Fermented black soybeans from China" to refer to soy nuggets.

Under "Fermented Cereal-Legume Products" we find: chiang, chiang-yu (chau-yu, Chinese soy sauce), fermented soybeans (soy nuggets), hamanatto, kochujang (kochu chang), miso, shoyu, tamari, taotjo (tao-tjo, tao dji; Fermented soybeans from Indonesia or Thailand [No! *Tao-tjo* is Indonesian-style miso and *tao dji* is Indonesian soy nuggets]), tao-tjung or tou-chiang (chiang), tao-yu (tou-yu; Chinese soy sauce), tauco (taocho, taoco, taucho; Indonesian miso), tou-pan-chiang (Chinese fava bean miso), tou-shi (toushih; Chinese soy nuggets), toyo (Filipino soy sauce). Note 2. This is the earliest English-language document seen (March 2009) that uses the word "taocho" to refer to Indonesian-style miso.

Fermented Vegetable Products include: Chiang-tsai (chiang-tsay; Vegetables in China pickled in chiang or soy sauce or tien-mien-chiang), miso-zuke. Address: USDA/NRRC, 1815 N. University St., Peoria, Illinois 61604.

2311. Winarno, F.G.; Reddy, N.R. 1986. Tempe. In: N.R. Reddy, M.D. Pierson, and D.K. Salunkhe, eds. 1986. Legume-Based Fermented Foods. Boca Raton, FL: CRC Press. viii + 254 p. See p. 95-117. Chap. 6. [77 ref]
• ***Summary:*** Contents: Introduction. Methods of preparation. Nutrient composition. Nutritional quality. Antinutritional and/or toxic factors. Tempeh and tempeh-like foods from other legumes. Conclusions. Address: 1. Director, Food Technology Development Center, Prof. and Head, Food Science Dep., Bogor Agricultural Univ., Bogor, Indonesia; 2. Dep. of Food Science and Technology, Virginia Polytechnic Inst. and State Univ., Blacksburg, VA.

2312. Winarno, F.G. 1986. Tempe bongkrek [Tempe bongkrek]. Jakarta, Indonesia: Kantor Menteri Muda Urusan Pengatan Produksi Pangan. iv + 60 p. Illust. 21 cm. [Ind]*
• ***Summary:*** Includes bibliographic references (p. 58-59). Address: Director, Food Technology Development Center, Prof. and Head, Food Science Dep., Bogor Agricultural Univ., Bogor, Indonesia.

2313. **Product Name:** [UU (Soymilk)].
**Manufacturer's Name:** Food & Nutrition Foundation.
**Manufacturer's Address:** Thailand.
**Date of Introduction:** 1986?
**Wt/Vol., Packaging, Price:** Tetra Brik Aseptic carton.
**How Stored:** Shelf stable; refrigerate after opening.
**New Product–Documentation:** Color photo sent by Anders Lindner of STS. 1987. Nov. 14. Tetra Brik carton. Brown, red, yellow, and blue on white. Shows a cartoon of a cow riding a bicycle carrying a yellow soybean character on the back.

2314. *Kecamatan Tempeh dalam Angka (Indonesia).* 1986? Serial/periodical. Published in Indonesia by Kantor Statistik Kabupaten Lumajang, Mantri Statistik Kecamatan Tempeh. Frequency: Annual. 21 cm. [Ind]*
• ***Summary:*** Gives statistics on tempeh production in Indonesia. Address: Indonesia.

2315. **Product Name:** Sunny Soya Bean Drink.
**Manufacturer's Address:** Brunei.
**Date of Introduction:** 1986?
**New Product–Documentation:** Color photo sent by Anders Lindner of STS. 1987. Nov. 14. Can. Red, white and light green on dark green.

Note: This is the earliest known commercial soy product made in Brunei.

2316. Wilson, Geoff. 1987. Special report from Australia [on soyfoods]. *Soyfoods (ESFA)* 1(1):25-29. Jan.
• ***Summary:*** Much of this material appeared in the National Farmer (1984), Australia. John Wilson, in charge of soymilk for Alfa-Laval and Owen Price, managing director of the Dairy Farm group of companies in Hong Kong (he has made a soy ice cream) are both expatriate Australians. Contents: New markets beckon soybeans (especially soymilk in Australia and Southeast Asia). Expatriate Australians boosting soy (John Wilson of Alfa-Laval in Sweden, and Owen Price, managing Director of the Dairy Farm group of companies in Hong Kong). Soybeans poised for big growth (in Australia, especially as soymilk). Tofutti takes off in Australia (David Grossbaum of Shoyu Natural Products in Melbourne has the sole Australian franchise for this popular soy-based product). Tofutti is tantalising U.S. tastebuds. Sustagen Gold uses dairy and soy foods (The increasingly popular Combibloc carton is now being used by Bristol Meters to package this product). Soy-dairy blends to overcome disadvantages. Six new soy drinks expected (following Golden Life, the first Australian soy drink launch late last year by Martin Pharmaceuticals). Soy products will enter the market (in Australia, believes Anders Lindner of STS–Soya Technology Systems). Flavored Soy Drinks selling well (according to Don Lazzaro of Ceres Natural Foods Pty Ltd. in East Bentleigh, Victoria). Address: Freelance journalist, Australia.

2317. Bahar, Farid A.; Saenong, Sania. 1987. Yield constraints to soybean production in south Sulawesi. *CGPRT* No. 10. p. 387-94. Feb. J.W.T. Bottema, F.

Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [12 ref]

• ***Summary:*** Summary. Plant population: The plant type, soil fertility and present management practices will affect the density of plants. An appropriate plant spacing would be 40 to 50 cm between the rows and 10 to 20 cm within the rows. At this plant spacing, 2 plants per hill is maintained.

Discusses: Liming; Rhizobia; Pests (the most destructive insect is *Etiella zinkenella)*. Address: Maros Research Inst. for Food Crops (MORIF), Ujung Pandang, south Sulawesi (Celebes).

2318. Benjasil, Vichitr. 1987. Soybean production and yield constraints: The situation in Thailand. *CGPRT* No. 10. p. 423-28. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [7 ref]

• ***Summary:*** "Soybean is grown in Thailand as part of the cropping system in the north and the central region of the country... Approximately 70% of soybean production is from upland rainfed planting in the rainy season of which the greater part of production is the early rainy season crops. Dry season cropping makes up about 30% of production and approximately half of this is under irrigation.

"Soybean production in Thailand has increased threefold in the past decade due mainly to increases in acreage and favourable prices. The current demand for soybean, however, has exceeded local production capacities. The demand for soybean meal for industry is especially high, requiring annual imports of about 200,000 tonnes to satisfy the total annual demand of 350,000 to 400,000 tonnes." A table giving the value of oil crop production (million U.S. dollars), shows soybean at 34.4 for 81/82; and 76.9 for 85/86.

In summary, it is "indicated that pest control management and time of planting in relation to water availability are probably the major factors contributing to yield constraints." Address: Director, Field Crops Research Inst., Dep. of Agriculture, Bangkhen, Bangkok, Thailand.

2319. Bosshart, R.P.; Uexkull, H.R. von. 1987. Maximum yield research on soybean: A new approach to overcoming yield limiting factors. *CGPRT* No. 10. p. 439-50. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [27 ref]

• ***Summary:*** "In its childhood in North America, Europe, and Japan, newborn in China and the Philippines, and in gestation in Malaysia and Thailand, maximum yield research (MYR) has not yet been conceived in Indonesia. A relatively new approach to agronomic research, MYR aims to maximize crop yield by simultaneously overcoming all factors limiting yield. To be successful, MYR must promote positive multiple interaction among all factors affecting yield. After the maximum yield has been determined, economic analyses must identify the optimum input rates and other practices to produce the maximum economic yields (MEY) which gives farmers the highest net profit per hectare...

"Traditionally, Justis Von Liebig's 'Law of the Minimum,' or single-limiting-factor concept, has guided researchers in increasing crop yield. Using the analogy of the water level in a barrel representing crop yield and the staves of the barrel the limiting factors, the single-limiting factor concept dictates that the water level or yield is controlled by the height of the shortest stave or the level of the most limiting factor. After the limitations caused by one factor, such as N fertilizer rate, are overcome, another factor is studied... Liebig's law, though applicable at the low end of the yield curve, has shortcomings in high-yield agriculture: multiple interaction among nutrients, water, and management practices may not be recognized... The MYR concept attempts both to increase the size of the barrel and to raise the water level to the top of the barrel in one step by increasing the height of all staves simultaneously... To achieve the maximum crop research yield for a given location, an intensive multidisciplinary effort is required to optimize all controllable factors..." Address: Deputy Director and Director, East and Southeast Asia programme of the Potash and Phosphate Inst. and the International Potash Inst., 126 Watte Estate Rd., Singapore 1128.

2320. Bottema, J.W.T.; Dauphin, F.; Gijsbers, G. eds. 1987. Soybean research and development in Indonesia. *CGPRT* No. 10. ix + 477 p. Proceedings of a Workshop held 24-26 Feb. 1987 in Capayung, Indonesia. (Regional Co-ordination Centre for Research and Development of Coarse Grains, Pulses, Roots and Tuber Crops in the Humid Tropics of Asia and the Pacific, Bogor, Indonesia). 25 cm. [400+ ref]

• ***Summary:*** The proceedings are divided into 9 sections: 1. Introduction. 2. Policy and programme issues. 3. Economics. 4. Soybean support programmes. 5. Technical factors in production. 6. Regional research and development and case studies. 7. Contributions from international agencies. 8. Summary. 9. Participants.

In the introduction, Dauphin notes: "Soybean is a traditional food crop in Indonesia, it is mentioned in Rumphius in the 17th century. It is grown mostly on Java, in a multitude of farming systems, in irrigated lowland and in dryland, in pure stand or associated with various other crops. A diversity of uses has developed, particularly in human consumption, which is matched in few other countries. Still a relatively expensive part of the diet, soybean consumption has grown rapidly during the past 2 decades with the rapid increase in income of large segments of the population of Java. Production has increased at a much lower rate and, as a result, a growing part of the

demand, at present, can only be met by imports in spite of the Government's efforts to boost soybean production.

"After the remarkable success obtained with rice, for which self-sufficiency has been recently attained, it was only logical to follow a similar strategy to increase soybean production. This implicitly assumed similarities in the production systems of the two commodities, an assumption which must be questioned..."

"One of the most striking findings is the extreme diversity of the farming systems in which soybean is found as well as of the technologies used to grow it. Practices differ not only in varieties and in quantities of seeds, fertilizers and other inputs, but also in other aspects, often covered by recommendations, such as the techniques used to prepare the soil, to plant the seeds or to irrigate, or the selection and arrangement of companion crops. A part of these differences, which occur from farm to farm as well as from area to area, may be explained by socio-economic factors such as access to land, capital or knowledge. The rest are due to differences in local climates, soils, irrigation facilities, or in pest infestation, and indicate a certain degree of technological adjustment by farmers to suit their environments.

"In this context of a diverse environment and of already diversified techniques, uniform recommendations as now developed without systematic on-farm verification on the target areas may have little or no significant benefit over traditional practices. They may well present serious drawbacks affecting the soybean crop or other components of the farming system." Address: 1. CGPRT, editor 2. Senior agronomist, CGPRT Centre.

2321. Bottema, J.W.T. 1987. Summary. *CGPRT* No. 10. p. 465-68. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia.
• ***Summary:*** "The CGPRT Centre organized a workshop on Soybean Research and Development in co-operation with AARD and CRIFC... In the period 1985 to 1987, the Centre implemented the first phase of 2 major research projects, the study of Soybean-based Farming Systems (SFSI) and the Soybean Yield Gap Analysis Project (SYGAP). Both studies are aimed at identifying constraints in the social and agronomical sphere to soybean production." Address: CGPRT Centre [Indonesia].

2322. Brotonegoro, S.; Manshuri, A. Ghozi; van Staveren, J. Ph. 1987. Soybean research and development in East Java. *CGPRT* No. 10. p. 295-311. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [40 ref]
• ***Summary:*** "With the establishment of the germplasm unit at MARIF, the variability of local soybeans has been assessed, evaluated and compared to modern improved varieties... Results obtained so far have indicated the need for putting more emphasis on the utilization of local varieties in soybean breeding and selection work... Four major soybean production systems have been recognized, including soybean after sawah [wet] rice, mono- and intercropping of soybean on rainfed upland, and production of seed planted on rainfed upland during the rainy season." Address: Director, Crop physiologist, Agronomist, and Soil Scientist: Malang Research Inst. for Food Crops (MARIF), Malang, Indonesia.

2323. Brotonegoro, Soetarjo; Heriyanto, -; Krisdiana, Ruly; Laumans, Q.L. 1987. Soybean production constraints after rice. *CGPRT* No. 10. p. 179-188. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [8 ref]
• ***Summary:*** The Government of Indonesia has tried to develop soybean production since 1974, but the rate of yield improvement at the farmer level is still low. The target of the Fourth Five-year Development plan (PELITA IV) is about 1.15 tonnes/ha. Address: Malang Research Inst. for Food Crops (MARIF).

2324. Dauphin, F. 1987. Variability of soybean cropping systems in Java: Implications for research and extension. *CGPRT* No. 10. p. 157-65. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [16 ref]
• ***Summary:*** Farmers work in diverse environments. It is important to learn from their practices, avoid the temptation to provide fixed recommendations, but provide practical useful information and develop a farmer's ability to use that information in his decisions. A case study is given. Address: Senior Agronomist, CGPRT Centre, Bogor, Indonesia.

2325. Goto, Torao. 1987. Joint soybean research project between JICA and CRIFC. *CGPRT* No. 10. p. 113-16. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [3 ref]
• ***Summary:*** The Japan-Indonesian Joint Food Crop Research Programme started on October 23, 1970. The project terminated its activity on October 22, 1978, after the initial 5-year term and 3-year extension. The new project which followed, Strengthening of Legumes in Relation to Cropping Systems Research Project (ATA-218), started on October 23, 1978. In the ATA- 218, the main effort focused on soybean as the most important element in the cropping system. ATA-218, originally planned to last 5 years, was further extended for 2 years, at the request of Central Research Institute for Food Crops (CRIFC). The project terminated successfully on October 22, 1985. During the follow-up period of ATA-218, a request for a new project, Strengthening of Pioneering Research for Palawija Crop Production, was proposed by the Indonesian side. An

agreement was reached on the new project after negotiation between Indonesia and Japan.

On April 1, 1986, the new project, Strengthening of Pioneering Research for Palawija Crop Production Project (ATA-378), started. It is scheduled to continue for 5 years, until March 31, 1991. This project is being implemented at the Bogor Institute for Food Crops (under CRIFC). Soybean is the major protein source and the most important palawija crop in Indonesia. Address: Team leader of Japanese experts (ATA-378).

2326. Guerts, P.M.H. 1987. Soybean trials and demonstrations in West Sumatra 1984/1985 to 1986/1987. *CGPRT* No. 10. p. 359-77. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [6 ref]

• ***Summary:*** "The Government of Indonesia, assisted by the Food and Agriculture Organization of the United Nations, implemented the Secondary Crop Intensification Programme in 1978, to increase the production of secondary crops.

"Activities in West Sumatra started in 1983 and over a 3-year period, 450 simple dispersed trials, 200 demonstrations, 5 block demonstration farms and 15 special purpose trials were carried out."

Terms in the Glossary include: Legin–"A peat-based soybean inoculum produced by the University of Gajah Mada in Yogyakarta, used in the INSUS programme. Characterization: 10 million–1 thousand million *Rhizobium japonicum* bacteria per gram; pH 6.8–7.2; storage at T 25°-30°C up to 6 months if cooled, Legin expires after 1 year." Sawah–"Bunded land used for lowland rice production." Secondary crops–"Food Crops often grown in rotation with rice." Upland–"Refers to either flat or sloping land that is not bunded and on which crops are grown under non-flooded (rainfed) conditions." Address: FAO Representative, Jakarta.

2327. Hedley, Douglas D. 1987. Diversification: Concepts and directions in Indonesian agricultural policy. *CGPRT* No. 10. p. 17-28. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [7 ref]

• ***Summary:*** Diversification (away from a focus on rice production) as an objective of agricultural policy in Indonesia began during PELITA 2 in the mid-1970s. After 1967 the New Order Government took a number of steps to expand rice production, the staple food of Indonesia, which was in short supply. Fortunately the "green revolution," which was just beginning, helped greatly. New programs (such as BIMAS and INMAS) and organizations (such as BULOG) were set up. This program was successful, and now recent efforts to diversify into secondary or non-rice crops, such as soybeans, have followed this pattern of success. Address: Chief of party, Technical Assistance Team for Agricultural Planning Project, Ministry of Agriculture, Indonesia.

2328. Hseu, Ming-Lii. 1987. Improvement of soybean production in East Java. *CGPRT* No. 10. p. 321-32. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia.

• ***Summary:*** "East Java produces 60% of the soybean in Indonesia where the crop has been grown for several decades. Management techniques in East Java are now rather advanced, however the area of soybean has gradually decreased. The main cause of this reduction is the poor yield per unit area. The yield increased very slowly from 750 kg/ha in 1974 to 850 kg/ha in 1984. The capital invested increased but the profit has declined gradually. Farmers are becoming less interested in growing soybeans.

"The Agricultural Technical Mission, Republic of China (ATM-ROC) has studied the potential for soybean production in East Java since 1983... Soybeans have a high potential in East Java, since the net profit can be doubled or even tripled with proper farm management. Soybean yield could be increased by: proper planting, use of improved varieties, intensive management, effective pest control, and good post-harvest processing and storage." Address: Specialist, Agricultural Technical Mission, Republic of China [Taiwan] to East Java.

2329. Ismunadji, M.; Zulkarnaini, I.; Somaatmadja, S. 1987. Nutritional disorders of soybean in Indonesia. *CGPRT* No. 10. p. 167-74. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [11 ref]

• ***Summary:*** Nutritional disorders of soybean are common in Indonesia. Visual symptoms, such as leaf chlorosis (potassium deficiency), stunted growth, and malformation of leaves are often observed in the field. Molybdenum and phosphorus deficiencies, aluminum toxicity, and acid mineral soils (corrected by careful liming) are common problems on specific soil types.

Soybean is the most important grain legume crop grown in Indonesia. It is used for food and feed and plays an important role in the Indonesian diet as a source of protein. Soybean protein is much cheaper than protein from animal sources. Soybean-based food such as tempe, tahu, soy sauce and taucho are very popular. Indonesia is not yet self-sufficient in soybean and imports are close to a half million tons/year. The Government is promoting soybean production by acreage expansion and intensification. Address: Bogor Research Inst. of Food Crops (BORIF).

2330. Kuntyastuti, Henny; Dauphin, F. 1987. Soybean yield reducing factors in East Java: A summary of the SYGAP investigations in Pasuruan. *CGPRT* No. 10. p. 333-42. Feb.

J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [5 ref]
• ***Summary:*** "Most of the soybean in East Java is grown in paddy fields after rice... Wetland soybean in Pasuruan is planted during 2 seasons: early dry season (DS-1: March/April to June) and late dry season (DS-2: July to October)." Address: MARIF staff and agronomist, CGPRT Centre.

2331. Lokollo, Erna Maria; Dauphin, F.; Rachim, A. 1987. A study of farmers' practices on irrigated soybean. *CGPRT* No. 10. p. 313-19. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [2 ref]
• ***Summary:*** "The survey was conducted as part of the Soybean Yield Gap Analysis Project (SYGAP) in Pasuruan district, East Java, during the late dry season soybean crop." Address: 1. Economist, Centre for Agro-Economic Research (CAER); 2. Senior Agronomist and Research Associate, CGPRT Centre.

2332. Okabe, Shiro. 1987. Welcoming statement. *CGPRT* No. 10. p. 7-8. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia.
• ***Summary:*** The Pusat Palawija, as the CGPRT Centre is known in Indonesian, has 3 main functions: To conduct research, to provide opportunities for training, and to produce and disseminate information on *palawija* commodities. The Centre's research program focuses on the economic aspects of *palawija* crop development.

Since achieving self-sufficiency in rice, the Government of Indonesia has given increasing attention to the diversification of the food crops sector. Among the secondary food crops, soybean has received and continues to receive high priority because of the importance of this commodity as food and feed and because of the country's growing dependence on imports to meet national demand.

The Government has requested the CGPRT Centre to focus its research efforts in Indonesia on major *palawija* crops, especially soybean. "As a result, we have been involved in soybean research for the past 3 years. Four programmes are worth mentioning here. Firstly, in co-operation with the Bogor Research Institute for Food Crops (BORIF) we conducted a study on the soybean commodity system in Indonesia; the results of which were published in 1985.

"Secondly, the Centre, in co-operation with BORIF, has an ongoing research project on the analysis of soybean-based farming systems in Garut, West Java and Lampung, South Sumatra.

"Thirdly, we are undertaking on-farm research on soybean productivity in a project entitled the Soybean Yield Gap Analysis Project. This research project is being undertaken in East Java and West Java in co-operation with the Malang Research Institute for Food Crops (MARIF) and BORIF."

The main objective of this workshop is "to present findings of recent research on soybean and to provide opportunities for researchers in Indonesia to discuss research methodologies and soybean research and development policies related to soybean production in the country. An equally important objective is to analyse the problems in soybean development and to identify opportunities for research to contribute to overcoming these problems." Address: Director, CGPRT Centre.

2333. Rachim, A.; Dauphin, F. 1987. Agro-economic surveys of soybean in upland areas, Garut, West Java. *CGPRT* No. 10. p. 87-97. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [3 ref]
• ***Summary:*** The results summarize the findings of surveys conducted in the framework of The Soybean Yield Gap Analysis Project during 1985 and 1986. A first survey was conducted in Wanaraja in October 1985 and a second in Banyuresmi in March 1986. The survey was aimed at identifying agro-economic factors constraining productivity in these areas.

The survey "confirms that decisions relating to soybean cultivation, including relative area to be allocated to this crop and the amount of input used for it (except labour), are only weakly related to farm resources. It is also verified that there is no statistical relationship between the amount of inputs used for soybean and its yield–which does not mean that there is no response to fertilizers." Bean fly was the major yield limiting factor during the early rainy season in 1985. Address: Research Asst. and Senior Agronomist, CGPRT Centre, Bogor, Indonesia.

2334. Saenong, Sania. 1987. Maintenance of soybean seed viability and its relation to grain yield. *CGPRT* No. 10. p. 227-35. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [16 ref]
• ***Summary:*** "The predominant unsaturated, fatty acid composition of soybean seed is the major cause of seed deterioration. The albumin and globulin protein of soybean seed absorbs more water than the other fractions of protein which contributes to higher moisture content of the seed and therefore enhances seed deterioration...

"When seeds are stored at room temperature (28 to 32ºC), it is recommended that an air-tight container be used and the moisture of the seed be maintained at 6 to 8%. This depends on the duration of the storage period. When air-conditioned storage is available, then seeds can be kept longer especially if their moisture is low.

"The use of high quality seed will produce good crop stands, require less seeds per hectare and is more likely to

produce a higher grain yield."

The Department of Agriculture has decided to increase the national production of soybean through intensification and extensification programs. Address: Maros Research Inst. for Food Crops, South Sulawesi, Indonesia.

2335. Sarasutha, I.G.P.; Maamun, Yusuf; Bahar, Farid A. 1987. Prospects for soybean production in south Sulawesi. *CGPRT* No. 10. p. 379-85. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [6 ref]

• ***Summary:*** "Soybean became an important secondary crop after rice when Indonesia began importing to fulfill the domestic demand (Sihombing 1985; Djauhari and Malian 1985). Domestic production has never met local demand except during the first 5-year development plan (Sihombing 1985). To meet the increasing demand for soybean, the government implemented a national programme called *Bimas Palawija* (mass guidance for secondary crops), the aim of which was to persuade farmers to grow soybean, at least for local needs... The inability of many soybean farmers to increase productivity is due to improper management and few or no inputs in the form of fertilizers or pesticides. Appropriate technological packages leading to high yield are necessary if farmers are to increase productivity... In South Sulawesi, farmers have grown soybean intensively since 1979... The total area harvested increased from 10,195 ha in 1982 to 17,885 ha in 1985." Address: Maros Research Inst. for Food Crops (MORIF), Ujung Pandang, south Sulawesi (Celebes).

2336. Satari, G. 1987. Keynote address: Research policies relating to soybean development. *CGPRT* No. 10. p. 11-15. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [6 ref]

• ***Summary:*** About 75% of Indonesia's population is directly dependent on agriculture for its livelihood. Indonesia attained self-sufficiency in rice in 1983, after being the biggest rice importer in the world for years. There has been a growing consensus in Indonesia since 1979, that *palawija* crops must be incorporated in a comprehensive national food policy. Among these *palawija* crops, soybean has received special attention in response to Indonesia's growing dependence on substantial soybean imports. Demand for soybean increased by approximately 18% per annum during the last 7 years due to rising per capita human consumption as well as to growing need for feed.

"Despite annual fluctuations, progress in soybean production was made during the PELITAs. In 1968, one year before PELITA (5 year development), domestic soybean production was 419,000 tonnes and the average yield was 0.62 tonnes/ha. In 1986, domestic production increased dramatically to 1.1 million tonnes as compared to 817,000 tonnes in the previous year and the average yield was around 1.0 tonnes/ha." Address: Director General, AARD.

2337. Sebayang, K.; Sihombing, D.A. 1987. The technology impact of soybean yield in Indonesia. *CGPRT* No. 10. p. 37-48. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [9 ref]

• ***Summary:*** East Java, as the production center of soybean, cannot increase its contribution since the growth of its yield and total production are low. To solve the problem, the Government of Indonesia has launched a special program, beginning on November 10, 1985 (National Hero's Day), to expand the production area through intensification of the movement of transmigrants from Java to other islands and by introducing a package program to increase the level of soybean yield. Several Government supports in promoting soybean production include: 1. Establish guaranteed floor price; 2. Subsidize the use of farm inputs; 3. Subsidize the use of *Rhizobium* inoculant; 4. Subsidize liming; 5. Intensify extension activities; 6. Intensify research and development. The successful soybean campaign in 1985/1986 increased the production of soybean through the expansion of area harvested (288,000 ha or a 32% increase compared to 1985 production) and, to some extent, its average yield. Address: Directorate of Food Crop Production.

2338. Shanmugasundaram, S.; Tsou, S.C.S. 1987. Filling the yield gap in soybean: Strategies and methodologies. *CGPRT* No. 10. p. 405-21. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [40 ref]

• ***Summary:*** "The average yield of soybean in Asia in 1985, according to FAO statistics, ranged from 600 kg/ha for the Philippines to 1812 kg/ha for Turkey and 978 kg/ha for Indonesia."

"The first strategy to fill the yield gap is to set the yield goal. For a researcher it is both the attainable yield and maximum yield; for an extension worker and progressive farmer it is the best farm yield; for the average farmer it is the maximum economic yield; and for the region or country it is to improve the average yield. For example, the maximum yield goal for Indonesia should be 4 tonnes/ha; best farm yield should be 3.5 tonnes/ha; maximum economic yield should be between 2.5 and 3.0 tonnes/ha; national average yield should be to achieve at least 1.5 tonnes/ha.

"The second strategy concerns constraints on high yield. Constraints can be varietal, edaphic, environmental, biological, socio-economic or a combination of the above."

In conclusion: "Researchers must first understand the farmers' problems before developing a technology for them." Address: Plant Breder and Director, Production Systems Programme, AVRDC, Taiwan.

2339. Silitonga, Chiriman; Purnomo, Slamet. 1987. Prospects for self-sufficiency in soybean and its implications for future imports. *CGPRT* No. 10. p. 29-35. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [1 ref]
• ***Summary:*** The Government of Indonesia has redirected its efforts to increasing the production of secondary or *palawija* crops since having achieved self-sufficiency in rice. Soybean has received first priority among *palawija* commodities because of its importance as a protein resource.

Before 1975, Indonesia exported small quantities of soybean. Since then, Indonesia has become an importing country. The increased rate of soybean production per year from 1969 to 1985 was 4.75%, whereas the increased rate of consumption per year during that period was 5.74%. Before 1974, imports of soybean were less than 300 tonnes/year, but since 1978, it increased to more than 100,000 tonnes/year, and during 1981 to 1984, the imports peaked at 300,000–400,000 tonnes/year. Indonesia imported 200,000 tonnes of soybean in 1985. Soybean production had been increasing since the beginning of PELITA I, however in 1975 and again 1982 it decreased. Address: Centre for Research and Development of Logistics System, BULOG, Jakarta, Indonesia.

2340. Smis, Tom. 1987. Soybean intensification experience of the FAO technical co-operation programme in East Java. *CGPRT* No. 10. p. 129-40. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia.
• ***Summary:*** In October 1985, the Government of Indonesia initiated a Crash Programme with the objective of obtaining self-sufficiency in soybean production by the end of REPELITA IV. At the beginning of the Crash Programme, the main constraints to soybean production in the country were identified as: 1. The lack of quality seeds of high yielding varieties; 2. The prevalence of pests, diseases and weeds; and 3. The lack of skill and knowledge of the extension workers and farmers in the field of soybean production techniques. The goals of the Crash Programme were set on the removal of these 3 constraints.

Concludes that based on the results of the FAO TCP project (for which extensive data is given), soybean cultivation practiced in a highly intensive way is very profitable. In east Java it would be realistic to expect the average farm productivity to reach 1,750 kg/ha. To reach this level it will be necessary to adopt the whole package of improved cultural practices. Gives numerous specific recommendations. Address: Technical advisor, FAO TCP/INS/6653.

2341. Soegianto, Ir.; Soepani, Ir.; Tabor, Steven R. 1987. Soybean marketing in Indonesia: A regional comparison. *CGPRT* No. 10. p. 68-75. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [6 ref]
• ***Summary:*** The drive for self-sufficiency in soybean production is an important component in the agricultural diversification program of the Indonesian Government. To achieve this goal, a series of production programs, largely consisting of area expansion and improved seed distribution were mounted under a special operation in the fiscal year 1986/1987. Note: The crash-program for soybean development is described in Kedele 1986. Address: 1-2. Director and Head of Marketing Subdirectorate, Directorate of Food Crop Economics and Post-Harvest Processing; 3. Consultant, U.S. Agency for International Development (USAID) Secondary Crops Development Project.

2342. Soejitno, J. 1987. Status and current research of soybean insect pests in Indonesia. *CGPRT* No. 10. p. 217-26. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [21 ref]
• ***Summary:*** Insect pests are one of the major constraints lowering Indonesian soybean yields, which are still low at about 0.865 tonnes/ha. Address: Bogor Research Inst. for Food Crops.

2343. Sumarno, -. 1987. Genetic yield potential of soybeans under non-intensive versus intensive crop management. *CGPRT* No. 10. p. 237-43. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [6 ref]
• ***Summary:*** "Conclusion: 1. Grain yields of soybean over 2.0 tonnes/ha can be achieved in Indonesia if intensive crop management is practiced. 2. High yielding lines and improved soybean varieties yield poorly at 0.8 to 1.0 tonnes/ha when grown under non-intensive crop management with low input levels." Address: Bogor Research Inst. for Food Crops.

2344. Syam, Mahyuddin; Bottema, J.W.T. 1987. Research communication: An observation on soybean. *CGPRT* No. 10. p. 117-27. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [63 ref]
• ***Summary:*** CRIFC (Central Research Inst. for Food Crops) has published 87 papers on soybean since 1980. Of these, 57 written from 1980 to 1986 are listed in a bibliography at the end of this article. All are in Indonesian with no English translations. Appendix 2 lists 7 additional publications on soybeans from CGPRT.

Out of Indonesia's total land area of 192 million ha, only 22 million ha are cropped, of which about 1 million ha are planted to soybean. This is a relatively small area

compared to the area planted to rice and corn covering 9.8 and 3.2 million ha respectively. The average yield of soybean by farmers at present is about 1.0 tonnes/ha. Address: Central Research Inst. for Food Crops and CGPRT Centre.

2345. Syarifuddin K., A.; Darmijati, S. 1987. Research and development of soybean in Sumatra after 1980. *CGPRT* No. 10. p. 343-50. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [20 ref]

• ***Summary:*** "In 1983, regions outside Java, which consist of more than 90% of Indonesia's land area, produced only 25% of its soybean crop... In 1985, soybean production in Indonesia increased by 206,484 tonnes or by 28% over 1984 production. Although the absolute increase occurred mainly in Java, the contribution of areas outside Java increased to 29%. Sumatra in particular showed a significant increment of 71%, Bali and Nusatenggara 46% and Sulawesi 31%. Probably for the first time, soybean production in Sumatra was over 100,000 tonnes for the year.

"Of 8 provinces in Sumatra, Lampung had the biggest increment from 13,177 in 1983 to 40,085 to in 1984... In 1985, a significant increase in soybean production was achieved again. Aceh production increased from 37,255 tonnes in 1984 to 57,411 in 1985 or about 54%. West Sumatra production increased from 2,909 tonnes in 1984 to 13,392 tonnes in 1985." Address: Director & Researcher, SARIF.

2346. Tabor, Steven R.; Gijsbers, G. 1987. Soybean supply/demand prospects for Indonesia. *CGPRT* No. 10. p. 51-61. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [2 ref]

• ***Summary:*** Soybean production is concentrated on Java. In 1986, Java accounted for 61% of total production of soybeans. The Province of East Java alone accounted for 37% of national production. Among other provinces, Sumatra accounts for 22% of total production; Sulawesi for 6.4%, and Bali and Nusa Tenggara for 8.7%. Java also accounts for the bulk of soybean consumption. More than 90% of total consumption of soybean products takes place in Java, according to the 1984 National Socio-Economic Survey (SUSENAS).

In 1986, soybean imports increased by 14% to a total of 343,000 tonnes. The total soybean import bill for 1986 was US$70.3 million. In 1986, soybean meal imports were 285,000 tonnes at a total cost of US$ 59 million. A total of US$ 2 million worth of soybean oil and modified soybean oil were imported in 1985. Small amounts of soybean sauces are also imported. The total value of sauce imports in 1985 was US$ 95,000. In 1986 the total cost of all soybean imports, including beans, meal, oil and sauces, was approximately US$ 131.5 million.

"Per capita consumption of soybeans has increased rapidly from 3.2 kg in 1970 to 5.3 kg in 1980. In 1985, per capita consumption was estimated as 5.9 kg. Based on the large increase in both production and imports in 1986, the 1986 domestic consumption is estimated at 7.9 kg/capita." Aggregate growth in soybean demand will increase at an average of 2.7% per annum in the period 1987-2000. Table is given showing soybean area harvested, yield, production and growth rates from 1969 to 1986 with forecasts from 1987 to 2000. Address: 1. Economist, U.S. Agency for International Development (USAID) Secondary Crops Development Project; 2. Economist, CGPRT Centre.

2347. Taslim, H.; Pirngadi, K. 1987. Constraints on soybean production in Jatiluhur irrigation command areas. *CGPRT* No. 10. p. 267-72. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [6 ref]

• ***Summary:*** Soybean (*Glycine max* (L.) Merr) is the second most important food crop after rice in Indonesia. The low input technology of soybean production may account for the low soybean average yield in Indonesia of 0.7 tonnes/ha. Address: Agronomists, Sukamandi Research Inst. for Food Crops.

2348. Yutono, -. 1987. Inoculation with *Rhizobium* on soybean in Indonesia. *CGPRT* No. 10. p. 175-78. Feb. J.W.T. Bottema, F. Dauphin, and G. Gijsbers, eds. Soybean Research and Development in Indonesia. [9 ref]

• ***Summary:*** The literature on legume-Rhizobium symbiosis is extensive. Indonesia has a Rhizobium inoculation program, which started in 1983 and is called *Intensifikasi Khusus (INSUS) Kedelai.* Since 1980 the Microbiology Laboratory, Faculty of Agriculture at Gadjah Mada University has worked with farmers in transmigration regions outside Java to supply an inoculum called Legin. Address: Faculty of Agriculture, Gadjah Mada Univ.

2349. Cooper, Derek. 1987. Tempeh–"the greatest food since yoghurt." *Listener (The) (London).* March 26. p. 20. [2 ref]

• ***Summary:*** "This July, nutritionists from all over the world will be converging on Java for a teach-in on the scientific and culinary aspects of tempeh, organized by the United Nations University." Address: UK.

2350. Kohn, Florrie. 1987. Asian countries emerge as soybean buyers with clout. *Sun (Schulyer, Nebraska).* March 26.

• ***Summary:*** China produced 404 million bushels in 1986, but need outpaces production. American Soybean Assoc. encourages domestic consumption especially for animal feed to keep China out of the export market. Japan purchases 95% of its soybeans from the U.S.

2351. Kiuchi, Kan; Taya, N.; Sulistyo, J.; Funane, K. 1987. [Isolation and identification of natto bacteria from market-sold natto starters]. *Shokuhin Sogo Kenkyujo Kenkyu Hokoku (Report of the National Food Research Institute)* No. 50. p. 18-21. March. [10 ref. Jap; eng]

• ***Summary:*** Seven bacterial strains were isolated from commercial starters made by 3 companies. Six strains were identified as *Bacillus natto,* a variety of *Bacillus subtilis.* One of the strains isolated from the natto starter made by company #2 consisted of *B. subtilis* which did not belong to *Bacillus natto.* Address: 2. Takano Foods Co. Ltd.; 3. National Biological Inst. of Indonesian Inst. of Sciences, Indonesia.

2352. Manuel, Paciencia C.; Huelgas, Romeo R.; Espanto, Leina H. 1987. Adoption of soybean in Lupao, Nueva Ecija, The Philippines. *CGPRT* No. 7. xvi + 57 p. March. Contains 50 tables. (Regional Co-ordination Centre for Research and Development of Coarse Grains, Pulses, Roots and Tuber Crops in the Humid Tropics of Asia and the Pacific, Bogor, Indonesia). Summarized in Palawija News. 1987. 4(1):10-11. March. [9 ref]

• ***Summary:*** This report describes and analyzes the performance of farmers participating in a package of technology program. Constraints to better yields were lack of water during vegetative growth, the occurrence of pests and diseases, and seed supply.

Some 70-90% of the Philippines' domestic production and imports of soybeans is used for animal feeds. Imports have risen sharply from 136,000 tonnes of soybean meal in 1979 to 291,000 tonnes in 1983. Imports of whole soybeans are small: 30,000 tonnes in 1983. Domestic soybean production in 1983 was a mere 8,000 tonnes.

In human foods, soybeans are most widely used as a coffee substitute. Only small amounts are used to make tofu, soy sprouts, and soy sauces. In 1983 the Philippine Government launched a program to develop soybean production to offset rising soybean meal imports. "The target was to be 130,000 hectares planted to soybean in 1986-1987 with a projected yield increase from 1.2 metric tonnes to 1.8 metric tonnes by 1986-1987. The programme aims at approximately 50% self-sufficiency in soybean in 1986-1987."

In Lupai it was found that 34% of the sample farmers participating in the soybean program achieved yields lower than 500 kg/ha of dry grain. Yields conforming to the national average of 1.2 tonnes/ha were reached by 20% of the participants. "The case study in Lupao permits the conclusion that the present recommended package of technology needs further adaption [adaptation] to farm-level practices; in particular, careful assessment of the place of soybean in the cropping calendar is necessary."

Contents: 1. Introduction; 2. The Farmer and His Environment; 3. Farmer Evaluation of the Pot (Package of Technologies); 4. Economic Evaluation of the Pot Trials; 5. Constraints to Soybean Production; 6. Conclusions and Recommendations. Address: 1. Agricultural Economist, Asst. Prof. & Project Leader, Dep. of Agroc. Economics, UPLB-CDEM, College, Laguna 3720, Philippines.

2353. *Palawija News (Bogor, Indonesia).*1987. Workshop: Soybean Research and Development in Indonesia. Held 24-26 February 1987 at Cipayang, Indonesia. 4(1):1-2, 7, 9, 11.

• ***Summary:*** CGPRT organized this workshop in cooperation with the Agency for Agricultural Research and Development (AARD) and the Central Research Institute for Food Crops (CRIFC). In attendance were 106 scientists from all major research institutes in Indonesia and several overseas institutions. An overview of Indonesian soybean production and consumption is given. The per capita consumption of soybean grain in the country rose from 3 kg in 1969 to 8 kg in 1986. This lead to a major increase in imports. Address: CGPRT Centre, Bogor.

2354. Rutherford, B. 1987. World view: Feedstuff needs and resources. Outlook '87: U.S. share to decline. *J. of the American Oil Chemists' Society* 64(3):300-06, 308-09. March. [1 ref]

• ***Summary:*** Compound feed production in the world continues to increase significantly. The average world production over the years 1974-76 was 290 million tonnes. By 1981, this had risen to 377 million tonnes, an annual growth rate of 4.5%. The increase per year was particularly significant in the developing countries, where it averaged 13.4%. Between 1975 and 1981, in the developing countries, compound production more than doubled, from 20 million tonnes to 43 million tonnes. In Indonesia, construction began in 1986 on a 1,000 to 1,500 tonne/day soybean facility, with operation set to begin in late 1987 or early 1988. Thus, the outlook for U.S. Soybean exports to Indonesia is bright. However, in the Philippines, a soybean processing plant that opened in August 1983 closed in February 1984, and all soybean imports have virtually ended.

China has displaced the U.S. as the principal soybean supplier to Malaysia's expanding processing industry, with China's share growing from 7% of Malaysia's soybean meal market in 1980/81 to 73% in 1984/85; during the same period, the U.S. share dropped from 52% to zero. Taiwan, the top pork-producing country in East Asia is also expanding soybean consumption. China exported 280,000 tonnes of soybeans to Japan last year. China needs the foreign exchange. Japan's import tariffs are some of the lowest tariffs in the world. However, the mark-up within Japan is very high. Food costs are at least three time, and sometimes as much as seven times, higher than in the U.S.

Japan's goals of being 99% self-sufficient in egg production and 96% in broiler production by 1990 offer potential marketing opportunities for soybean meal. Specific American Soybean Assoc. goals in Japan include increasing the crude protein level 1% in layer/broiler feed and replacing 1% of the fish meal with soy meal. Another is to increase dairy crude protein feed levels for a total of 556,000 tonnes of additional soy meal usage.

The European Economic Community (EEC) generally imports about 80% of the Brazilian and Argentine soybean crops plus soybeans from China. During the 1970s, the EEC increased protein in feed rations, helping to expand soybean meal use, but has since limited milk production and cut animal numbers. Address: President, FEFAC (European Assoc. of Animal Feed Manufacturers).

2355. STS–Soya Technology Systems Ltd. 1987. Soymilk in brief: A case that makes sense. 11 Dhoby Ghaut #11-06, Cathay Building, Singapore 0922. 53 p. March. Illust. 21 cm. [9 ref]

• ***Summary:*** A revised edition of their "Soymilk" (1982). A Chinese edition was published at the same time. Contains some material reprinted from other sources without permission.

Contents: The soybean–a few facts. History of the soybean. Uses of soybean. History of soymilk. Varieties of soymilk. Flavor of soymilk. Basic soymilk production methods. Principles of soymilk production. Nutritional aspects of soymilk. Flowchart of soymilk plant. Soymilk today. Soymilk tomorrow. Food for thought. Soymilk glossary. Structure of soybean. Conversion table. Major foods from soybean. References. Address: Singapore.

2356. STS–Soya Technology Systems Ltd. 1987. Membrane filtration for soymilk products. 11 Dhoby Ghaut #11-06, Cathay Building, Singapore 0922. 8 p. March.

• ***Summary:*** Contents: Membrane filtration. Ultrafiltration. Reverse osmosis. Membrane structure/membrane material. Membrane filtration in the food industry. Application of ultrafiltration to soymilk base. Why use ultrafiltration? Products. Concentration of soymilk. Concentration of acidified and coagulated soymilk. Yields. Spreads. Processed tofu/soy paneer. Soy cheese. Production processes for soy spreads, processed tofu, and soy cheese. Processing plant for UF processed tofu. Example of material balance for processed tofu. Address: Singapore.

2357. Yanagida, Fujiharu. 1987. Traditional foods and their processing in Asia. Tokyo: NODAI Research Institute, Tokyo Univ. of Agriculture (Tokyo Nogyo Daigaku, Sogo Kenkyugo). vii + 235 p. Illust. No index. 26 cm. [50+ ref]

• ***Summary:*** "This volume was compiled from manuscripts presented at the seminar entitled "Seminar on Traditional Foods and Their Processing in Asia," which was held on November 13-15, 1986 at the Tokyo University of Agriculture, Japan." About 100 scientists from Japan, Indonesia, the Philippines, Thailand, Burma, Korea, Malaysia, Nepal, and Taiwan attended. The seminar was organized by NODAI Research Institute of Tokyo University of Agriculture. Address: Faculty of Agriculture, Gadjah Mada Univ., Indonesia.

2358. Saperstein, Hilary. 1987. Kosher "ice cream" fine with or without meat. *Jewish Journal (Fort Lauderdale, Florida).* April 23.

• ***Summary:*** "David Mintz grew up in an Orthodox Jewish family in New York. He attended Brooklyn College, where he majored in business. He initially joined his family's fur business. Then he founded a small grocery store in Mountaindale, New York. The population was 18 in the winter, thousands in the summer. One day he was reading a nutrition magazine and he read about tofu. Tofutti is now available in the Soviet Union, Japan, Australia, Canada, Hong Kong, and Singapore."

2359. Alfa-Laval South-East-Asia Pte. Ltd. 1987. Food Processing Research & Development Centre (Leaflet). Singapore. 4 p. April.

• ***Summary:*** Within the centre is a complete Soy Pilot Plant which includes grinding, fiber separation, deaeration and deodorization. "Starting from dry or soaked [soy] beans a soybase product can be produced. The base can then be further processed to soymilk, soy yoghurt, tofu, etc. Also other types of raw materials than soybeans can be used." A moderate fee is charged to use the 600 square meter centre. Contains many color photos of the equipment, soymilk, and several packages.

Note 1. Letter from Monica Kjellker Gimre, R&D manager, Alfa-Laval, Singapore. 1990. Sept. 3. This undated leaflet was first published in April 1987.

Note 2. This is the earliest English-language document seen (May 2006) that uses the word "soybase" to refer to a concentrated form of soymilk, containing 9-12% total solids / dry matter, from which regular soymilk or soymilk products can be made by adding water, flavors, sweetener, etc. Prior to this time, Alfa-Laval used the term "soybean extract" instead of soy base. Address: R&D manager, Alfa-Laval South East Asia Pte. Ltd., 11 Joo Koon Circle, Singapore 2262. Phone: 86 22 711.

2360. *Soybean Update.* 1987. In Indonesia, P.T. Biru & Sons Ltd. plans to distribute the country's first bottled soyoil. May 25.

• ***Summary:*** It will be identified on the label as 100% soyoil. Label will also say "ASA (American Soybean Assoc.) recommends soyoil as a nutritious food for daily use."

2361. *Soybean Update.*1987. American Soybean Association and three Indonesian groups organizing soyfoods workshop in Jakarta July 16 to promote first class image for soyfoods. June 15. p. 3.
• ***Summary:*** The Indonesia Hotel and Restaurant Association, the Food and Beverage Association, and the University of Trisakti are joining forces with ASA. Staff from leading hotels, restaurants, and caterers are expected to attend. They will learn innovative ways to incorporate soyfoods such as tempeh and tofu into menu items. First class restaurants rarely feature soyfoods.

2362. Kokke, Robert; Sudo, Narini. 1987. Indonesia no kenko shokubin, tenpe [Indonesia's health food, tempeh]. *Daizu Geppo (Soybean Monthly News).* June. p. 4-18. [50 ref. Jap]
• ***Summary:*** Contains a lengthy and well documented history of tempeh plus an original bibliography of 50 references. Perhaps the best publication on tempeh seen to date in Japanese. Address: 1. United Nations University (Kokusai Rengo Daigaku), Development Programming; 2. Consultant.

2363. Lindner, Anders. 1987. An introduction to soybean uses. *North European Food and Dairy Journal* No. 6/87. p. 210-15. June. [Eng; Ger; Dan]
• ***Summary:*** Of the 95 million tons of soybeans produced worldwide in 1986, an estimated 75 million tons were crushed, 15 million tons were stock, and 5 million tons were processed without crushing to make human foods. Of the soybeans crushed, 54 million tons became meal and flour, while 13 million tons became oil. Oriental soyfoods can be divided into those originating from traditional soymilk (tofu, yuba, soybean drinks, okara) and fermented products (soysauce, tempeh, miso). Modern soymilk can be formulated to make dairylike products or concentrated by ultrafiltration to make a host of new products. Lists German and Danish names for all basic soyfoods. Each is described briefly. Advantages of using soybeans as a basis for products are discussed with emphasis on biotechnological advances. Address: Soya Technology Systems (STS), Ltd., Singapore.

2364. STS–Soya Technology Systems Ltd. 1987. Storage, cleaning, screening & dehulling of soybeans. The quality of a soymilk depends on the quality of the raw material used (Brochure). 11 Dhoby Ghaut #11-06, Cathay Building, Singapore 0922. 4 p. Also published in Chinese. [Eng; Chi]
• ***Summary:*** Contains 11 color photos with descriptions showing soybeans during the cleaning process.

2365. American Soybean Association. 1987. Soya Bluebook '87. St. Louis, Missouri: American Soybean Assoc. 270 p. July. Index (bold face type indicates advertiser). 22 cm.
• ***Summary:*** This is the last issue of the *Soya Bluebook* published by the American Soybean Association.

Contents: Organization: International associations, government trading agencies. Soy Directory: Oil extraction plants/refineries, manufacturers of edible grade soy products & soyfoods, manufacturers of industrial grade soy products. Soybean manufacturing support industries: Category listings, product handling equipment & supplies, soybean processing equipment & supplies, manufacturing services, alphabetical company listings. Marketing & auxiliary services: Marketing services, commercial services & suppliers, exporters of soybeans & soybean products, importers of soybeans & soybean products. Soy statistics: Metric conversions, tables, charts, graphs. Glossary. Standards and Specifications. Indexes: Alphabetical company listings, Soya Bluebook sections and categories, advertisers. Maps.

The section titled "Soy statistics (tables, charts, graphs) (p. 185-244) is a rich source of information, worldwide. Contents: Soybean production–Area planted / harvested and yield: U.S. soybean planting and harvesting dates. U.S. soybean acreage, yield, and production. U.S. soybean planted acreage by state. U.S. soybean harvested acreage by state. U.S. soybean yield by state. U.S. soybean production by state.

U.S. production of major crops: Soybeans, corn, wheat, cotton (graph). U.S. harvested acreage of major crops: Soybeans, corn, wheat, cotton (graph). U.S. yield per acre of major crops: Soybeans, corn, wheat, cotton (graph). Argentine soybean area, yield and production by province. Brazilian soybean area, yield and production by state. Canadian soybean production. Canadian soybean production and utilization.

Soybean production by major countries (graph). Share of world soybean production by major countries (graph). World soybean production. Soybean acreage by major countries (graph). Share of world soybean acreage by major countries (graph).

Soybeans and soybean products: Supply and disposition: U.S. soybeans: Supply, disposition, acreage / yield and price. U.S. soybean meal and oil: Supply and disposition. Soybean usage in the U.S. (graph). U.S. soybean exports–percent of total usage (graph). Argentine soybeans: Supply and disposition. Argentine soybean meal and oil: Supply and disposition. Brazilian soybeans: Supply and disposition. Brazilian soybean meal and oil: Supply and disposition.

U.S. soybean prices, crop value, farm marketings: Prices of U.S. soybeans: No.1 yellow. Prices of U.S. soybeans: Received by farmers. U.S. soybean price support operations. U.S. soybean crop value. U.S. farm marketings of soybeans.

Soybean processing and products–processing facilities and product value: U.S. soybean processing plants (map).

Value of U.S. soybean products and crush margin.

Meal: U.S. soybean meal: Prices paid by farmers. U.S. soybean meal: Average wholesale price, Decatur. U.S. soybean meal: Beginning stocks, production, exports and domestic disappearance. U.S. oilseed cake and meals: Supply, disposition, and price. World major protein meals: Supply and utilization.

Fat and Oils: World major oilseeds: Supply and utilization. World major vegetable and marine oils: Supply and utilization. Prices of U.S. soybean oil. U.S. soybean oil utilization. U.S. soybean oil value as percent of total soybean value (graph). U.S. soybean oil: Supply, disposition, and price. U.S. edible fats and oils: Supply and disappearance.

Exports and imports–U.S. exports of soybeans by montb. U.S. soybean exports by port and country of destination. U.S. exports: Soybeans by country of destination. U.S. soybean exports by port areas (map). U.S. exports: Soybean oilseed cake and meal by country of destination. U.S. exports: Soybean oil by country of destination. U.S. exports: Soybean oil, P.L. 480, title I and III by country of destination. U.S. exports: Soybean, cottonseed and sunflowerseed oils by country of destination. U.S. exports: Soybean and cottonseed oils by year. Brazilian exports of soybeans and products to major countries. Soybean and product exports by major countries (graph). World share of soybean and product exports (graph).

Before page 199 are two fold-out color maps (color coded by county): U.S. soybean production 1985, and U.S. soybean acreage 1985. Two other maps are: American Soybean Association international offices / world regions, U.S. soybean processing plants, and U.S. soybean exports by port areas.

A full-page table (p. 235) shows U.S. exports of whole soybeans, 1982-1986–Volume of exports (in metric tons) by country of destination and total value each year. Region and country of destination: North America: Canada, Mexico, other, total. South America: Brazil, Colombia, Ecuador, Peru, Venezuela, other, total. Europe and Russia: Belgium & Luxembourg, Czechoslovakia, Denmark, France, Germany (West), Germany (East), Greece, Ireland, Italy, Netherlands, Norway, Portugal, Romania, Soviet Union, Spain, Switzerland, United Kingdom, Yugoslavia, other, total. Middle East. Africa. Asia: China–PRC, China–Taiwan, India, Indonesia, Japan, Korea (South), Pakistan, other, total. Australia & Oceania. Other unidentified. Grand total. Value of exports–total (million $). Address: P.O. Box 27300, St. Louis, Missouri 63141.

2366. Otsuka, Shigeru. 1987. Shôyu sekai e no tabi [A journey into the world of shoyu]. Tokyo: Toyo Keizai Shinpo-sha. 230 p. Illust. No index. 20 cm. [22 ref. Jap]

• ***Summary:*** Contents: A pedigree of shoyu (p. 11). The road to shoyu (p. 35). Shoyu and the world (p. 67). A friend of meat cookery (p. 103). Shoyu... make in the USA (p. 115). Shoyu as a forerunner of Japanese culture (p. 129). A visit to the real centers of the Japanese food boom (p. 159). Shoyu recipe contest (p. 209). Mini-science on shoyu (p. 213). Conclusion (p. 219). Postscript (p. 225).

In the section on "Shoyu and the World," subsection "Exports during the Edo Period" (p. 67-79) it is noted that: "In a book-keeping book under the date Man-en 1 (1860), Aug. 16 it is stated that 4 ceramic bottles of Japanese shoyu were shipped to Jakarta (Java), Indonesia. The shoyu that was exported to Europe was sent via Jakarta, Indonesia, to Holland. It was sbipped in ceramic bottles each containing a volume of 3 gô (540 ml, or about 1 pint). On each bottle, in roman letters, was written the fact that the bottle contained Japanese shoyu. Terms such as "Japansch Zoya" or "JapanschZoya" or "Jap. Soya" appeared on tbe bottles.


One photo (p. 76) shows four (another shows three) of these bottles. Below this name, near the base of many bottles was written the brand "CPD" which is thought to have stood for stood for "Comprador." During the Kan-ei period (1624-1630) some rich merchants in Nagasaki established a company named *Konpura-sha.* The merchants who ran it were called Comprador. [Note: They are now (Oct. 2007) generally known in English as the "Comprador Merchant Guild;" Japanese: *Konpura Nakama].*

It is recorded in the *Kôka Nisshi,* the diary of a voyage by Tôsei? Yanakawa in 1860 (Ansei 7) from Japan to the USA by boat, that "after we landed in Washington state, we didn't have any miso or shoyu, so we had nothing but salt with which to season our meals."

In 1765 tbe French enclycopedist Denis Diderot (lived 1713-1784) wrote a section in his Encyclopedie titled "soui ou soi" about Japanese soy sauce. Note tbat the first term, pronounced soy, is today's French word for soy sauce. The second term, pronounced "swa" apparently no longer exists.

Two black-and-white photos (p. 47) show the outside and inside of the Goyo-Gura in Noda. Page 93 shows a

typical shoyu section in a Japanese supermarket. Address: Toyonaka-shi, Osaka-fu, Japan.

2367. STS–Soya Technology Systems Ltd. 1987. Soymilk makes sense (Ad). 11 Dhoby Ghaut #11-06, Cathay Building, Singapore 0922. 1 p.
• ***Summary:*** Shows two milk bottles, one filled with soymilk, one filled with soybeans, set atop soybeans, with a green field of soybeans in the background. Address: Singapore.

2368. STS–Soya Technology Systems. 1987. Soymilk processes/products (Leaflet). Singapore. 1 p.
• ***Summary:*** Roughly half of the products are made using ultrafiltration (UF), which can be used to remove water or selectively remove food components (such as oligosaccharides). A "cast tofu or paneer" is made using a 2-stage UF concentration. Address: 11 Dhoby Ghaut #11-06, Cathay Building, Singapore 0922.

2369. *Technocrate Magazine.*1987. Collaboration: New soymilk plant at Ghaziabad. July.
• ***Summary:*** India's second and largest to date soymilk plant is being set up at Ghaziabad, Uttar Pradesh, India. It is being supplied by Soya Technology Systems Ltd. (Singapore), in collaboration with the Indian firm Larsen & Toubro Limited (L&T). The 160-million-rupee project, with a capacity of 6,000 liters/hour of soymilk based drinks, is being set up by Amrit Soya and Protein Foods Ltd. Address: India.

2370. United Press International (UPI). 1987. Soybean, heart associations plot tropical fat battle. *National Wire.* Aug. 13.
• ***Summary:*** The Malaysian government is launching a counteroffensive to promote coconut oil in the USA. Soy oil contains 15% saturated fat vs. 92% in coconut oil. Safflower, sunflower, corn, and olive oil contain even less saturated fat than soy oil. Nutritionists advise reducing total fat intake, saturated fats, and cholesterol.

2371. Asian Vegetable Research and Development Center. 1987. Soybean varietal improvement: Proceedings of the international workshop, Jakarta, Indonesia, 21-22 July 1984. P.O. Box 42, Shanhua, Tainan 74199, Taiwan. vii + 93 p. No index. 26 cm.
• ***Summary:*** This collection of 17 different presentations on soybean crop improvement was edited by S. Shanmugasundaram, P. Lastimosa, and N. Llemit. The conference was jointly sponsored by: International Rice Research Inst., AVRDC, International Soybean Program (INTSOY), International Inst. of Tropical Agriculture (IITA), and the Indonesian Agency for Agricultural Research and Development.

On the last page (p. 93) is a list of the 29 participants, with the person's name, institution, and country given for each. Address: Shanhua, Tainan, Taiwan.

2372. Carangal, V.R. 1987. Selection and testing of soybean for rice-based cropping systems. In: Asian Vegetable Research and Development Center. Soybean Varietal Improvement: Proceedings of the International Workshop, Jakarta, Indonesia, 21-22 July 1984. Shanhua, Taiwan: AVRDC. vii + 93 p. See p. 25-30.
• ***Summary:*** Contents: Introduction. Asian rice-farming systems network. Varietal characteristics of soybean. Collaboration with the University of the Philippines. Varietal testing of upland crops. Address: Head, Rice Farming Systems Program, International Rice Research Inst., Los Baños, Laguna, Philippines.

2373. *J. of the American Oil Chemists' Society.*1987. World fats & oils report: Higher oil prices predicted. 64(8):1058-59, 1062, 1064, 1066-78, 1080-85. Aug. [1 ref]
• ***Summary:*** Statistics and general information on vegetable oil production, consumption, and trends in the following countries is given: Australia, Austria, Brazil, Canada, China, Czechoslovakia, Egypt, Finland, France, West Germany, East Germany, Hungary, India, Indonesia, Italy, Ivory Coast, Japan, Korea, Malaysia, Mexico, the Netherlands, Nigeria, Norway, Pakistan, Peru, the Philippines, Poland, Soviet Union, Spain, Sweden, Turkey, Uruguay, Venezuela, and Yugoslavia.

Tables include: 1. World production and consumption of major vegetable and marine oils. 2. Top 10 producers of major vegetable oils (USA, EEC 12 countries, Malaysia, China, Brazil, USSR, Indonesia, East Europe, Argentina, India. The oils: soybean, cottonseed, sunflowerseed, rapeseed, coconut, palm kernel, and palm oil). 3. Top 8 exporters of major edible oils (Malaysia, EEC 12 countries, Argentina, Philippines, USA, Singapore, Brazil, Indonesia). 4. Top 8 importers of major edible oils (EEC 12 countries, Africa, India, USA, Singapore, USSR, China, Pakistan). 5. Margarine, compound fat/shortening, and salad oil production for selected countries (USA, USSR, Japan, India, Pakistan, Netherlands, West Germany, UK, Canada, Poland, Brazil).

2374. Kalayanamitr, Anisa; Bhumiratana, A.; Flegel, T.W.; Glinsukon, T.; Shinmyo, A. 1987. Occurrence of toxicity among protease, amylase, and color mutants of a nontoxic soy sauce koji mold. *Applied and Environmental Microbiology* 53(8):1980-82. Aug. [23 ref]
Address: 1-4. Dep. of Microbiology and Physiology, Mahidol of Science, Bangkok 10400, Thailand.

2375. Kauffman, H.E. 1987. The changing role of INTSOY in international soybean research and development. In:

Asian Vegetable Research and Development Center. Soybean Varietal Improvement: Proceedings of the International Workshop, Jakarta, Indonesia, 21-22 July 1984. Shanhua, Taiwan: AVRDC. vii + 93 p. See p. 21-23.
• ***Summary:*** Contents: Introduction. Historical perspective: Past, present, future (soybean processing and utilization, germplasm preservation, evaluation and enhancement, production, education and communication). Strengthening of the international soybean research network. Address: Director, INTSOY, 113 Mumford Hall, 1301 West Gregory Dr., Univ. of Illinois, Urbana, IL 61801.

2376. Noor, Ramli bin Mohd. 1987. Soybean in Malaysia: Potential and research directions. In: Asian Vegetable Research and Development Center. Soybean Varietal Improvement: Proceedings of the International Workshop, Jakarta, Indonesia, 21-22 July 1984. Shanhua, Taiwan: AVRDC. vii + 93 p. See p. 49-51.
• ***Summary:*** Contents: Introduction. Potential for soybean production. Production constraints. Directions in soybean research. Research highlights. Collaboration with IARCs and other regional centers. Conclusion. Address: Senior Research Officer, Miscellaneous Crop Div., Malaysian Agricultural Research and Development Inst. (MARDI), Kuala Lumpur, Malaysia.

2377. Pandey, R.K. 1987. The role of IITA soybean improvement program in tropical Asia. In: Asian Vegetable Research and Development Center. Soybean Varietal Improvement: Proceedings of the International Workshop, Jakarta, Indonesia, 21-22 July 1984. Shanhua, Taiwan: AVRDC. vii + 93 p. See p. 31-36. [8 ref]
• ***Summary:*** Contents: Introduction. Tropically adapted cultivars. Seed longevity and establishment. Nitrogen fixation in soybeans. Drought and excessive moisture. Insects and diseases. Evaluation and conferences. Address: Agronomist/Breeder, and Coordinator, South and Southeast (Asia) IITA Grain Legume Improvement Program, Rice Farming Systems Program, IRRI, P.O. Box 933, Manila, Philippines.

2378. Potan, Nark. 1987. Soybean research in Thailand. In: Asian Vegetable Research and Development Center. Soybean Varietal Improvement: Proceedings of the International Workshop, Jakarta, Indonesia, 21-22 July 1984. Shanhua, Taiwan: AVRDC. vii + 93 p. See p. 59-62.
• ***Summary:*** Contents: Introduction. Area, planting season, and productivity. Problems in soybean production. Research directions. Research highlights. Collaboration with other agencies. Address: Oilseed Crops Branch, Field Crops Research Inst., Dep. of Agriculture, Banghken, Bangkok 10900, Thailand.

2379. STS–Soya Technology Systems Ltd. 1987. Different types of soymilk plants. 11 Dhoby Ghaut #11-06, Cathay Building, Singapore 0922. 8 p. Aug. 24.
• ***Summary:*** "Only a large capacity soymilk plant is economically viable for making non beany-tasting soymilk with a long shelf life. Non-bean tasting technology is a substantial investment." Photos show various small, medium, and large soymilk systems, each with the country of origin, capacity in liters/hour, and price range. Address: Singapore.

2380. Sumarno, -. 1987. Soybean breeding for Indonesian cropping systems. In: Asian Vegetable Research and Development Center. Soybean Varietal Improvement: Proceedings of the International Workshop, Jakarta, Indonesia, 21-22 July 1984. Shanhua, Taiwan: AVRDC. vii + 93 p. See p. 9-13. [3 ref]
• ***Summary:*** Contents: Introduction. Potential soybean areas. Problems in soybean production. Breeding objectives: Adaptability to minimum or no tillage, and weeding, earliness, seed viability, season specificity, low pH tolerance, shade tolerance, pest resistance, disease resistance, breeding methodology, regional yield evaluation. Research findings. Research collaboration. Address: Soybean Breeder, Bogor Research Inst. for Food Crops, Bogor, Indonesia.

2381. Thein, Pe Maung. 1987. Soybean varietal testing program in Burma. In: Asian Vegetable Research and Development Center. Soybean Varietal Improvement: Proceedings of the International Workshop, Jakarta, Indonesia, 21-22 July 1984. Shanhua, Taiwan: AVRDC. vii + 93 p. See p. 73-75.
• ***Summary:*** Contents: Introduction. Results of varietal testing. Future directions. Address: Deputy General Manager, Food Legumes Div., Agricultural Research Inst., Pyinmana, Burma.

2382. *Media General Financial Weekly (Richmond, Virginia).* 1987. Palmists vs. soyers: Whose fat is better? Sept. 28.
• ***Summary:*** He's a tropical fat cat clad in a white suit and matching broad-brimmed hat. With a cigar and coconut cocktail in hand, he glowers at the world from his comfortable perch on a rattan peacock chair next to a menacing black barrel of palm oil. Americans be warned. This man is evil. He is "Tropical Fats." Malaysia, however, the world's biggest producer of palm oil, is incensed. Malaysian palm oil experts and government officials contend soybean growers are basing their claims on dubious and outdated research.

Malaysia exports only 300,000 tonnes of palm oil annually to the United States, less than 3% of the domestic American market for edible oils. Malaysia, along with other

main producers in Indonesia, Thailand, and Nigeria, can ill afford to lose the thousands of millions of dollars in palm oil export earnings which are at stake. In 1986, Malaysia produced 4.5 million tons of palm oil, representing 60% of the world's crop. Palm oil experts don't deny the oil's saturated fat content, but say that scientific research shows that, unlike other oils, palm oil does not behave as a saturated fat and has characteristics that actually inhibit the build-up of cholesterol.

2383. *Soybean Digest.*1987. Prospecting for new varieties. Aug/Sept. p. 19.
• ***Summary:*** Ted Hymowitz estimates that the Chinese have more than 25,000 soybean strains in their collection. Nearly all the genes in varieties grown by U.S. farmers originate from only 20 plant introductions. Closely related varieties are more likely to be uniformly susceptible to a particular pest than comparatively unrelated varieties. Hence the concern with the narrow genetic base for soybeans, and efforts to broaden it. Soybean rust, not found in the USA, is devastating in Southeast Asia.

2384. Unnevehr, Laurian J.; Gleason, Jane E.; Kauffman, Harold E. 1987. Soybeans in international agriculture. *Illinois Research* 29(2/3):24-26. Summer/Fall.
• ***Summary:*** Soybean cultivation originated in the North China Plain. Today, China is still a major producer of soybean, accounting for about 10% of world production. Other countries in Asia produce only minor quantities. Since 1970, production of soybeans has expanded significantly in four Latin American countries: Argentina, Brazil, Paraguay, and Uruguay. Among the major producers, the U.S. and Argentina have the highest average yields of about 2 tonnes/ha (30 bushels/acre). Lowest average yields, about 1 tonne/ha (15 bushels/acre), are found in China. Over 80% of world soybean production is crushed to provide meal and oil. The soybean is the single largest source of supply in both protein meal and edible oil markets, providing 30% of the world's edible oil and 50% of world supply of protein meal for animal feeds. Its ratio of protein to oil is highest among all oilseeds. The soybean also has high-quality protein compared to other oilseeds.

Because income is a major determinant of soybean meal and oil consumption, it is not surprising that high-income industrial countries are the largest consumers. The European Economic Community (EEC), Japan, and the U.S. account for two-thirds of world soybean meal consumption and one-half of world soybean oil consumption. Recent growth in demand for soybean products has been greatest in less developed countries because incomes are growing most rapidly there. From 1960 to 1980, per capita income in South Korea tripled from $500 to $1,500.

As a result, meat consumption increased from 12 to 40 kilograms per capita. To satisfy increased meat demand, livestock production and feed use also increased rapidly, causing soybean meal consumption to increase from 0 to 300,000 tons in only 20 years. The use of soybeans for food products is a very small part of total use in most countries, but there are some exceptions. For instance, from 1983 to 1985, Indonesia used 92.9% as food; China, 73.8%; and South Korea, 35.9%. Japan protects its domestic soybean processors by confining imports to whole beans. Address: 1. Asst. Prof. of Agricultural Economics; 2. INTSOY agricultural economist; 3. Director, INTSOY, and Prof. of International Agriculture. All: Univ. of Illinois, Urbana, IL 61801.

2385. Maita, Stephen. 1987. Vegetable oil war growing hotter. *San Francisco Chronicle.* Oct. 3.
• ***Summary:*** The American Soybean Assoc., trying to increase its share of the U.S. oil market, has launched a $200,000 ad campaign alleging that tropical fats pose health risks because they contain high levels of saturated fat. Across the Pacific, the Palm Oil Research Inst. of Malaysia is retaliating. The trade group started a six-city U.S. tour to present "new scientific evidence" that tropical oils actually lower cholesterol levels. The $8,000 million soybean industry is concerned because palm oil now accounts for about 10% of the U.S. oil market. That displaces 171 million bushels of soybeans. Palm oil is 52% saturated fat.

2386. *Associated Press Financial Wire.*1987. Cholesterol report goes to the heart of vegetable oil dispute. Oct. 9.
• ***Summary:*** The report on detection and treatment of high blood cholesterol in adults, released Monday by the National Heart, Blood, and Lung Institute, recommended that people with unusually high levels of cholesterol should avoid eating coconut oil, palm oil and palm kernel oil. The soybean association, along with the American Heart Association, the American Dietetic Association and several other health-conscious organizations, are supporting efforts in Congress to require food makers to specify the types of oil their products contain.

But tropical oil producers, led by the Palm Oil Research Institute of Malaysia (PORIM), say the measure is protectionist legislation in disguise. Soybean oil accounts for about 70% of edible oil consumption in the U.S., according to the soybean association. Palm oil, which usually runs cheaper than soybean oil, has about 3% of the market, according to Kurt Berger, a PORIM consultant. PORIM officials are visiting six U.S. cities this month with a traveling academic symposium on the health benefits of palm oil. They are presenting papers that conclude palm oil can help lower blood cholesterol and prevent cancer. They point out that all edible oils contain some saturated fats (15% for soybean oil compared to 50% for palm oil); that not all saturated fats promote cholesterol production; and

that there are different types of cholesterol, some harmful, some not.

2387. Lindner, Anders. 1987. The world soymilk market and Soya Technology Systems (STS) (Interview). Conducted by William Shurtleff of Soyfoods Center, Oct. 21. 7 p. transcript.

• ***Summary:*** This far-ranging and very interesting interview discusses new soymilk developments in India with Noble House Great Shake, Godrej, and Amrit, and in Germany with DE-VAU-GE's big plant. Ultrafiltration offers an innovative new way to automate tofu production, already being tested by Island Spring. Major competitors for soymilk equipment (especially Alfa-Laval) are discussed, and details on the four plants that STS has sold in Germany, India, France and USA (Island Spring). A step by step description of the STS soymilk process is given. STS and Danish Turnkey Dairies were recently purchased by APV Baker, a big British baking equipment company.

Concerning the four plants that STS has sold: "Our biggest and most successful plant was sold to DE-VAU-GE, a Seventh-day Adventist food company in Lueneburg (near Hamburg), Germany. They started production in August 1985 and make Granose and GranoVita brands soymilk, sold mainly in the UK and West Germany, but also in Scandinavia and France. The plant is running at full capacity, which is 3,000 liters per hour of finished soymilk (3.5% protein), or 50,000 liters a day. They currently only make two products. Labels for the UK market read Granose Soya Milk (4 flavors) and Granose Soya Dessert (3 flavors of custard puddings gelled with natural carrageenan, a seaweed extract). Both products are packed in half liter or liter aseptic Tetra Brik cartons. The plant is doing very well, selling all it can make. This is the only one of the four that has started operation.

"We have also sold a plant to Island Spring (Vashon, Washington), which may be the next to start production. The capacity is also 3,000 liters/hour of soymilk base.

"Amrit in India should be in production by mid-1988. Their plant has the same basic capacity as the plant in Germany, but since their soymilk will contain only 2.25% protein, the actual output will be 6,000 liters per hour, which is larger than Germany. They will make both beverages and foods, mainly a paneer type cheese. The beverages will contain Indian flavorings.

"Our fourth plant is in France, but I am not allowed to divulge the name of the company until the product is on the market. They plan to make only liquid soymilk.

"Alfa-Laval installed their first European plant (a small one) in France this year, billing it as the "soymilk development center of Europe, the first plant on the continent" as if our large DE-VAU-GE plant did not exist." Address: STS, Singapore.

2388. *Farm & Country (Toronto, ONT, Canada).*1987. Asians buying plenty: Soy. Oct. 27.

• ***Summary:*** Ontario has captured 66% of Singapore's 41,000-tonne market (soybean). Yet out of Japan's 500,000-tonne annual imports for tofu manufacture, Ontario supplies less than 3,000 tonnes. Canada applies more rigorous grade standards than the U.S., but Canada needs better beans, not just better grading. Buyers believe that American beans are higher in protein. Address: Ontario, Canada.

2389. Bradner, Norman. 1987. Soybeans for the food market. *Seed World (Des Plaines, Illinois).* Oct. p. 44.

• ***Summary:*** Thailand imports nearly 100,000 tonnes/year of soybeans for food use. Japan imports 65,000 to 70,000 tonnes of small beans to make natto. Natto beans can be less than 5 mm in diameter and have a yellow cotyledon and hilum. For tofu, soymilk and miso, importers want high protein, low oil, maximum water soluble proteins, low phytate, high 11S protein fraction, large seed size and high sugar content. But a variety judged good one year can be deemed unsuitable the next. Environmental conditions during seed development play a significant role in determining the final chemical composition. Address: Pulse Breeder, King Agro, Inc., Chatham, Ontario, Canada.

2390. Dashiell, K.E.; Bello, L.L.; Root, W.R. 1987. Breeding soybeans for the tropics. In: S.R. Singh, K.O. Rachie, and K.E. Dashiell. eds. 1987. Soybeans for the Tropics. New York: John Wiley & Sons. xx + 230 p. See p. 3-16.

• ***Summary:*** Contents: Introduction. INTSOY. AVRDC. Brazil's experience. IITA: Seed longevity, nodulation.

Soybean breeding has increased dramatically in the tropics during the past 10 years. International organizations such as INTSOY (the International Soybean Program, Univ. of Illinois), AVRDC (the Asian Vegetable Research and Development Center, in Taiwan), and IITA (the International Institute of Tropical Agriculture, in Nigeria) have programs to develop improved cultivars, as do national agencies in countries such as Brazil, India, Thailand, Indonesia and Zimbabwe.

Since 1973, INTSOY has coordinated international testing of soybean varieties through the International Soybean Variety Evaluation Experiment (ISVEX). ISVEX has focused on testing soybeans in localities where they have not previously been cultivated. AVRDC benefits from its location at the extreme north edge of the tropics.

Most of the soybean production in Brazil is in the subtropical or temperate areas, Rio Grande do Sul, Santa Catarina, Paraña and Sao Paulo (traditional). But since 1970 production has increased dramatically in the tropical areas (see Table 1.3).

In preliminary yield trials at IITA in 1974, the highest yield (3615 kg/ha) was obtained with TGm 249-3.

Unfortunately, all the varieties tested had two weaknesses: they could not form nodules with *Rhizobium* indigenous to African soils and the seed quickly lost its viability when stored under ambient conditions.

In 1975 researchers at IITA began to evaluate soybean varieties for seed longevity. The deterioration of seed after maturity and before harvest is called "field weathering," and it is evidently caused primarily by pathogens.

Developing varieties that have both seed longevity and resistance to field weathering will be essential if soybeans are to be grown in the lowland, humid tropics. A general rule of thumb is that large-seeded genotypes are highly susceptible to incubator weathering and have poor seed longevity. The other major technical obstacle is the inability of common varieties to nodulate with indigenous rhizobia.

IITA noted in its 1986 annual report that its soybean scientists started programs in 1985 in Tanzania and Zimbabwe to actively develop and test improved lines. These regional programs will continue to emphasize promiscuous nodulation and seed longevity. This regionalization should allow IITA to serve national programs more effectively and aid them in quickly developing improved soybean lines. Address: International Inst. of Tropical Agriculture (IITA), PMB 5320, Ibadan, Nigeria.

2391. Haumann, Barbara. 1987. Expanding soybean markets, uses. *J. of the American Oil Chemists' Society* 64(10):1369, 1372-79. Oct.

• ***Summary:*** Value-added products and soybean varieties tailored to produce specific end products are among the promising developments envisioned to expand markets for U.S. soybeans. Keith Smith, staff vice president of research for the American Soybean Association (ASA) said, "Aquaculture–raising fish such as shrimp, catfish and trout–is a growing industry in the U.S. and abroad." Smith went on to say that the switch from mainly production research to more utilization research occurred eight to nine years ago, and that 60% of ASA's total research money in the past 6 years has gone for utilization research.

Genetic research is working to improve the fatty acid content of soybean oil. Work is also under way to develop a quick, low-cost method to determine oil and protein content. Other work includes trying to lower levels of linolenic acid in the oil. At Purdue Univ. in Indiana, research geneticist Niels Nielsen of the USDA's Agricultural Research Service (ARS) is trying to develop soybean lines free of lipoxygenase enzymes. Soymilk and flours produced from the new seeds are rated significantly better in flavor and aroma. Professor Nielsen and his research group are trying to "improve the nutritional quality of the major soy storage proteins by increasing sulfur amino acid content." He noted that the methodology has resulted in doubling and tripling the methionine content. At the University of Kentucky, David Hildebrand is also working on genetic engineering of soybeans.

Brazil, the second largest producer of soybeans, has evolved as the largest exporter of soybean meal and oil. The other top producers are China, in third place; Argentina, in fourth; and India, which recently made the top five. Indonesia is in 6th. Italy's production has grown substantially in recent years to make it the most important soybean-producing area in Europe. Other European producers include France and Spain. According to Oil World Annual published by ISTA Mielke, West Germany, the top 10 soybean oil producers for 1986/87 (in tonnes) were the following: U.S. 5,430,000; Brazil 2,538,000; Argentina 780,000; Japan 715,000; China 679,000; West Germany 521,000; The Netherlands 488,000; Spain 421,000; Italy 350,000; and Mexico 336,000.

ANPA (American Newspaper Publisher's Association) began seeking alternative sources to petroleum for ink seven years ago due to problems with petroleum supplies. Four years ago, with fluctuations in supplies and price, ANPA began considering the use of soybean oil ink. ANPA has filed a soy ink patent application and has begun licensing major ink manufacturers to make it. The first ink manufacturer to produce the ink, colored and black, is General Printing Ink, a division of Sun Chemical Corp., located in Carlstadt, New Jersey. One advantage of soy oil ink is that it is environmentally nonhazardous, which could reduce waste disposal problems. It also eliminates dependence on petroleum. There is less "ruboff" and the same amount of ink will print more pages. One drawback is that black ink made from soybean oil costs more than traditional black ink. Oil content in newspaper ink averages about 70%.

In the March 4, 1987 *Federal Register,* the U.S. Federal Grain Inspection Service (FGIS) ruled that soybean and other edible oils may be used to control grain dust in elevators. A U.S. Patent, licensed to Industrial Fumigant Co., is held jointly by Harold N. Barham and Harold N. Barham Jr. of Seed Technology of Texas. The patent was filed in 1978. Kinsella, director of the Institute of Food Science at Cornell Univ. said that another research interest was in the area of omega-3 fatty acids. It may desirable to develop soybean cultivars with high omega-3 fatty acid levels. John W. Erdman Jr. of the Univ. of Illinois' Dep. of Food Science and co-worker Angela Poneros want to nail down the factors that lower zinc bioavailability. He said, "We want to find out why this happens and if we can increase it."

Meanwhile, at INTSOY, team member Sing-Wood Yeh and others are working in the field of soybean dairy analogs. Tofulicious, a non-dairy frozen dessert, was developed through research coordinated by University of Minnesota food scientist William Breene and funded by the Minnesota Soybean Research and Promotion Council.

Abroad, ASA has been promoting soy-fortified foods. For instance, in Venezuela three years ago, ASA launched an education program for consumer groups and government agencies on the benefits of soy protein. As a result, soy-fortified foods are available in Venezuela's major supermarkets, and demand for soy protein has increased to more than 48,000 pounds per month.

Soybean researchers are also working on standardization of NIR (near-infrared spectroscopy) as a measure of protein and oil content in soybeans. NIR already is successfully used to measure grain and forage composition. If NIR were adopted as a standard by the industry, soybeans eventually could be purchased based on protein and oil content.

2392. Ontario Ministry of Agriculture and Food. 1987. Soybean buyers mission from Japan, Hong Kong, Malaysia, Singapore, October 10-20, 1987. Toronto, Ontario, Canada: Ontario Ministry of Agriculture and Food. 23 p. 30 cm. Saddle stitched. [Eng]

• ***Summary:*** Contents: Mission members (with a photo of each). Itinerary. Japanese market for edible soybeans. General uses of edible soybeans in Hong Kong, Malaysia and Singapore. List of major importers in Asia (by country). Ontario soybean suppliers. Role of the Ontario Soya-Bean Growers Marketing Board (Chatham, Ontario).

This conference, which took place in Toronto, Chatham, and Harrow, Ontario, Canada, was sponsored by OMAF in Toronto. On the mission were 6 buyers from Japan (Takeya Miso Co., Asahi Industries [tofu maker], Takano Foods Co. [natto maker], Dah Cong Hong, Wako Shokuryo Co., and Gomei Shoji Co. [the last 3 is each an importer and wholesaler]), 2 from Hong Kong (Amoy Industries Ltd., and Chung Hing Co.), 3 from Malaysia (Sin Yong Huat Enterprises Sdn. Ltd, Yeo Hiap Seng (Malaysia) Ltd., and Chop Lee Kit Heng), and 2 buyers from Singapore (Eng Huat (S) Ltd. and Chop Hin Leong). Mike Hojo of OMAF/Tokyo was the mission leader.

The Japanese soybean market is about 5 million tons a year. Of this: Oil crushing 4,036,000 tons. Food 849,000 tons (17% of total), and feed (not crushed) 70,000 tons. From 1982 to 1986 domestic Japanese soybean production has decreased from 168,000 tons to 147,000 tons, while imports have increased from 4,344,000 tons to 4,857,000 tons. Demand for food soybeans has increased from 803,000 tons to 849,000 tons. Tofu, miso, and natto account for more than 94% of the total utilization of edible soybeans, roughly as follows: Tofu 500,000 tons, miso 200,000 tons, natto 100,000 tons.

In 1986 some 89.9% of Japan's soybean imports came from the USA, followed by China (6.7%), and Brazil (2.65%). That year the least expensive soybeans came from Brazil (US$219.86/ton), followed by USA ($221.36), China ($236.06), and Canada ($277.50). Note that Canadian soybeans are 25.3% more expensive than those from the USA. Chinese and Canadian soybeans are most widely used to make foods. Large Chinese soybeans are used to make tofu, medium sized for miso, and small for natto. Of the soybeans imported from the USA, 80-85% are imported from oil crushing because of their high oil content. The remaining 10-15%, or approximately 700,000 tons are food soybeans from Iowa, Ohio, or Michigan. Called "IOM" soybeans, they are used mainly to make tofu. Brazilian soybeans have a high oil content and are used for oil crushing only. The ocean freight cost for a 20-foot container shipped to Tokyo is as follows: USA west coast $1,000. Toronto, Canada $1,800. USA East Coast $2,000. Brazil $2,100. Argentina $2,500. But a large percentage of regular soybeans are loaded directly into ships, and travel at lower freight rates. Exports of food soybeans from Canada to Japan rose from 10,000 tons in 1979 to 26,000 tons in 1986, while those from China rose from 267,000 tons in 1979 to 323,000 tons in 1986.

Very detailed preferred characteristics are given for soybeans to make miso (6 characteristics), natto (5), and tofu (5). Canadian soybeans are recognized as superior to Chinese and American soybeans for food use. This is one reason they command a relatively higher price.

Hong Kong imports 28,100 tons/year of soybeans, and 63% of these come from Canada, followed by China (35%), and the USA (1.8%). Malaysia and Singapore import 124,800 tons/year, and 53% of these come from the USA, followed by Canada (31.7%), and China (8.2%). Most of the food soybeans in Malaysia and Singapore are used to make soymilk and tofu.

Soymilk: Vitasoy dominates the market in Hong Kong, whereas in Malaysia and Singapore the leading manufacturers are Yeo Hiap Seng, Cold Storage, Lam Soon, and Nestle. Soymilk consumption is increasing in these 3 countries, and in neighboring countries. Soymilk makers believe there are four requirements for their products' success: It must taste good, must be priced competitively with soft drinks, must be perceived as a health food, and must be marketed properly.

Bean curd sheets and sticks [yuba] are very common snacks and dishes in Hong Kong, Malaysia, and Singapore. Manufacturers consider only Chinese and Canadian soybeans for these products. Canadian soybeans produce whiter soymilk and this whiter yuba. However the larger size of Chinese soybeans results in a larger yield. Manufacturers normally blend 60% of Canadian soybeans with 40% of Chinese soybeans to obtain a higher output of whiter sheets.

Major Japanese soybean importers include: Da Chong Hong (Japan) Ltd., Gomei Shoji Co. Ltd., C. Itoh & Co. Ltd., Mitsubishi Corp., Kanematsu-Gosho Ltd., Nichimen Corp., Marubeni Corp., Mitsui & Co. Ltd., Nissho Iwai

Corp., Okura & Co. Ltd., Toyo Menka Kaisha Ltd., Wako Shokuryo Co. Ltd. Address: Ontario, Canada.

2393. Pandey, R.K.; Sumarno, -; Potan, Nark; Navarro, R.; Dharmasena, C.; Beg, Akhtar. 1987. Asia's shortfall in production of soybeans and the response of national programmes. In: S.R. Singh, K.O. Rachie, and K.E. Dashiell. eds. 1987. Soybeans for the Tropics. New York: John Wiley & Sons. xx + 230 p. See p. 101-09.
• ***Summary:*** Contents: Introduction. Constraints. National research programmes: Varietal improvement, cultural practices. Cooperative research: A new dimension.

Demand for soybeans and products in the region is about twice the regional production. By the year 2000, if current trends continue, Asia's demand for soybeans is projected to be more than three times the amount produced.

The leading soybean producers in Asia, in descending order of tonnes produced in 1983, are China, India, Indonesia, Korea, and Thailand. In Indonesia, soybean production during the past 10 years has been constant at about 700,000 tonnes (metric tons) per year; soybeans are produced mainly in Java.

In 1984 Thailand produced 284,000 tonnes, which was far below its demand of about 350,000 to 450,000 tonnes. A national program set a goal of producing 390,000 tonnes by 1986.

In the Philippines, Mindanao, located in the south, is the leading soybean producer. During the last 10 years, producing has gradually increased, however in 1983 only 8,320 ha were planted to soybeans; that year, imports totaled 261,000 tonnes of soybean meal and 31,000 tonne of whole soybeans.

In Pakistan, commercial soybean production began in 1970 and is concentrated in the North Frontier Province, Sind and Punjab. The area planted to soybeans is small (4,300 ha) but the potential for expansion is very large.

Vietnam produces only about 1% of Asia's soybeans, however the amount is increasing.

The following countries started research programs on soybean breeding and production at an early date: China, Indonesia, Thailand, India, Philippines, Korea, and Sri Lanka; these programs have made great progress during the past few years. China has large and well-run germplasm collections.

Since 1967, the Indian Council on Agricultural Research has had an interdisciplinary team working on soybeans. The project's headquarters are currently at Pantnagar, and a network of 19 centers throughout India tests varieties and production techniques.

In Indonesia, soybean research is coordinated by the Central Research Institute for Food Crops in Bogor, and conducted by five research institutions.

In Thailand, soybean research is coordinated by the Field Crop Research Center at Chiangmai.

In Sri Lanka, in 1973, the government initiated soybean research, with technical assistance from the International Soybean Program (INTSOY), to promote soybean production and utilization in the country.

In 1984 the Asian Soybean Improvement Network (ASIN) was launched in a cooperative effort to extend the resources devoted to research by national programs, IITA, IRRI, AVRDC, INTSOY, the Australian Centre for International Agricultural Research (ACIAR), and the United Nations Economic and Social Council for Asia and the Pacific. The network is coordinated by representatives of AVRDC and IITA.

Figures show: (1) Pie charts–Asia's proportion of world area and production of soybeans. Concerning world production, Asia has about 15.7% of the total, compared with 57.3% for North and Central America, 24.6% for South America, and 2.4% for others. Within Asia, China has 79.1% of Asia's total soybean production, followed by India (5.9%), Indonesia (4.5%), Korea (3.0%), Others (incl. Japan; 7.2%).

(2) Pie charts–Trade in soybeans, soybean meal and oil in Asia and the world. For soybean oil imports, Asia is the leader (37.9% of the world total), followed by Europe (24.5%), Africa (13.9%), South America (12.5%) ad Others (9.2%). For soymeal imports, Europe is the leader (73.0% of the world total), followed by USSR (10.2%), Asia (8.2%), and Others (8.6%). For whole soybean imports, Europe is the leader (58.0% of the world total), followed by Asia (30.6%), North & Central America (6.4%), USSR (5.0%), and Others (0.0%). Within Asia, for soybean oil imports, India is the leader (36.4%), followed by Iran (22.9%), Pakistan (19.3%), Turkey (6.4%), Bangladesh (3.57%), and Others (11.4%). For soymeal imports, Korea is the leader (15.2%), followed by Philippines (14.7%), Iran (12.9%), Japan (12.5%), Thailand (10.0%), Malaysia (8.0%), Others (26.7%). For whole soybean imports, Japan is the leader (61.2%), followed by China (17.5%), Korea (6.6%), Israel (6.6%), Indonesia (2.7%), and Others (3.9%).

(3) Changes in the area planted to soybean over the past 15 years (1965-1983) in selected Asian countries. Graphs of India, Thailand, Indonesia (which have increased, with India's graph increasing dramatically), Asia, China, and Korea (which have decreased somewhat).

(4) Soybean production, consumption, and projected demand in Asia by the year 2000 (Source FAO, 1960-83; IFPRI, 1977). Asia will have to steadily increase its imports of edible oils, since consumption (production + imports) of soybeans is falling behind demand. Address: 1. International Rice Research Inst., Los Baños, Philippines; 2. Central Research Inst. for Agriculture (Lembaga Pusat Penelitian Pertanian), Bogor, Indonesia; 3. Field Crops Research Inst., Dep. of Agriculture, Bangkhen, Bangkok, Thailand. 4. Inst. of Plant Breeding, Univ. of the Philippines, Los Baños,

Philippines. 5. Soybean Project, Peradeniya, Sri Lanka. 6. Agricultural Research Council, Islamabad, Pakistan.

2394. Root, W.R.; Oyekan, P.O.; Dashiell, K.E. 1987. West and Central Africa: Nigeria sets example for expansion of soybeans. In: S.R. Singh, K.O. Rachie, and K.E. Dashiell. eds. 1987. Soybeans for the Tropics. New York: John Wiley & Sons. xx + 230 p. See p. 81-85.

• ***Summary:*** While focusing on developments in Nigeria, this interesting account also describes developments with production and utilization in Zaire, Cameroon, Ghana, Ivory Coast, Senegal, Burkina Faso, Togo, and Benin.

Nigeria is the largest producer of soybeans for food use in West and Central Africa. Zaire, Cameroon, and Ghana also produce and consume soy beans. Soybeans may be the most practical means of relieving kwashiorkor (protein-calorie malnutrition), which is increasing in prevalence among young children in the densely populated humid tropics... The successes experienced by people introducing food use of soybeans into villages in West and Central Africa have been encouraging

Nigeria: As the largest producer of soybean, Nigeria also has the most extensive research programme. In 1908 soybeans were first introduced to Nigeria, but the first successful cultivation was in 1937 with the variety Malayan, which was used for commercial production in Benue State. Since then, many small-scale farmers in this part of south-central Nigeria have incorporated soybean in their cropping system. Less important areas of production are in southern Kaduna State and in the Federal Capital Territory and adjacent Niger State [in Nigeria]. Large-scale farmers, particularly in the guinea savanna, on the Jos Plateau and in the derived savanna of Oyo State, have recently become interested in soybean production.

Before Nigeria's civil war [1967-1970, Biafra], all the soybeans produced in the country were exported; now almost all the local production is used for 'dawa-dawa,' a traditional condiment made and sold by women operating small businesses in southern Kaduna State.

Since Nigeria's recent ban on imports of vegetable oil, some mills in the country are turning to soybeans as a source of edible oil.

The present expansion of soybeans in Nigeria has been founded on years of research. In the mid-1960s, the Institute for Agricultural Research (IAR) started a breeding programme for soybean and in 1983 initiated the release of two lines from a cross between Malayan and Clemson Non-shattering.

In 1980, soybean scientists in Nigeria adopted a nationally coordinated approach to soybean research that was subsequently endorsed by the federal government.

Four major research institutes–the Institute of Agricultural Research and Training, the National Cereals Research Institute, IAR and IITA–carry out the bulk of Nigeria's soybean research. The coordinated research projects have been reported elsewhere by Oyekan.

Note: This document contains the earliest date seen for soybeans in Nigeria (1908). Unfortunately the source of the information is not cited.

Zaire: Like Nigeria, Zaire has a history of soybean production by indigenous farmers. Soybeans were introduced and promoted first by missionaries before the nation won independence, and they are now considered a medicinal food to prevent and cure the wasting effects of kwashiorkor.

For the past 6 years, researchers from l'Office National de la Recherche et du Développement in Zaire, with the cooperation of scientists from AID (the United States Agency for International Development) have conducted a breeding program in three stations and have identified at least two improved varieties suitable for different regions of the country. Yields of experimental lines have surpassed 2.5 tonnes per ha in research trials.

Cameroon: Research on soybean in this country, where the crop was reportedly introduced in 1924 (Numfor, 1983), focuses not only on varietal development and testing but also on utilization and extension.

Research on utilization and extension has focused on increasing industrial and household use of soybeans. At last report, the low price for soybean deterred its commercial production, but homemakers, introduced to the crop through demonstrations, had begun to accept it.

"Ghana: Published research on soybeans in Ghana dates from at least the 1950s, and local farmers in the north grow the crop for home use." Homemakers grind the beans into flour and use them in various local dishes.

Côte d'Ivoire [Ivory Coast]: In 1978 Côte d'Ivoire began a project in cooperation with scientists in Brazil to develop 2,000-ha seed farms for soybeans and maize at four sites in the country (derived savanna to northern guinea savanna).

"Senegal: For the past 15 years [i.e. since 1972] IRAT [Institut de Recherches Agronomiques Tropicales] has conducted a breeding program as well as research on agronomic practices for soybeans in Senegal, including suitable strains of rhizobia for inoculant. Recently, the research effort has been taken over by l'Institut Sénégalais de Recherche Agricole. Lines from this breeding program have been successful in Côte d'Ivoire, Togo, and Cameroon. Testing in Senegal has focused on the region of the Senegal River, where trials have yielded good results. Yet few local farmers are growing soybeans.

Other countries: In Burkina Faso, in 1958, soybean cultivars were introduced for experimental studies; after suitable varieties had been identified, efforts to popularize the crop began in the 1970s (Picasso, 1985). Togo and Benin have also identified suitable soybean varieties and have begun extension programs for the crop.

The future: Nigeria offers the best example in Africa of the potential for soybean production and use. The country has dramatically increased production from an estimated 30,000 ha in 1983 to 110,000 ha in 1986. The increase resulted from: (1) Government policies to produce food locally rather than import it. (2) Research to develop improved varieties and practices for all the agroclimatic zones in the country. (3) Emphasis on developing recipes that substitute or incorporate soybeans in traditional foods. (4) Willingness of local manufacturers to use soybeans in baby foods, vegetable oils and animal feeds. (5) Promotion of soybeans by organizations such as the river basin development authorities, agricultural development projects, hospitals, schools and local governments.

The rapid increase in production is expected to continue for many years. By 1996, Nigeria should have at least 1 million ha being cultivated with soybeans. Address: 1&3. International Inst. of Tropical Agriculture (IITA), PMB 5320, Ibadan, Nigeria; 2. Obafemi Awolowo Univ., Inst. of Agricultural Research and Training, Moor Plantation, Ibadan, Nigeria.

2395. Singh, B.B. 1987. Soybean research and development in India: Introduction and history to 1965 (Document part). In: S.R. Singh, K.O. Rachie, and K.E. Dashiell. eds. 1987. Soybeans for the Tropics. New York: John Wiley & Sons. xx + 230 p. See p. 111-12. Chap. 11.

• ***Summary:*** "Soybean was probably introduced to India from China through the Himalayan mountains several centuries ago. Some believe that it was also brought via Burma by traders from Indonesia. Small, black-seeded varieties were successfully grown in the central provinces of India in 1882 (Lal, 1968), and soybean has been cultivated in the northern hills since time immemorial.

The crop was initially established and successfully cultivated on the slopes of the Himalayas up to about 2,000 "meters in Himachal Pradesh, Uttar Pradesh, Bihar, West Bengal and Assam; referred to locally as Bhat, Bhatwan, Bhatmas, Ramkulthi, Garakalay and Kalitur, it did not become popular in the plains except for a few pockets in Bihar and Madhya Pradesh. The reason was probably partly the production problems and partly the available alternative crops. However, because of the protein and oil content of soybean and other attributes such as its beneficial effect on soil fertility, several attempts were made in the past to develop varieties suitable for the plains of India. Unfortunately, before 1960, most of the attempts failed. With the establishment of numerous agricultural universities between 1960 and 1963 and the impetus from a general food scarcity particularly for protein and vegetable oil in India, a fresh attempt was initiated in 1965 to popularize soybean.

In 1967, the Indian Council of Agricultural Research (ICAR) provided financial and infrastructural support and launched an all-India coordinated project for research on soybean. The success of the project has been phenomenal: from a negligible area in 1968, soybean is now being cultivated on more than 1 million hectares and has given birth to a chain of soy-based industries.

"Before 1965: The first systematic attempts to develop varieties of soybean suitable for Indian environments were in the early 1900s at Pusa Agricultural Research Farm in Bihar State; the work was eventually extended to Bengal, Orissa, Uttar Pradesh, Delhi, Punjab, Madhya Pradesh, Maharashtra, Madras and Rajasthan... Several varieties were evaluated at Pusa farm between 1917 and 1924...

"Research in Uttar Pradesh was initiated in 1943 at Kanpur with 100 lines from the USA and 139 lines from other sources... Work on soybean improvement in Punjab began in 1947 and about 90 varieties were evaluated; Punjab Soy No. 1 was developed and recommended for cultivation in the Kangra valley [in India].

"The Indian Agricultural Research Institute also initiated work on soybean at Delhi in 1947, and a number of varieties from the USA were evaluated. Monneta was found to yield well for both grain and fodder.

"Considerable work was also done on soybean improvement in West Bengal at Kalimpong and Berhampore, resulting in three improved varieties: Soyamax, K-30 and Barameli. Soyamax is still cultivated in the Kalimpong area.

"Soybean improvement in the central and southern parts of India began in the early 1900s–almost at the same time as at Pusa farm–and continued until the late 1950s. A number of lines were evaluated at Nagpur, Jabalpur, Seoni, Indore and Powerkheda in Madhya Pradesh; Yeotmal in Maharashtra and Madras in Tamil Nadu, and several selections were made. Some of these were recommended for general cultivation. A variety called Kalitur is still being grown in Madhya Pradesh.

"Despite all these efforts, soybean did not become established on the plains of India except within a few pockets in Uttar Pradesh, Madhya Pradesh and West Bengal. Farmers remained indifferent toward soybean perhaps because of problems in production combined with the unsuitability of soybean for use as dhal. Also, at the time, no oil or other processing industries existed to create a market for the crop." Address: International Inst. of Tropical Agriculture, Ibadan, Nigeria.

2396. Thottappilly, G.; Rossel, H.W. 1987. Viruses affecting soybean. In: S.R. Singh, K.O. Rachie, and K.E. Dashiell. eds. 1987. Soybeans for the Tropics. New York: John Wiley & Sons. xx + 230 p. See p. 53-68.

• ***Summary:*** Contents: Introduction. Soybean mosaic virus. Cowpea milk mottle virus. Indonesian soybean dwarf virus. African soybean dwarf virus. Mungbean yellow mosaic virus / Horsegram yellow mosaic virus. Cowpea yellow

mosaic virus. Cowpea severe mosaic virus. Tobacco ringspot virus. Tobacco streak virus. Peanut mottle virus. Soybean stunt virus. Bean yellow mosaic virus. Alfalfa mosaic virus. Cowpea aphid-borne / Blackeye cowpea mosaic / Azuki bean mosaic. Blackgram mottle virus. Soybean crinkle leaf virus. Soybean yellow vein virus. Other whitefly-transmitted diseases. Viruses from other regions. Diseases caused by mycoplasma-like organisms. Conclusions.

Eighteen viruses have been reported from soybeans in the tropics. Beyond doubt soybean mosaic viris (SMV) is the most frequently isolated virus of soybean; it probably occurs wherever soybean is grown. The disease caused by SMV was noted by Clinton (1916) in the USA as early as 1915. A discussion of each virus is given. Address: Virology Unit, International Inst. of Tropical Agriculture (IITA), PMB 5320, Ibadan, Nigeria.

2397. Hymowitz, T. 1987. Present research on soybeans (Interview). *SoyaScan Notes.* Nov. 13. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** 1. Plate tectonics: The distribution of the genus follows the plates. The wild Glycine is not found east of the Andesite line. This research aims to show the ancient place of origin of the soybean before domestication. Lots of field research is involved, collecting in Oceania and Southeast Asia, plus study of botanical literature. Plans to collect in Taiwan and the Ryukyus. 2. Dissemination of the soybean in Illinois after its introduction by Dr. Benjamin Franklin Edwards. 3. Trading between Sweden and China in early days. Address: Dep. of Agronomy, Univ. of Illinois.

2398. Freedman, Alix M.; Waldholz, Michael. 1987. A different oil war breaks out, and now the fat is in the fire. Malaysia's palm-oil forces take on U.S. soybeaners; at issue: Health & money. *Wall Street Journal, European Edition.* Nov. 18. p. 1, 10.

• ***Summary:*** A cutting, comical review of the battles to date. All tropical fats account for only 5% of the $2,000 million cooking oil market; soy oil has 80%. The Malaysians, however, worry that the soybeaners' war of words will spill over U.S. borders and hurt their sales elsewhere in the world, where their major markets lie. American soybean farmers should be more worried about Canadian rapeseed oil, which has only 7% saturated fat. This is a trade issue which has been carried into the science and health arena. Malaysians and Filipinos raise the risk of Communist insurgency. Address: Heerlen, Netherlands.

2399. Weiss, J.M. 1987. Malaysia and U.S. slipping and sliding over palm oil exports. *Christian Science Monitor.* Nov. 20.

• ***Summary:*** The heavy publicity campaigns on both sides ignore one fundamental fact: More than 60% of palm oil imports [to the U.S.] are channeled for industrial uses.

2400. *Soybean Update.* 1987. Malaysia is developing a palm hybrid designed to yield a vegetable oil that is low in saturated fat. Nov. 23. p. 3.

• ***Summary:*** This according to the Journal of Commerce. A low saturated fat palm presently exists but produces little oil per plant. The experimental hybrid would yield much more oil.

2401. Pedraza, Juan Miguel. 1987. Tropical fats won't go away but ASA's ad campaign will. *Adweek (Grand Forks, North Dakota).* Nov. 30.

• ***Summary:*** Asian producers of "tropical fats" found a strong ally in U.S. Trade Representative Clayton Yeutter, who opposes the health hazard labeling that the American Soybean Association (ASA) wants on products containing palm or coconut oils. Asian reaction to the ASA fat-cat smear campaign became so heated that riots occurred outside U.S. embassies. The ASA ads that angered tropical fats producers feature a mean-looking white-suited hombre sitting in a tropical-style wicker throne, next to a barrel of tropical oil, chomping a big cigar. The print says the tough guy is hawking vegetable oils that are bad for health and no good for U.S. farmers. The ad bristled with animosity and conveyed a thoroughly despicable image of tropical fat producers. ASA's real message–that tropical fats are bad for your health–got lost in the insult.

But tropical fats won't go away. In the last 5 years Malaysia's production of palm oil has nearly doubled. Indonesia has boosted its production too. In September the U.S. imported 131.5 million lb of coconut oil, up more than 50% from a year ago. Palm kernel oil imports rose to 35 million pounds from 16 million lb a year ago.

2402. American Oil Chemists' Society. 1987. Vegetable protein for human and animal use is subject of 1988 world congress and expo in Singapore (News release). 1608 Broadmoor Dr. (P.O. Box 3489), Champaign, IL 61821-0489. 2 p. Dec.

• ***Summary:*** The conference will be held Oct. 2-7, 1988. It is expected to attract 1,000 people. Address: Champaign, Illinois.

2403. *J. of the American Oil Chemists' Society.* 1987. Tropical fats labeling: Malaysians counterattack ASA drive. 64(12):1596, 1598. Dec.

• ***Summary:*** "Malaysia's palm oil industry, stung by an American Soybean Association (ASA) drive to require foods with palm, palm kernel or coconut oil that are sold in the U.S. to be labeled differently than foods with other fats, held one-day seminars in six U.S. cities during October to counterattack. Malaysians agreed that palm oil has about 50% saturated fat, but cited research in Europe and North

America that palm oil may have an antithrombotic effect greater than that of less saturated oils and contended that palm oil's high carotenoid and tocopherol content may convey some protection against cancer...

"In their counterattack on soy oil, palm oil spokesmen noted that the British government has said *trans* content of oils should be considered part of the saturated content of an oil on food labels identifying saturated-unsaturated levels, and that there has been evidence linking more rapid development of cancer with polyunsaturated fats in the diet."

2404. Jacobson, Jodi L. 1987. Planning the global family. *Worldwatch Paper* No. 80. 56 p. Dec. Worldwatch Inst., Washington, DC.

• ***Summary:*** Over the past two decades, steadily declining birthrates have contributed significant improvements to the health and well being of millions of people and to the growth of national economies. Yet the world population increased by 87 million people in 1987, the largest annual increment ever. Encouraging small families requires a two-pronged strategy: family planning and social change. With few exceptions total fertility rates in the industrial world are below replacement level. The most dramatic declines in total fertility rates (number of children per woman) took place in East Asia and Cuba. From 1960 to 1987 the average number of children per woman fell as follows: Singapore 75%, Taiwan 72%, South Korea 65%, Cuba 62%, China 56% (from 5.5 to 2.4 children/woman), Chile 55%... Mexico 44%, Brazil 44%, Malaysia 43%, Indonesia 41%... India 31%. But in Sub-Saharan Africa, fertility rates have not declined at all. Address: Washington, DC.

2405. Rachim, A.; Sunarlim, N. 1987. Economic evaluation of N-fertilizer trial on soybean at Garut, Ngawuku season, 1986/87. *Palawija News (Bogor, Indonesia)* 4(2):4-6.

• ***Summary:*** Optimum economic fertilizer treatment is 150 kg/ha. This gives a net yield of 1,022 kg/ha compared with 420 kg/ha when no nitrogen was added. Address: 1. Research Associate, CGPRT Centre, Bogor; 2. Agronomist, BORIF.

2406. *SoyaScan Notes.*1987. New Trend: Rebirth of interest in research on industrial utilization of soybeans–based on the early concept of chemurgy (Overview). Dec. Compiled by William Shurtleff of Soyfoods Center.

• ***Summary:*** As early as 980 A.D. the Chinese were using soy oil, mixed with tung oil, for caulking boats. It was widely used as an illuminant in homes and temples lit with wicked oil lamps, until the 1920s, when it was replaced by kerosene. By the 1920s it was widely used in China to make soft soaps (that were known for their ability to give a good lather in hard water), lacquers, paints, printing inks, and waterproof cloths and umbrellas.

By the 1500s, soybean cake began to be widely used in China as a fertilizer, primarily as a source of nitrogen and organic matter, but also for its content of phosphorus and potassium.

The earliest document seen that mentions industrial uses of soybeans in the West appeared in 1880, when L.C. Bryan, an American, noted that soy oil could be used as a substitute for linseed oil in paints, or be burned in lamps. In 1909 soybeans were first imported in significant quantities to Europe; they were purchased solely for their oil, most of which was made into soap. The world's first use of soy oil to make soap was in 1909 in England or Sweden. Manchuria was also soon using large amounts of soy oil in soaps. In 1909 Goessel, a German, developed and patented the first rubber substitute from soy oil. That same year, Henry A. Gardner of the Paint Manufacturers Assoc. of the U.S. began extensive research on the use of soy oil to partially replace linseed oil in paints and varnishes. In 1912 Beltzer, a Frenchman, developed a soy protein plastic, Sojalithe, which he soon produced commercially on a large scale. By 1916 the main use of soy oil in America was in soaps, where it replaced cottonseed oil. In 1917 Satow, a Japanese, published the first of many articles from that country on the use of soybean proteins to make plastics.

The heyday of interest in industrial utilization of soybeans took place in America during the 1930s and Great Depression, spurred largely by the work of Henry Ford (who began focusing on soybean research in Dec. 1931), the Farm Chemurgic Council (founded in 1935), the Chemurgic movement, and the U.S. Regional Soybean Industrial Products Laboratory (founded 1936 at the University of Illinois). The goal was to make industrial products from farm crops to help depressed farmers. The soybean was one of the great success stories of the Chemurgic movement. In 1933, the peak year percentage-wise, a remarkable 70% of all soy oil in the USA went into industrial, non-food uses–primarily paints and varnishes, followed by soaps, linoleum, and oilcloth. Large amounts of soy flour were made into plywood glue, especially by the I.F. Laucks Co. In 1936, the peak year for publications, some 59 publications on industrial uses appeared. In 1935 the Glidden Co. in Chicago built the first small plant for production of industrial grade soy protein isolate, which they called "Alpha" protein.

Active work in this field accelerated during World War II, when soybeans were used to make products that were in short supply. In 1941, after imports of tropical oils from Southeast Asia had been suddenly cut off by the Japanese military, use of soy oil in industrial products skyrocketed to its historical peak in absolute terms; 74.25 million lb were used that year. Of this, 56% was used in paint and varnish, and 33% in soap. But by 1944 industrial uses of soy oil had fallen to only 17 million lb. During the 1950s, a period of huge surpluses for most U.S. farm crops (and of predicted

soybean surpluses... which never materialized), research focused on industrial products that could alleviate the surpluses. During the 1960s, as surpluses disappeared, the concern for world hunger and protein shortages grew, and petroleum came to dominate industrial utilization, research switched from utilization to production.

This focus continued until the mid-1980s, when foreign soybean competition, largely from Latin America, and huge surpluses of soy oil led to a rebirth of interest in research on soybean utilization, especially industrial utilization, that could lead to new value-added products for new markets. Promising applications included soy oil for printing inks, dust suppressants, diesel fuels, and the like.

There was little interest, however, in food utilization research (other than soy oil) in the U.S. since the total amount of soybeans used in foods was still quite small, and soybean farmers feared that the resulting products would compete with meat and dairy products, which require the use of more soybeans.

2407. U.S. International Trade Commission. 1987. U.S. global competitiveness: Oilseeds and oilseed products. Washington, DC: USITC. xxii + 214 p. No index. 28 cm. Plus 17 p. Appendixes. USITC Publication 2045. Dec. [100 ref]

• ***Summary:*** This is a "Report to the Committee on Finance, U.S. Senate, Investigation No. 332-240, Under Section 332(g) of the Tariff Act of 1930." It is filled with valuable tables, statistics, and analyses.

Contents: 1. Introduction, 2. Global market dimensions. 3. Oilseed complex of the United States. 4. Oilseed complex of the European Community. 5. Oilseed complex of Argentina. 6. Oilseed complex of Brazil. 7. Oil palm industry of Malaysia. 8. Status of U.S. competitiveness. Appendixes. Figures. Tables.

Soybeans have lost ground to other oilseeds in the production upswing. Rapeseed, cottonseed, sunflowerseed and peanuts accounted for almost 75% of the growth in worldwide oilseed production between 1979-80 and 1985-86. Their market share grew from 40% to 44%, while the market share for soybeans fell from 56% to 51%. Developing countries with improved agricultural output and more money in their pockets initially splurge on vegetable oil, not oilseed meal. The U.S. share of the world soybean market dropped from 78% in 1984 to 65% in 1987. The ITC study forecasts continued decline. In January 1986, there were 73 soybean crushing mills in the U.S. operated by 13 firms with the capacity to crush a total of 115.5 million short tons daily. Of these, the four largest firms held 77% of crushing capacity, and the 8 largest 93%. Illinois is the leading soybean crushing state with 24% of total capacity (13 mills), followed by Iowa (17%, 10 mills), Minnesota (7%, 4 mills), and Missouri (6%, 4 mills). Table 3-25 lists soybean related mergers and other asset transfers in the U.S. soybean processing industry, Sept. 1983 to Sept. 1987. Address: ITC, Herbert Hoover Building, 14th St. & Constitution Ave. N.W., Washington, DC 20230. Phone: 202-252-1807.

2408. U.S. International Trade Commission. 1987. Status of U.S. competitiveness (Document part). In: USITC. 1987. U.S. Global Competitiveness: Oilseeds and Oilseed Products. Washington, DC: USITC. xxii + 214 p. See p. 8-1 to 8-32. Chap. 8. USITC Publication 2045. Dec. [100 ref]

• ***Summary:*** Contents: Introduction. The changing structure of oilseed product markets and the loss of U.S. market share: The U.S. share of world markets, macroeconomic effects of U.S. export performance (the value of the U.S. dollar, stagnant world economic growth, the debt crisis in non-petroleum developing countries), technological development (research and development, cost differentials {farm costs, processing costs, transportation costs}), government involvement in agriculture (U.S. government agriculture policies, foreign government agriculture policies), multinationalization (multinational enterprises or MNE's).

U.S. adjustment efforts: Strategic responses to foreign competition, cost reduction and capital expenditures. Industry views of U.S. competitiveness: Questionnaire respondents (the Commission's questionnaire asks nine of the largest U.S. soybean processors for their views on U.S. competitiveness; competitive assessment of foreign rivals–Brazil, Argentina, Malaysia, Spain, and EC-11 except Spain, effects of U.S. and foreign government policies), industry testimony (National Soybean Processors Association, American Soybean Association). Prospects for the future.

Tables: 8-1. U.S. shares of selected world markets related to soybeans, 1978-1986. 8-2. Real and nominal exchange rate indexes for the U.S. dollar against currencies of major exporters of oilseeds and oilseed products, in units of foreign currency per dollar, 1980-1986. 8-3. Effects of real appreciation and depreciation of the U.S. dollar, 1980-82, 1984-85, and 1986. 8-4. Growth of gross product, import volumes, and export volumes for industrial and developing countries.

8-5. Outstanding external debt of developing countries, 1981-1986 (in billion dollars; all vs. non-petroleum, long term vs. short term). 8-6. Soybean production: Comparison of costs (dollars per bushel) in selected countries, 1986 (Argentina is $5.04, Brazil is $6.21, USA Corn Belt is $6.77). 8-7. Soybean mills: Average costs of production of selected soybean mills, in the United States, EC, and South America (Brazil and Argentina), 1985 and 1986. 8-8. U.S. industry response to foreign competition: Strategies to be initiated or carried out within the next year by 8 U.S. soybean crushers. 8-9. U.S. Industry views on U.S. competitiveness compared with major competitors (Brazil, Argentina, Malaysia, EC-11 (not incl. Spain)). Address:

ITC, Herbert Hoover Building, 14th St. & Constitution Ave. N.W., Washington, DC 20230. Phone: 202-252-1807.

2409. *Centerpoint (AVRDC, Shanhua, Taiwan).*1987. Cultivars released. 6:4-5.
• ***Summary:*** Soybean varieties developed by AVRDC were released in various countries in the region. (1) Indonesia: The variety Tindar (formerly G2120M) is an early maturing mutant selected from an irradiated population of G2120. In western Java it gives average yields of 1,230 kg/ha and is adaptable. (2) Taiwan: The vegetable soybean variety Kaohsiung 1 (formerly AGS292) bears green vegetable soybeans of good freezing quality in 74 days. It outyields cultivar 205 by 23.5%. The variety Tainan 1 (formerly AGS66) is early maturing and outyields Tainan 15 in both the spring and summer seasons, giving yields of 3,500 kg/ha and 3,100 kg/ha respectively. Tainan 1 is non-shattering and resistant to downy mildew *(Peronospora manshurica).* Address: AVRDC, P.O. Box 42, Shanhua, Tainan 74199, Taiwan.

2410. Co, D.T. 1987. Feasibility study on the establishment of a soybean plantation in the Philippines. Masters thesis, Asian Institute of Management, Makati, Metro Manila, Philippines. 221 p. *

2411. STS–Soya Technology Systems Ltd. 1987. [Questionnaire]. 11 Dhoby Ghaut #11-06, Cathay Building, Singapore 0922. 8 p. [Chi]
• ***Summary:*** Asks potential clients many questions to aid in developing a turnkey soymilk plant to suit their needs. Address: Singapore.

2412. Beuchat, Larry R. 1987. Food and beverage mycology. 2nd ed. New York, NY: Van Nostrand Reinhold. xiii + 661 p. Illust. Index. 23 cm. [20+ soy ref]
• ***Summary:*** Contents: Contributors. Foreword. Preface. Classification of food and beverage fungi, by E.S. Beneke and K.E. Stevenson. Relationships of water activity to fungal growth, by Janet E.L. Corry. Fruits and fruit products, by D.F. Splittstoesser. Vegetables and related products, by R.E. Brackett. Meats, poultry, and seafoods, by James M. Jay. Dairy products, by Elmer H. Marth. Field and storage fungi, by C. M. Christensen. Bakery products, by J.G. Ponte, Jr. and C. C. Tsen. Traditional fermented food products, by L.R. Beuchat. Alcoholic beverages, by G. G Stewart. Edible mushrooms, by W.A. Hayes. Poisonous mushrooms, by Donald M. Simons. Fungi as a source of protein, by A. J. Sinskey and C.A. Batt. Fungal enzymes and primary metabolites used in food processing, by R. Bigelis and L.L. Lasure. Mycotoxins, by N.D. Davis and U.L. Diener. Methods for detecting mycotoxins in food and beverages, by L.B. Bullerman. Methods for detecting fungi in foods and beverages, by B. Jarvis and A.P. Williams. Appendix. Regulatory action levels for mold defects in foods.

Chapter 9, "Traditional fermented food products, has a section on koji and a long section on fermented soybean foods that discusses: Shoyu, miso, natto (incl. itohiki-natto, yukiwari-natto, and hama-natto / hamanatto; called tu su by the Chinese and tao-si by the Filipinos), sufu, meitauza, and témpé [tempeh]

Tables show: (9.1) Some fermented foods of fungal origin. For each food is given: Product name, geography, substrate, microorganisms, nature of product, and product use. Soy-related products include: Chee fan, Chinese yeast, Hamanatto, kecap, kenima, ketjap, meitauza, meju, miso (incl. chiang, jang, doenjang, tauco, tao chieo), natto, soybean milk, soy sauce (incl. chiang-yu, shoyu, toyo, kanjang, kecap, see-ieu), sufu (tahuri, tao-kaoan, tao-ju-yi), tao-si, taotjo, tauco and témpéh. Address: Dep. of Food Science, Agric. Exp. Station, Univ. of Georgia, Experiment, GA 30212.

2413. Campbell-Platt, Geoffrey. 1987. Fermented foods of the world: A dictionary and guide. London and Boston: Butterworths. xxiii + 291 p. 26 cm. [25 soy ref]
• ***Summary:*** The author classifies fermented foods into 9 groups: Beverages, Cereal products, dairy products, fish products, fruit and vegetable products, legumes, meat products, starch crop products, and miscellaneous products. Fermented legume products are particularly important in the diets of East Asia, Southeast Asia, and the Indian subcontinent. He has sections on many fermented soyfoods (dawadawa, hama-natto, kenima, miso, natto, tempe [tempeh], sufu) listing major areas consumed, related terms, how consumed, types, how produced, microbiology and biochemistry, and a few key references. His research began in Ghana with dawadawa made from the African locust bean. Address: National College Prof. of Food Technology, Dep. of Food Science & Technology, Univ. of Reading, Reading, Berkshire, UK.

2414. **Product Name:** Tofu.
**Manufacturer's Name:** Chang Shing Tofu, Inc.
**Manufacturer's Address:** 24 Lake St., Somerville, MA 02143. Phone: 617-628-2224.
**Date of Introduction:** 1987. January.
**New Product–Documentation:** 1995 Asian American Yellow Pages–New England Edition. Talk with Cathy Huynh. 1997. Feb. 11. She and her husband Albert started this company in 1987. The correct address is 24 Lake St., not 28.

2415. Hartadi, Sri; Kabirun, Siti. 1987. Improvement of traditional soy sauce fermentation mold selection and its application. In: Fujiharu Yanagida, ed. 1987. Traditional Foods and Their Processing in Asia. Tokyo: NODAI

Research Institute, Tokyo Univ. of Agriculture. vii + 235 p. See p. 219-33. [15 ref]

• ***Summary:*** Contents: Abstract. Introduction. Materials and methods: Mold selection, soy sauce inoculum preparation (laboratory scale, then commercial scale). Results and discussion. Conclusions.

From a survey of soy sauce manufacturers in Java and laboratory studies the authors conclude that practically none of the soy sauce manufacturers in Java, except for one modern manufacturer in Jakarta, use special inoculum in the soy sauce fermentation process. The source of active microorganisms is mainly the previously used fermentation containers. Most of the soy sauce processing is not carried out in aseptic conditions, so many kinds of molds, yeast, and bacteria can be isolated from the fermented materials. The authors isolated a suitable mold for soy sauce fermentation, and found that the use of 1% of fresh inoculum is adequate for the fermentation of soy sauce. Address: Faculty of Agriculture, Gadjah Mada Univ., Indonesia.

2416. Karim, Mohamed Ismail Abdul; Hassan, Zaiton. 1987. Traditional fermented foods of Malaysia. In: Fujiharu Yanagida, ed. 1987. Traditional Foods and Their Processing in Asia. Tokyo: NODAI Research Institute, Tokyo Univ. of Agriculture. vii + 235 p. See p. 210-18. [12 ref]

• ***Summary:*** The authors discuss the preparation of a number of Malaysian fermented soyfoods, including tempeh, kicap kacang soya (soy sauce), and tauco (soybean paste). They also discuss other Malaysian fermented foods: budu or kicap ikan (fish sauce), cincaluk (fermented shrimp), belacan (fish/shrimp paste), pekasam (fermented freshwater fish), tapai (fermented rice or cassava), tempoyak (fermented durian), tairu/taire/taina (fresh cow's milk fermented by bacteria equivalent to sour milk or yogurt), dadeh (made from fermented buffalo milk), idli and dosai, arak beras (rice wine), toddy (palm wine), idli (steamed pudding), dosai (pancake), dadeh (fermented sweetened milk), and jeruk buahbuahan & sayur sayuran (pickled fruits and vegetables). Address: Faculty of Food Science and Biotechnology, Universiti Pertanian Malaysia, Malaysia.

2417. Karki, Tika. 1987. Indigenous fermented foods in Nepal. In: Fujiharu Yanagida, ed. 1987. Traditional Foods and Their Processing in Asia. Tokyo: NODAI Research Institute, Tokyo Univ. of Agriculture. vii + 235 p. See p. 122-40. [5 ref]

• ***Summary:*** Of Nepal's population of 16 million, 90% are involved in agriculture. A conservative estimate calculates the production of kinema to be 300 tonnes/year. Kinema is a traditional non-salted soybean fermented food product widely and popularly consumed by the Kirat ethnic population of the eastern hills of Nepal, Darjeeling, and Sikkim. This product greatly resembles natto of Japan and thua-nao of Thailand, and is usually produced in the winter season. Kinema is consumed both as a soup, with other green vegetables, and as a curry. *Bacillus subtilis* strain has been found to be the dominant microflora of kinema fermentation (Karki, 1985). Production figures of kinema are not available, but a conservative estimate would be around 300 tonnes. The obvious reason for the limited kinema production is the virtual ignorance of this product. Even researchers have little knowledge of it. Another plausible explanatory factor is the typical ammonia-like odour which many people living in other parts of the country are not partial to.

Preparation of kinema: Soybeans are washed, soaked overnight, cooked at boiling temperatures till softened and then mashed by light pounding. About 0.5% ash is added and mixed in thoroughly by hand. The mixture is then fermented overnight in a bamboo basket surrounded by banana leaves, at a temperature of around 25ºC. After fermentation, the fresh kinema is dried in the sun for about 3 days and then stored for six months. Reducing sugar is drastically reduced in kinema, compared to natto. A higher ash content in kinema may be due to the addition of ash during processing. It is very important to maintain a balance between acid, reducing sugar, the ammonia odour, stickiness, and textural characteristics, in order to improve the kinema processing technology.

Chemical composition of kinema, averages: Moisture (8.9%), protein (46.2%), fat (18.1%), total sugar (21.2%), reducing sugar (2.1%), crude fiber (7.1%), ash (5.2%), acidity (1.52%). Address: Central Food Research Lab., Nepal.

2418. Kauffman, H.E. 1987. Soybean genetic improvement work outside the United States. *ASTA (American Seed Trade Association)* 16:14-25. [38 ref]

• ***Summary:*** Contents: Introduction. Perspective–Historical and environmental. Asia (East, Southeast, South), South America, Caribbean Basin, Central America, and Mexico. Sub-Sahara Africa. North Africa and Middle East. Europe and Soviet Union. International Cooperation. Summary and Conclusion. Address: Director, INTSOY, Univ. of Illinois, Urbana.

2419. Leavenworth, Donald H. 1987. Soybeans in the '90s–World supply and demand. *ASTA (American Seed Trade Association)* 16:1-13.

• ***Summary:*** Outlines eleven major changes that have taken place in the world soybean economy during the past six years, most of them negative for the U.S. soybean industry. 1. Drop in annual crushing capacity utilization from 80% to 70%. 2. Exports of oil and meal have declined. 3. Plants have been closed permanently. 4. Crushing volume peaked in 1979-80. 5. The U.S. share of the world market has

declined though the total market is growing 5% a year. 6. Production of rapeseed and sunflower seed have increased rapidly in the EEC. 7. The strong dollar has encouraged developing countries to develop oilseed self sufficiency. 8. Malaysia and Indonesia have increased palm oil production. 9. Rapeseed varieties have been improved and Canola oil is now Canada's leading oil. 10. Crushing capacity in Brazil and Argentina have grown dramatically because of high taxes on soybean exports. 11. The 1981 farm bill gave U.S. farmers a fixed loan rate averaging $5.02 leading to high U.S. soybean prices. Address: Cargill, Inc., Minneapolis, Minnesota.

2420. Pandey, R.K. 1987. A farmer's primer on growing soybean on riceland. Los Baños, Philippines: International Rice Research Inst. 216 p. Illust. by John Figarola. No index. 23 cm.

• ***Summary:*** This is an excellent, practical book, "intended specifically for farmers in the tropics whose productivity and income could be significantly increased by raising soybean." Almost every page contains one or more clear, lovely illustrations (line drawings). Contents: Part 1: The soybean crop. 1. The soybean crop. 2. The seed. 3. Seedling growth. 4. Growth stages–vegetative phase. 5. Growth stages–flowering. 6. Growth stages–pod development. 7. The roots. 8. Root nodules and nitrogen fixing. Part 2: Growing soybean. 9. Environment. 10. Water. 11. Choosing the right variety. 12. Tillage and planting. 13. Fertilizer and lime. 14. Growing conditions and dry matter production. 15. Harvesting and storing soybean. Part 3: Increasing yields and profits. 16. Yield components. 17. Production factors. 18. Yield reducers–weeds. 19. Yield reducers–insect pests. 20. Yield reducers–diseases. Part 4: Soybean in other cropping systems. 21. Sequence cropping. 22. Intercropping. 23. Strip-cropping. Address: International Rice Research Inst., Los Baños, Philippines.

2421. Passmore, Jacki. 1987. Asia: The beautiful cookbook. Los Angeles, California: Knapp Press. 256 p. Illust. (color). Index. 37 cm.

• ***Summary:*** This is a stunningly beautiful, oversized book–a feast for the eyes, filled with elegant color photos (many full page), authentic recipes and many insights about Asian cookery. Each recipe is accompanied by one or more photos, Contents: Japan: Simplicity and elegance. Korea: Warm and sustaining. China: From the beginning of time. Philippines: East meets West. Thailand: Titillating, tantalizing. Laos and Kampuchea: Unforgettable foods. Vietnam: Herbaceous overtones. Singapore and Malaysia: A blending of cultures. India: Southern fire, northern serenity. Burma: Exotic offerings. Indonesia: Symphony of flavors. Sri Lanka: Gems from an enchanted isle. Glossary. Acknowledgments.

Japan: Yudofu (Simmered bean curd, with 3 cakes tofu {bean curd}, p. 31). Tofu dengaku (Grilled bean curd on skewers, with 2 lb {1 kg} momen tofu and white miso, p. 31). Ton-negu no teriyaki (Teriyaki pork rolls, p. 38). Miso-shiru (Miso-flavored soup with bean curd).

Singapore and Malaysia: Popiah (with ¼ cup (about 2 oz / 60 gm) compressed bean curd cake, shredded, p. 155, 148-49). Tempe lemak (Tempe in coconut milk, p. 166). Hokkien mie (Hokkien style noodles, with 2 cakes compressed bean curd, p. 168). Laksa ayam (Chicken with laksa noodles in coconut sauce, with 2 squares / cakes compressed bean curd, p. 169).

Indonesia: Kecap manis is a sweetish soy and chili sauce (p. 218). Babi kecap (Pork in sweet soy sauce, p. 227).

Glossary (p. 252-54) includes short definitions of: Azuki beans. Bean curd. Bean pastes and sauces. Kecap manis ("based on dark soy sauce, sugar and spices"). Kombu. Nori. Paneer (India). Sesam. Wakame.

2422. Shurtleff, William; Aoyagi, Akiko. 1987. Soymilk industry and market: Updates from 1984 to 1987. Lafayette, California: Soyfoods Center. 17 + 59 p. Index. 28 cm. [165 ref]

• ***Summary:*** This 1987 update to the Soyfood Center's two-volume 1984 *Soymilk Industry and Market* has two parts: (1) Year in Reviewing, describing key events and trends each year from 1984 to 1986. (2) A bibliography of soymilk from January 1987 to late 1987, based on records in the SoyaScan database; at the end is a 10-page index. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549.

2423. Singh, S.R.; Rachie, K.O.; Dashiell, K.E. eds. 1987. Soybeans for the tropics: Research, production and utilization. New York, NY: John Wiley & Sons Ltd. xx + 230 p. A Wiley-Interscience Publication. Illust. Index. 24 cm. [670 ref]

• ***Summary:*** Based on the papers presented at the Tropical Soybean Workshop held at IITA from 30 Sept. to 4 Oct. 1985. Contains a superb bibliography. The 16 chapters by various authors are cited separately. Address: International Inst. of Tropical Agriculture (IITA), PMB 5320, Ibadan, Nigeria.

2424. Sonntag, Linda. 1987. The little tofu book. London: Judy Piatkus (Publishers) Ltd. 60 p. Illust. by Trevor Newton and Hanife Hassan. No index. 16 cm.

• ***Summary:*** Contents: What is tofu? Storing tofu. What to do with tofu. Tofu recipes. Dips and spreads. Tofu, the wonder health food. The food for the future. Tofu slimmers. Making your own tofu. The bonuses of making tofu: Go, okara, soya bean milk, yuba, whey. Tofu in Japan. Tofu in Indonesia. Tofu in China. Miso. Other titles in the series.

Note: This book draws heavily on *The Book of Tofu* by Shurtleff and Aoyagi. Address: England.

2425. Ace Canning Corporation Sdn. Bhd. 1987? Product brochure. Selangor, Malaysia. 6 looseleaf pages in a portfolio. Undated. 27 cm. Catalog. [Eng]

• ***Summary:*** Among the company's many products, the only soy product is Drinho Soya Bean Drink (soymilk), sold in a 250 ml aseptic carton. The company is a member of the Lam Soon Group. Address: P.O. Box 8, Jalan 205, 46050 Petaling Jaya, Selangor, Malaysia. Phone: 03-757-2755.

2426. Lam Soon. 1987? Lam Soon in Malaysia. Petaling Jaya, Malaysia. 31 p. Undated. 26 x 23 cm. Catalog. [Eng]

• ***Summary:*** This attractive color catalog presents Lam Soon, which has its headquarters and a huge factory complex in Petaling Jaya, just north of Kuala Lumpur, Malaysia. Lam Soon began in 1958 as Lam Soon Oil & Soap Manufacturing (M) Sdn. Bhd. with about 100 people, processing and selling vegetable oils for use in the local market. Today Lam Soon is a household name in consumer items, with advanced technology for making oil-based products plus Drinho Soya Bean Drink *(Minuman Kacang Soya).* The main oil processed is palm oil, but corn and soybeans oils are also used. Address: Petaling Jaya, Selangor, Malaysia.

2427. Hayami, Y.; Kawagoe, T.; Morooka, Y.; Siregar, M. 1988. Income and employment generation from agricultural processing and marketing: The case of soybean in Indonesia. *Agricultural Economics (Amsterdam, Netherlands)* 1(4):327-39. Jan. *

2428. *International Agriculture Newsletter (Univ. of Illinois).* 1988. Harold E. Kauffman and Alvin I. Nelson of INTSOY will visit Asia. Jan.

• ***Summary:*** They will visit Delhi and Bombay, India from January 3 to 9 to discuss current developments in the soy processing industry. From Jan. 9-16 they will participate in the INTSOY short course, "Soybean Processing for Food Uses," in Peradeniya, Sri Lanka. From Jan. 19 to Feb. 4, Dr. Kauffman, will visit Nepal, Bangladesh, Viet Nam, and China to discuss collaborative research and development activities relating to soybean utilization. In China, Dr. Kauffman will discuss joint sponsorship of an international conference on soybean utilization.

2429. Okada, Noriyuki. 1988. Tenpe–Indonesia no daizu hakkô shokuhin [Tempeh–An Indonesian fermented soyfood]. *Shokuryo: Sono Kagaku to Gijutsu (Food: Its Science and Technology)* No. 27. p. 65-93. Jan. [1 ref. Jap]

• ***Summary:*** Contents: Origin of tempeh. Chronology of tempeh (Both taken largely from *History of Tempeh* by Shurtleff and Aoyagi). Methods of making tempeh (with a chronology of their development). Microorganisms that have been isolated from tempeh and its starter. Changes taking place during tempeh fermentation. Protein efficiency. Antioxidants in tempeh. Ways of eating tempeh. Conclusion. Address: Oyo Biseibutsu-bu, Biseibutsu Riyo Dai-ichi Kenkyu-shitsu (Norinsho, Tsukuba, Japan).

2430. Prevedell, Donna. 1988. The battle over tropical fats. *Soybean Digest.* Jan. p. 38-41.

• ***Summary:*** "A full-scale, international food fight is shaping up. The American Soybean Association (ASA), representing 430,000 U.S. soybean farmers, has launched a three-pronged attack on palm, palm kernel and coconut oils imported to the U.S. primarily from Malaysia, the Philippines and Indonesia.

"The first assault was ASA's joining a dozen other health and consumer organizations to support truth-in-labeling legislation. Second, ASA petitioned the Food and Drug Administration (FDA) to draft similar rules. Finally, the organization launched a national campaign to discredit imported oils and to pressure large U.S. food manufacturers to discontinue their use of the 'dangerous' competitors."

"Federal truth-in-labeling legislation has been introduced in the U.S. House and Senate... It would amend the Federal Food, Drug and Cosmetic Act so that a food that contains palm, palm kernel or coconut oil is labeled as containing saturated fat."

"Food manufacturers are the main opponents of this proposal and the Glickman-Wyden bill, because they would lose flexibility in formulating products. The current 'and/or' labels allow a food company to make a least-cost blend without altering the ingredient list. They claim the new rules would end least-cost formulations or require expensive relabeling, and both costs would be paid by the consumer.

"The Reagan Administration also opposes the truth-in-labeling legislation. Its adverse effect on the Philippine economy will have a major negative impact on our relations with that country.

"ASA reports that Frito Lay, Pepperidge Farms, Quaker Oats and Smuckers have stopped using tropical fats. In the U.S. tropical oils at their peak claimed only a 7.55% share of edible consumption."

2431. *Soybean Update.* 1988. Soybean meal for shrimp production in Southeast Asia. Feb. 29.

• ***Summary:*** "...shrimp production in Southeast Asia has reached all-time highs and may be on the verge of explosive growth... using soybean protein in fish feeds is the key to growth of the shrimp industry."

"There is a great potential for expansion of aquaculture in the Philippines and Indonesia," Smith said. "They have the water, the land, the climate and the people to manage it."

2432. Heise, Lori. 1988. AIDS: New threat to the Third World. A deadly virus could unravel decades of development. *World Watch*. Jan/Feb. p. 19-21.
• ***Summary:*** African countries, for example, had reported a total of 6,635 AIDS (acquired immunodeficiency syndrome) cases to WHO as of November 25, 1987; the U.S. had reported 45,436. To put AIDS into perspective, consider the fact that the Bubonic Plague killed 17 million to 28 million people–one-third to one-half of Europe's population–between 1347 and 1350. Pregnancy & childbirth kills 500,000 women worldwide each year. The Ethiopian Famine killed 1 million people during 1984-85. The Vietnam War killed 54,000 Americans between 1963-75, and a total of 2,358,000 people between 1960-75. Address: Washington, DC.

2433. Linder, Anders B.J. 1988. STS moves head office from Singapore to Denmark (News release). Soya Technology Systems, Ltd., 11 Dhoby Ghaut #11-06, Cathay Building, Singapore 0922. 1 p. Feb.
• ***Summary:*** From the day STS was established by Danisb Turnkey Dairies Ltd. in 1982, soymilk activities have been headed from offices in Singapore. In June, 1987, STS' parent company, Danish Turnkey Dairies Ltd. was purchased by APV, a leading multinational maker of processing machinery for the food and beverage industries. From an organization with over 200 companies, the APV group last month was restructured into nine primary subsidiaries of which APV Pasilac A/S is the one to which Danish Turnkey Dairies Ltd. and STS now belong. As a consequence of this large organizational restructuring, STS (Singapore) will move offices to its parent company's, Danish Turnkey Dairies Ltd. premises in Aarhus, Denmark with effect from April 1, 1988. Address: Singapore.

2434. Nordquist, Ted. 1988. New developments with tofu and soymilk in Sweden (Interview). *SoyaScan Notes*. March 26. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Ted is working with three of Sweden's largest food companies: (1) Semper AB, the country's largest milk company, used to be an independent milk research company. Semper now makes an infant formula, and two flavors of soy drink for adults, both from soy protein isolates. The later is poor tasting. Semper is now wholly owned by Arla, the Swedish milk company. (2) Karlshamn Oliefabrik, Sweden's largest oils and fats company, that is also the largest manufacturer of ice cream and margarine. They used to be a soybean crusher, but now they import their oil. Karlshamn has the Swedish franchise for Ralston Purina. They have a newsletter The Soybean Magazine that they use to market Ralston's products. They import isolates, which Semper buys for use in their infant formula (Soja Semp) and adult soymilks. (3) Trensums Musteri, a juice company owned by Mark Jungstrum, who owns the only 3 Combibloc machines in Sweden. He packages Knorr soups in them. The resources are unlimited. The present focus is on developing a natural soy base free of beany flavor and evaluation the economics of the product. From this base they will make a line of products, including dairylike products and non-beany tofu. Ted has a contract with Trensums to receive a 2% commission on all soy products made in the new plant, since he basically developed the plant, which is inside the Trensums Musteri juice factory located in the south of Sweden, near Karlshamn. He also has a contract with Semper. Semper supplies Karlshamn with all their milk products. Roughly 12 million crowns ($2-3 million) has already been invested in soy equipment and R&D at this plant in Tingsryd, which produces about 4,000 liters/hour of soymilk.

This project began in 1983, when Luke Lukoskie came to Ted with a proposal to cooperate with Alfa-Laval, since Ted was the only tofu maker in Sweden, where Alfa-Laval is located (in Lund). Luke had a contract with Alfa-Laval to develop tofu and other soy products. He wanted a continuous tofu making process. Alfa-Laval had a plant installed in his former factory, which burned down. At one point Lukoskie was considering a lawsuit against Alfa-Laval. In 1984 Alfa-Laval began moving the soy development operations from Lund to Singapore. At the time they had sold one plant to China, with plans to sell 2 more if the first proved successful.

Ted met with the people from Talmo Gordon, who were planning to build a soymilk plant in Ludvika, funded with government money, but dropped the idea after Semper and Ted showed them that their concept was not feasible. The owner of the plant in Tingsryd is an expert at product development, including foods such as mushroom soups in German Combibloc that cannot be done in Tetra Pak. So Ted left his cooperation with Alfa-Laval and started developing with him in Tingsryd. They signed a contract. Ted goes there for 3 days a week. The sales of Aros grew 70% last year, in part because of new labels. All products are doing well. He makes an average of 2,000 kg (4,400 lb) of tofu per week. By vacuum packing his tofu then pasteurizing it at 95ºC for 45 minutes, then quick cooling it in water at 4-6ºC, he gets a shelf life of 85 days at 4ºC under ideal conditions vs. 30 days shelf life if it is not vacuum packed. None of Sweden's three big supermarket distributors carry his tofu, so he distributes to supers himself. The three distributors that serve the country's 65 health food stores do not have refrigeration. There are no tofu companies yet in Norway, Denmark, or Finland. Of all of Aros sales, 55% is regular tofu, followed by marinated tofu *(Tofu Marinerad)* 15%, then three other products. Nutana makes a canned tofu (made entirely from isolates) in cubes in a sauce. Lima Foods sells a bottled tofu. There are 8 million people in Sweden.

Tomsun is trying to register the trademark Jofu (their nonfermented soy yogurt) in Sweden. This may upstage Ted's attempt to trademark Sofu for soymilk and wipe out his trademark on the term "Tofu."

Semper is interested in having the new soy base be low in oligosaccharides so that their infant formula does not cause flatulence. The following oligosaccharide levels have been found in European soymilks: Alfa-Laval's plant in Colmar, France, that uses ultrafiltration 0.02 gm/liter; Alpro in Belgium 0.28 gm/liter; Alfa-Laval's pilot plant in Sweden 0.43 gm/liter; the STS plant built for DE-VAU-GE in Germany 0.58 gm/liter. By using ultrafiltration to make tofu you can both remove the oligosaccharides and reduce the water content. Address: President, Aros Sojaprodukter, Bergsvagen 1, S-190 63 Orsundsbro, Sweden. Phone: 0171-604 56.

2435. *Soybean Digest.* 1988. Soymeal keys growth of shrimp industry. March. p. 34.
• ***Summary:*** "Shrimp production in Southeast Asia has reached all-time highs and may be on the verge of explosive growth... Using soybean protein in fish feeds is the key to the growth of the shrimp industry. 'There is great potential for expansion of aquaculture in the Philippines and Indonesia.'"

2436. Nordquist, Ted. 1988. Island Spring, Alfa-Laval, and continuous tofu production using ultrafiltration (Interview). *SoyaScan Notes.* April 2. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** In 1983-84 Alfa-Laval lost huge amounts of money as the dairy industry in Europe continued its steady downhill slide. They had to cut back on expenses and increase income. So they dropped many long-term research projects and required that those which were not dropped become profitable. They have always charged high prices for equipment and high labor rates for repair and maintenance. They had a little soymilk plant in Lund which they used to show to anyone who was interested. Now they started to charge for tours and demos. At that point Ted discontinued his work with Alfa-Laval and went to work with a juice company. Within a year Alfa-Laval had turned things around. A little later they moved John Wilson and their soymilk operations to Singapore.

Island Spring's work with Alfa-Laval started out well. They installed an ultrafiltration unit at Luke's plant so that he could do R&D work on continuous processing of tofu, and they sent many high-level people over to work with him. But when the crunch came, they dropped him. The ultrafiltration unit may have burned in his fire. Then Luke began to work with STS.

Luke has a contract with Alfa-Laval stating that continuous process production of tofu using ultrafiltration is his idea. He has a right to 6% of the sale value of all equipment that Alfa-Laval sells using ultrafiltration to make tofu. Ted is not aware that Alfa has sold any such equipment so far, but for some reason Luke is not happy with his relationship with Alfa and may be considering a lawsuit. Address: President, Aros Sojaprodukter, Bergsvagen 1, S-190 63 Orsundsbro, Sweden. Phone: 0171-604 56.

2437. *High Plains Journal (Dodge City, Kansas).* 1988. Farmers in Asia, U.S. gain from soy fish feeds. April 18. Also in Soybean Update. March 21. p. 3.
• ***Summary:*** Dr. Dean Akiyama, who heads up the American Soybean Association's aquaculture programs in Japan, Korea, Taiwan and southern China, says U.S. soybean meal and science could push shrimp production to all-time highs. "Shrimp culture in Southeast Asia is booming," Akiyama said. He also noted that feed trials have shown shrimp feeds can use up to 40% soymeal [mixed with fish meal] with no substantial loss in overall production. In the past, only fish meal has been used to feed shrimp.

"Soymeal is cost effective," Akiyama said, "The basic nutritional principles found in fish meal are also found in soymeal. The only difference is, soymeal is cheaper. We have proven soymeal mixed with fish meal can save a farmer up to 45% on his feeds costs." A shrimp farmer spends about $4 to $8 to raise a pound of shrimp, then sells it for $15 a pound. A typical farm can have up to a tonne of shrimp per acre, per crop. Producing 2.5 tonnes/acre on an average year, the farmer makes $18,000 for every acre farmed.

2438. Anthan, George. 1988. Health groups hail cutbacks in tropical oils. *Des Moines Register (Iowa).* April 29. p. 1, 10A.
• ***Summary:*** Leading health and consumer groups Thursday joined farm organizations in lauding food manufacturers who voluntarily have stopped using tropical oils–so-called 'jungle grease'–in their products. The U.S., in recent years, began buying increasing amounts of tropical oils from the Philippines, Malaysia, Thailand and some other Asian countries that are allies or friends. The American Soybean Association, said a survey of 2,500 food products in three supermarkets "shows some major food manufacturers are responding to consumer demands for products made with unsaturated vegetable oils."

Nancy Chapman, a registered dietician said that major manufacturers who have eliminated tropical fats from many of their products include: Archway (cookies), Sunshine (crackers and cookies), Nabisco (crackers and cookies), Lance (snack foods), Mrs. Paul's (fish), Frito Lay (chips and snack foods), ConAgra (frozen dinners and snacks), General Mills (fruit bars and popcorn), Keebler (chips and snacks), Campbell's (some soups), and Continental Baking (some whole wheat bread and muffins). She said certain

flavors (chocolate), textures (chewy) and preparation (microwave) are still associated with the use of saturated oils. Chapman said more than 70% of products that do not contain tropical oils have ambiguous labels.

Expressing concern over the use of tropical oils were the American Heart Association, American Soybean Association, American Diabetes Association, Center for Science in the Public Interest, Public Voice for Food and Health Policy, Citizens for Public Action Against Cholesterol, and Consumer Federation of America.

2439. Acompañado, Marita F. 1988. IDRC supports soybean workshop. *PCARRD Monitor* 16(4):4-5. April.
• ***Summary:*** IDRC is the International Development Research Centre (IDRC) in Canada. The Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD) coordinated a workshop which aimed at developing and packaging a comprehensive nutrition-focused multi-disciplinary and interagency research and development (R & D) program on soybean. The soybean-based Nutrition Workshop, which took place in Puerto Azul, Ternate, Cavite on 27-28 April 1988, was made possible through the support of the IDRC in Canada. It was participated in by 25 agency heads/researchers. The group visited the Soybean Pilot Project site in Nueva Ecija. Address: Science Research Specialist, PCARRD, Philippines.

2440. Business Trend Analysts, Inc. 1988. The market for salad dressings, sauces and condiments. 2171 Jericho Turnpike, Commack, NY 11725. 260 p. Price: $750.
• ***Summary:*** Sauces include the following table sauces: Ketchup, meat (incl. steak, worcestershire, vegetable, and seafood sauces), barbecue, Mexican (incl. chili, taco, enchilada, etc.), prepared mustard, and soy and teriyaki. Gravies, dips, and dry sauce mixes are not included. Ketchup is the largest segment, about 40% of the total. It has grown at 4.6% annually from 1982-87, but growing faster during the same time are soy and teriyaki sauce (10.3%), barbecue sauce (11.4%), and Mexican sauce (9.2%). In 1977 soy and teriyaki revenues represented 3.1% of total sauce sales, compared to 6.7% in 1987. BTA expects the market to grow at 8.9% annually reaching $280 million in 1997. Kikkoman, the leading producer of soy sauce in the U.S. sells most of its product is the western portion of the country. In 1987 it launched a national ad campaign to expand to the rest of the country.

According to U.S. Dept. of Commerce statistics, sales of soy and teriyaki sauce (in million dollars) and market percentage have grown from $7.7 and 1.8% in 1972, to $25.0 and 3.1% in 1977, to $50.1 and 4.9% in 1980, to $98.1 and 6.0% in 1985, and to an estimated $132.0 and 7.0% in 1988. Other estimated market shares in 1988 were ketchup 39.2%, meat 19.6%, barbecue 14.4%, Mexican 12.1%, and prepared mustard 7.8%. Thus soy and teriyaki have the smallest share.

But the growth rate for soy and teriyaki sales have been slowing, in part due to lower inflation rates. The rate was 26.6% in 1972-77, 24.2% in 1977-82, 10.3% in 1982-87, and a projected 8.9% in 1987-97. In this latter period the growth rate is higher than for any other sauce category.

In 1987 for leading U.S. soy sauce producers, sales and market share were: Kikkoman Foods Inc. $49 million and 41% market share; La Choy Food Products (Subsidiary Beatrice/Hunt-Wesson) $43 million and 36%; Nabisco Brands Inc. (Subsidiary RJR Nabisco), maker of Chun King, $12 million and 10%. All others, $16 million and 13%. Note: Chun King Frozen Foods line was sold to ConAgra, Inc. (Omaha, Nebraska) in 1987. Nabisco still owns the soy sauce and other packaged goods. the U.S. soy and teriyaki market, an estimated 41%., with 1987 sales of $49 million.

According to Department of commerce statistics, U.S. imports of "thin" soy sauce have grown steadily from 13.3 million lb in 1978, to 15.9 in 1980, to 29.6 in 1985, and an estimated 40.0 in 1987. In 1986 roughly 38.9% of this came from Japan, followed by 26.9% from Hong Kong, 12.8% from China, 12.0% from Taiwan, and 9.3% from Others (incl. South Korea, Canada, and Philippines). These imports of 32.5 million lb in 1986 were worth $13.9 million. Between 1980 and 1986 roughly 2,500 lb/year of soy sauce have been exported, a negligible amount. The main destinations were West Germany, Canada, and Mexico. Address: Commack, New York.

2441. Shurtleff, William; Aoyagi, Akiko. comps. 1988. Bibliography of tempeh, from 1815 to 1988: With 1050+ references. Lafayette, California: Soyfoods Center. 103 p. Subject and country index. Partially annotated. Printed April. 28 cm. [1078 ref]
• ***Summary:*** The most comprehensive bibliography on the subject published up to this time. Contains all known commercial products. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549. Phone: 415-283-2991.

2442. Haumann, Barbara F.; Baldwin, A.R. 1988. Feature. Update: Fats and oils industry changes. *J. of the American Oil Chemists' Society* 65(5):702-04, 706, 708, 710-13. May.
• ***Summary:*** Dramatic changes have occurred in the worlds' fats and oils industry during the past 25 years. U.S. soybeans, the major factor in world fats and oils trade in 1961, have encountered increasing competition from soybeans produced in South America as well as from palm oil, sunflowerseed and rapeseed. U.S. soybean dominance of world oilseed trade during the 1950s and 1960s began to crack in the 1970s. U.S. embargoes on soybean exports in 1973 and 1980 led Europeans, the Soviets and the Japanese to look for alternate sources of supply. They found Brazil

and Argentina willing to learn how to grow soybeans for the export market. Ohio State University researcher Norman Rask has estimated total costs of producing a bushel of soybeans at $6.62 in the U.S., $5.39 in Brazil and $4.06 in Argentina.

In the world soybean market, Brazil's share of international trade has grown from 3% in 1981/82 to 14% in 1984/85; in the same time span, Argentina's market share rose from 6% to 13%. Meanwhile, the U.S. share declined from 82% to 65%. In world soybean oil markets, Argentina's share has grown from 3% in 1981/82 to 14% in 1984/85. Brazil's share has increased from 24% to 27%; the U.S. share has fallen from 27% to 20%. U.S. soybean growing area peaked in 1980 at 70 million acres. In recent years, it has declined, with only 56.4 million acres harvested in 1987. U.S. soybean accounted for 65.9% of all world oilseed trade volume in 1979/80. By 1986/87, its share had dropped to 55%. The 1982 Census of Manufactures counted 243 vegetable oil mills operating in the U.S. in 1982. Of these, soybean oil mills had increased to 137 establishments, versus 121 in 1977.

The U.S. Food and Drug Administration (FDA) in 1985 ruled that low erucic acid rapeseed oil could be used in food products in the U.S. The first company to act on this was Procter & Gamble, which in 1986 reformulated its Puritan cooking oil to contain 100% canola oil. The phenomenal increase in corn oil production has been due to enzymatic processes for high fructose corn syrup and a gas tax subsidy on fuel alcohol. Consolidation, mergers, buyouts, and restructurings have led to increasing concentration of capacity in the hands of a few international companies whose operations range from seed cultivation through shipping and export to complete processing. This has led to fewer locations that process larger quantities of oilseeds.

U.S. based soybean processors are expanding their foreign investments in an attempt to escape relatively high U.S. soybean prices as well as to circumvent trade barriers. These include Archer Daniels Midland Co. (ADM), Bunge, Cargill, and Continental Grain. Since 1982, ADM also has held a 45% interest in Alfred C. Toepfer International, a large commodities trading firm with headquarters in Hamburg, West Germany. In 1984, a National Institutes of Health panel recommended that Americans limit their cholesterol intake to less than 300 mg/day, fat intake to 30% of total calories in their diet, saturated fat intake to less than 10% of calories, and polyunsaturated fat intake to a maximum of 10% of calories.

There are a number of possible developments to watch during the next 20 years, including: Soybeans with low or zero linolenic acid; soybeans with higher yields (possibly hybrids) with broader adaptability to increase overall production; increased consolidation of oilseed processing. As world markets for oilseeds and oilseed products increase, market shares for soybeans and soybean products will decline. Address: JAOCS.

2443. Ontario Soya-bean Growers' Marketing Board. 1988. Report on export market development mission of the Ontario soybean industry, March 19th–April 3rd, 1988. Chatham, Ontario, Canada. 23 p. May. 28 cm. Spiral bound. [Eng]

• ***Summary:*** This report was prepared by Owen Dobbyn, John Cunningham, Maurice Waddick, and Fred Brandenburg of OSGMB. Contents: Japan. The Japanese soybean market. Visits: Japan Miso Co-operative Industrial Assoc. (M. Iida, chairman), Japan Packaged Tofu Assoc. (H. Kijima, Exec. Secy.), Federation of Japan Natto Manufacturers Cooperative Society (Mr. Ohse), Takano Foods Co. Ltd. (E. Takano, president, uses 7,000 to 8,000 tonnes of soybeans annually to make natto), Home Foods Co. Ltd (Home Shokuhin, Y. Murai. managing director, has 160 employees and 3 tofu factories that use 300 tonnes of soybeans/month; owned by Wako Shokuryo, the #1 wholesaler of soybeans in Japan), Japan Oilseed Processors Assoc. (JOPA; H. Higashimori, managing director). Japan Oil and Fat Importers & Exporters Assoc. (JOFIEA; I. Shimizu, exec. director), Canadian Embassy, Tokyo.

Hong Kong. Soybean imports. Visits: The Hong Kong Soya-Bean Products Co. Ltd. (makers of Vitasoy soymilk), Amoy Industries (International) Ltd.

Malaysia. Soybean imports 1984, 1985, 1986. Visits: Ace Canning (owned by Lam Soon). Yeo Hiap Seng (Malaysia) Berhad (soymilk), Cheong Chuan (Hup Kee) Sdn. Bhd. (traditional fermented soysauce), Sin Yong Huat Enterprises Sdn. Bhd. (soybean importers), Syarikat Perniagaan Cheon Fatt (tofu manufacturer).

Singapore. Soybean imports (1983-1986). Visits: Sin Seng Lee Trading Co. (Pte.) Ltd. (claims to import 60% of soybeans to Singapore). Conclusions for each country. Recommendations for future action. Future export development missions. Accomplishments. Competition.

In Japan, 842,000 tonnes soybeans are used to make foods, as follows (in tonnes, p. 1): Tofu 456,000, miso 180,000, natto 90,000, dried-frozen tofu 30,000, boiled soybeans 23,000, soybean powder [probably kinako] 10,000, soymilk, 7,000, soysauce 5,000, other 41,000. The suppliers of these edible soybeans are (in tonnes): USA 400,000, China 280,000, Japanese domestic 280,000, Canada 24,000. Total Japanese soybean imports: 5,000,000 tonnes. Of this 4,036,000 tonnes (81%) are used for crushing, 842,000 tonnes for food, and 70,000 tonnes for feed (not crushed). The Japanese market for soybeans is very large for both crushing and food use, but is not growing. The beans for crushing come mostly from the USA and South America.

Preferred characteristics of soybeans for each type of soyfood are given. For example, for miso: Low oil, high

protein, high sugar, white hilum. For tofu: High sugars (glucose, sucrose), moisture content 10-12.5%, new crop preferred to old, protein 40%, oil 19-20%, hilum color is not very important but white is preferred, varietal consistency; preferred varieties are Beeson, Amsoy, Corsoy. Natto: Most important is small size, 5.5 mm or less, clean beans free of foreign material, high sugar content (saccharose, stachyose, which bacillus needs to work), less oil, must absorb water well. Soymilk: Good flavor, low moisture (10%), low percentage of splits (too high can cause rancidity), low oil, high protein.

In Japan, vegetable oil consumption has increased 2.5 times in the past 20 years to 45.17 gm/capita/day in 1986. Soyoil and canola oil together account for 85% of production. Canola is replacing soybean oil. If the oil market is strong, the 30 Japanese crushers crush more canola, but if protein is strong they crush more soybeans. U.S. soybeans have too much foreign material; new contracts have a penalty for > 2% FM.

In Hong Kong, 6,000,000 cases of Vitasoy brand soymilk are produced annually. The company uses 2,500 tonnes/year of soybeans, 80% of which are grown in Canada. It uses 100 to 200 tonnes of organic soybeans for Vitasoy exported to U.S. health food stores. Using 15 Tetra Pak machines, production takes place 24 hours/day (3 shifts), 6 days a week. Contacts: Patrick Cheung (marketing manager), and Raymond Yuen (commercial manager).

Amoy Industries, the largest maker of soy sauce in this part of the world, produces 6,000 tonnes/year. The company was established 80 years ago in Amoy, eastern China, moved to Hong Kong in 1949; 50% was purchased by Pillsbury in 1983. Uses 2 containers of soybeans/week, 100% from Ontario for the past 5 years.

Malaysia soybean imports rose from 174,400 tonnes in 1984 to 255,200 tonnes in 1986. The main suppliers in 1986 were China (56.2% of total), Vietnam (15.8%), and Argentina (14.3%). Ace Canning uses ton tonnes/month of soybeans (presently all from China) to make soymilk. They have 7 Tetra Pak machines. Yeo Hiap Seng (Malaysia) is the largest soymilk producer in Malaysia, making 25,000 liters/ year using 9 Tetra Pak machines. They use 1,250 tonnes of soybeans (80 containers) per year, all Canadian.

In Singapore, soybean imports rose from 28,287 tonnes in 1983 to 41,571 tonnes in 1986. In 1986, some 66% came from Canada, 16.6% from China, and the rest from others.

The major competition for food quality soybeans in these four countries at present comes from China. The Chinese have improved their soybean quality and appear to be actively seeking to increase their market share. In the long run, however, China may choose to reduce its soybean exports in order to increase meat consumption in China. This could lead to new market opportunities for Canada in these four countries. Address: P.O. Box 1199, Chatham, ONT N7M 5L8, Canada. Phone: 519-352-7730.

2444. *Soybean Update.* 1988. Poultry producers in India are experiencing a major crunch for feed protein sources. June 6.

• ***Summary:*** Prices of protein ingredients continue to go up. Flock mortality in India is currently running at 8-10%. Christino Collado, technical director of poultry promotion at the American Soybean Association (ASA) office in Singapore, went to India to look at ways to ease the government's ban on oilseed imports. ASA has been showing feedmillers how to utilize soymeal.

2445. *Soybean Update.* 1988. Indonesian poultry industry is expanding at a rate of 10% a year. June 6.

• ***Summary:*** ... with about 90% of the total commercial feeds and concentrates manufactured in the country being used for poultry. Aquaculture is also on the rise. Carp feeding with floating feed has been very successful. Soymeal is the key for continued expansion in the aquaculture industry. Thomason says soybeans are popular for human foods in Indonesia, with tempeh, a fermented soyfood, consumed by both humans and livestock for its anti-bacterial properties.

2446. Thung (Shindumarta), Rudy. 1988. Soyfoods in Indonesia. Indonesians in California (Interview). *SoyaScan Notes.* July 31. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Rudy is very interested in soyfoods, and did his Master's thesis on soy sauce in Indonesia. He speaks Indonesian, Chinese, Dutch, and English. He has 150 kg of Indonesian language books on soyfoods at 3 homes in Indonesia. His wife speaks fluent English. A master's degree in Indonesia is a Dokterandes. A thesis is a "scripsi."

According to the Indonesian consulate in San Francisco, there are 10,000 Indonesians in California, including 6,000 in Los Angeles, 2,000 is Fresno, and 2,000 in the San Francisco Bay Area (incl. San Jose). Address: Concord, California. Phone: 415-827-0130.

2447. *Watashi no Kenko (My Health).* 1988. Atarashii nattô tenpe wa kôshite taberu. Indonesia no kusakunai nattô [Here's how you eat the new natto, tempeh. Indonesia's natto that doesn't smell]. July. p. 147-62. [Jap]

• ***Summary:*** A popular introduction to tempeh containing nutritional information and recipes.

2448. Lee, Ken. 1988. New developments with yuba, soymilk, and tofu at Soyfoods of America (Interview). *SoyaScan Notes.* Aug. 29. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Soyfoods of America started production in Nov. 1981, making yuba, soymilk, and tofu. Of the yuba, 90% is fresh frozen sheets and 10% is dry sticks. This

company is the only maker of fresh yuba in America and he ships it nationwide, to Houston, Dallas, Seattle, Chicago, etc. It is sold mostly to the Oriental market but also to a few health foods restaurants such as Healthys in Hawaii, and Orean. All imported yuba is dried. It takes 3 months to get here and usually contains preservatives, bleach, and dyes. His prices is 4 times the imported product but he still can't keep up with demand. He now has 4 workers, working 2 shifts. They make 240 cases/week with 200 sheets/case = 48,000 sheets/week. It is all hand-made now but he may automate. Of the company's total sales, 50% is soymilk, 30% is tofu, and 20% is yuba. The soymilk is sold mostly to Chinese, Vietnamese and other Asian-Americans. They are going to make a soymilk without beany flavor. They sell 150 cases/week of half-gallon bottles of soymilk to Price Club. Spicy Tofu and Tofu Noodles were introduced in Jan. 1984. The brand "Furama" means "fortune" as in "good fortune." Address: 1091 E. Hamilton Rd., Duarte, California 91010. Phone: 213-681-5393.

2449. Johnson, D. Gale. 1988. Policy implications [of using isolated soy proteins]. In: F.H. Schwarz, ed. 1988. Soy Protein and National Food Policy. Boulder and London: Westview Press. x + 349 p. See p. 1-10. Chap. 1.

• ***Summary:*** During the past several decades there has been general improvement in the nutrition and health status of the population of the developing countries, though it has not taken place everywhere, not uniformly. According to the FAO Production Yearbooks, using 1961-65 as the base for comparison, by 1985 per capita food consumption had changed as follows: Far East (South, Southeast and East Asia) +20%, Near East (Northern Africa and the Middle East) +12%, Latin America +15%, and Africa -14%.

"But the most striking evidence of improvement in health and nutrition, even in low income African countries, is the data on the increases in life expectancy and the declines in infant mortality and child death rates between 1960 and 1982. In low income African countries, the life expectancy has increased by 7-10 years, and in India by 12 years." Address: Prof. of Economics, Univ. of Chicago.

2450. Sumarno, -; Dauphin, F.; Rachim, A.; Sunarlim, N.; Santoso, B.; Kuntyastuti, H. 1988. Soybean yield gap analysis in Java: A report of the Soybean Yield Gap Analysis Project. CGPRT Centre, Jalan Merdeka 99, Bogor, Indonesia. xix + 67 p. 24 cm. EEC Contract No. TSD-A-299. [32 ref]

• ***Summary:*** "The Soybean Yield Gap Analysis Project (SYGAP) was conducted in Indonesia from 1985 to 1987. The results of this project represent the cooperation between researchers, extension agents and farmers in their attempt to identify an appropriate technology which would increase the soybean yield in farmers' fields. Even though more research has to be done to increase the performance of soybean in Indonesia, the findings in this report show that an efficient technology is available and that farmers demonstrate their ability to apply it successfully in their fields."

Contents: Introduction. The soybean production system in Indonesia. SYGAP: Objectives and methodology. Dryland soybean in Garut: Field survey, field research. Wetland soybean in Pasuruan: Field survey, field research. Transfer methodology: Demonstration plots, field days and training. Major constraints to soybean production in Indonesia. Research and developments in soybean technology. References.

Participating organizations included: CIRAD/DSA (Centre de Cooperation Internationale en Recherche Agronomique pour le Developpement, Departement des Systemes Agraires, Montpellier, France); CGPRT Centre (Regional Co-ordination Centre for Research and Development of Coarse Grains, Pulses, Roots and Tuber Crops in the Humid Tropics of Asia and the Pacific, Bogor, Indonesia); CRIFC (Central Research Institute for Food Crops, Bogor); CAER (Centre for Agro-Economic Research, Bogor); BORIF (Bogor Research Institute for Food Crops); and MARIF (Malang Research Institute for Food Crops). Address: Bogor, Indonesia.

2451. Rowe, Trent. 1988. Business sprouts from humble bean: Marjon foods come with recipes for how to use them. *Ledger (Lakeland, Florida).* Sept. 29. p. 1E, 12E.

• ***Summary:*** Marjon Specialty Foods, started by Marcia and John Miller in 1972 in their basement, is now the largest producer of sprouts in the Southeast. They have 70 employees and 7 trucks in their business based in Plant City, between Tampa and Lakewood. John is a vegetarian. Marcia is a devoted cook and amateur nutritionist. They have been making tofu for 10 years. They learned how by hiring some Vietnamese immigrants who had made tofu in East Asia to show them. Their tofu is sold in a box. Their product list, which is pages long, includes all sorts of weird and exotic wonderful foods: horseradish from Illinois, endive, ginger, plantains. One of their goals is to make unfamiliar foods familiar. Includes recipes for Tofu Chili, Tofu Nuggets, and Tofu Peanut Butter Oatmeal Cookies.

Contains a large color photo of the Millers and their products.

Also published in the *Daily News* (Palatka, Florida). 1988. Oct. 5.

2452. Morooka, Yoshinori; Kosugi, Sho; Mayrowani, Henny. 1988. Socio-economic studies on soybean based farming systems at the village level in Indonesia. *Palawija News (Bogor, Indonesia)* 5(3):6-8. Sept.

• ***Summary:*** The study was conducted at a village *(desa)* in Garut, West Java. The objectives were: 1. To identify constraints on the wider adoption of improved technologies

by farmers through the analysis of current soybean-based farming systems in an upland area. 2. To analyse and evaluate interactions among the crops involved as well as among the farmers' economic activities in the farming system at the household and village levels. Address: 1. National Agricultural Research Center, Japan; 2. CGPRT Centre, Bogor; 3. Bogor Research Inst. for Food Crops.

2453. Shurtleff, William; Aoyagi, Akiko. 1988. Das Tempeh-Buch: Nahrung fuer alle Band 3 [The book of tempeh: Food for mankind. Vol. 3]. Ahorn Verlag, Irmingardweg 10, D-8210 Prien, West Germany. 256 p. Illust. by Akiko Aoyagi Shurtleff. Index. Sept. 23 cm. Translated by Christiane and Dr. Peter Heningsen, and by Flora Yap. [292 ref. Ger]

• ***Summary:*** Contents: What is tempeh? Preface. Acknowledgments. How to use this book. Part I. Tempeh: Food for all. 1. Soybeans: Protein source of the future. 2. The nutritional value of tempeh.

Part II. Cooking with Tempeh (162 recipes). 3. Getting started–Preparation, principles, and basic recipes. Favorite tempeh recipes. 4. Western-style tempeh recipes. 5. Indonesian tempeh recipes.

Part III. Making tempeh. Making tempeh at home, in a community, or on a commercial scale. 7. Other types of tempeh and onchom. 8. Making tempeh starter. 9. The Indonesian tempeh shop.

Part IV. Tempeh history and research. 10. The history of tempeh East and West. 11. The microbiology and chemistry of tempeh fermentation. Part V. Appendixes: Tempeh contacts throughout the world. Bibliography. Glossary. List of illustrations. About the authors and their work (autobiographical).

Published in a hardcover edition only–6 years after the project started. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549.

2454. Sumarno, -; Rondot, Pierre. 1988. Soybean Yield Gap Analysis Project. *Palawija News (Bogor, Indonesia)* 5(3):1-3. Sept.

• ***Summary:*** "Soybean yields at farmers' fields are generally much lower than those indicated by trials at research stations. In Indonesia the figure in 1985 was 0.9 tonnes/ha at farmers' fields and 2.0 tonnes/ha at most research plots. This yield difference is termed a yield gap. The Centre was interested in studying this soybean yield gap, from the aspect of both socio-economic and agronomic components.

"The first phase of the Soybean Yield Gap Analysis Project (SYGAP) was conducted in Indonesia from 1985 to 1987. The study was a cooperative undertaking of the CGPRT Centre and the Indonesia National Agriculture Research Institutes: Centre for Agro-Economic Research (CAER) and Central Research Institute for Food Crops (CRIFC) in Bogor, with technical support from Centre de Cooperation Internationale en Recherche Agronomique pour le Development (CIRAD) in France. The project was funded by the European Economic Community." Address: 1. Bogor Research Inst. for Food Crops (BORIF); 2. CGPRT Centre.

2455. Karta, Susani K. 1988. Market trends in the development of traditional soyfood. Paper presented at the ASEAN Food Conference '88: Food Science and Technology in Industrial Development. 18 p. Held 24-26 Oct. 1988 at Bangkok, Thailand.

• ***Summary:*** Contents: Introduction. Traditional soyfood. Market situation and trends. Indonesia. Singapore. Malaysia. Thailand. Constraints in the market development of soyfood (in each of the above 4 nations). Major trends in the development of traditional soyfoods. Marketing strategy of soyfood. Tables: 1. Traditional non-fermented soyfood products. 2. Nutritional composition of traditional non-fermented soyfoods. 3. Description and uses of traditional fermented soyfood products. 4. Nutritional composition of traditional fermented soyfoods.

5. 1987 estimated consumption of soybeans as foods in the Far East [total and per capita in East Asia]. China, 1,062 million population, 7,325,000 tonnes, 6.9 kg/capita. Japan, 122 million population, 1,141,000 tonnes, 9.3 kg/capita. South Korea, 42.1 million population, 330,000 tonnes, 7.8 kg/capita. Taiwan, 19.6 million population, 260,000 tonnes, 13.3 kg/capita.

6. Southeast Asia soybean consumption for food. From 1983 to 1989 the increase in 1,000 metric tons was: Indonesia 927 to 1,600. Singapore 14 to 26. Malaysia 32 to 70. Thailand 40 to 150. Philippines 9 to 24. Total 1,022 to 1,870 (increase of 82.9% in 7 years).

7. Per capita soybean consumption for food in Southeast Asia. From 1983 to 1989 the increase in kg/person was: Indonesia 6.0 to 8.8. Singapore 5.6 to 10.5. Malaysia 2.1 to 3.7. Thailand 0.8 to 2.6. Philippines 0.2 to 0.5. Average total: 3.8 to 5.9 (increase of 55.3% in 7 years).

8. 1987 estimated consumption of soybeans as foods in Southeast Asia [total and per capita]. Indonesia, 175 million population, 1,575,000 tonnes, 9.0 kg/capita. Thailand, 53.6 million population, 118,000 tonnes, 2.2 kg/capita. Malaysia, 16.1 million population, 55,000 tonnes, 3.4 kg/capita. Singapore, 2.6 million population, 20,000 tonnes, 7.7 kg/capita. Philippines, 61.5 million population, 18,000 tonnes, 0.3 kg/capita.

9. Indonesian soybean production, imports, and consumption as food (in tonnes). From 1983 to 1989, production rose from 536,000 to 1,250,000, imports decreased from 391,000 to 350,000, and the amount consumed as food increased from 927,000 to 1,600,000. About 50% of the soybeans used for foods in Indonesia go to make tempeh, and 40% are used to make tofu.

10. Singapore soybean consumption as food. From 1983 to 1989 the amount increased from 14,000 tonnes to 26,000 tonnes. Most of these soybeans are used to make tofu and soymilk. 11. Malaysia soybean imports and consumption as food (in tonnes). From 1983 to 1989, production rose from 182,000 to 440,000, and the amount consumed as food increased from 32,000 to 70,000. 12. Thailand soybean production, and consumption as food (in tonnes). From 1983 to 1989, production rose from 113,000 to 490,000, and the amount consumed as food increased from 40,000 to 150,000. Only in 1988 were soybeans imported–40,000 tonnes. This growth of soyfood consumption is due partially to the Government of Thailand's interest in promoting the awareness and utilization of soyfood products. The Thailand Agricultural Extension Service program and other institutions have been actively advocating of soyfoods into the food industry and the human diet, especially in rural areas. The government controls soybean imports by issuing licenses.

In summary: The soybeans with the highest per capita soybean consumption for soyfoods are: Taiwan 13.3 kg, Japan 9.3 kg, Indonesia 9.0 kg, Singapore 7.7 kg, South Korea 7.3 kg, and China 6.9 kg. The greatest potential for growth lies in China, where it is very common to find markets running out of soyfoods early in the morning. There is also great potential for growth in Malaysia, Thailand, and the Philippines. Address: American Soybean Assoc., 541 Orchard Rd., #11-03 Liat Towers, Singapore 0923, Republic of Singapore.

2456. Yu, R. 1988. Incorporation of lupin into human foods. In: Saipin Maneepun, Pivan Varangoon, and Bulan Phithakpol, eds. 1988. Food Science and Technology in Industrial Development: Proceedings of the Food Conference '88. 2 vols. Bangkok, Thailand: Institute for Food Research and Product Development, Kasetsart University, Thailand. See p. 24-26. Held 24-26 Oct. 1988 in Bangkok, Thailand. *

• ***Summary:*** Research in Australia has shown that lupin seed *(Lupin angustifolius)* can be used to make acceptable tempe. The writer stated that lupin was a better substrate for fermentation than soybean, and that taste panelists preferred the nutty flavor and golden color of lupin tempe.

Literature reports indicate a faster growth of lupin sprouts (36% greater yield) than for soy and mung bean, and that the crispier lupin sprouts have a high acceptability rating compared to soy sprouts.

Note: Lupin grain was sold into Indonesia for tempe manufacture from about 1985 to 1995, however trade was abandoned during the tumultuous years of political change and the Indonesia monetary crisis. There has been renewed interest in the use of lupin for tempe (Jayasena and Quail, 2004).

2457. Chow, Edward T.S.; Wei, L.S.; DeVor, R.E.; Steinberg, M.P. 1988. Performance of ingredients in a soybean whipped topping: A response surface analysis. *J. of Food Science* 53(6):1761-65. Nov/Dec. [26 ref]

• ***Summary:*** Most commercial non-dairy whipped toppings use sodium caseinate as the major protein source; they come in various forms, such as liquid, liquid concentrate, aerosol, powdered, and frozen pre-whipped. The authors discuss the performance of "Illinois Soybean Beverage" in various whipped topping systems. The systems contained 1.5-3.5% soybean solids, Hydrol 91 (partially hydrogenated coconut oil), Span 60 (sorbitan monostearate), Tween 60 (polyoxyethylene sorbitan monostearate), sucrose, and water. Desired foam characteristics were obtained with numerous ingredient combinations. Foaming characteristics were improved by partial removal of cell wall particles and decrease in particle size. Address: 1. Yung Wah Industrial Co. (PTE) Ltd., 121 Neythal Road, Jurong, Singapore 2262; 2&4. Dep. of Food Science; 3. Dep. of Mechanical & Industrial Engineering. Last 3: Univ. of Illinois, 382D Agricultural Engineering Science Bldg., 1304 W. Pennsylvania Ave., Urbana, Illinois 61801.

2458. *J. of the American Oil Chemists' Society.* 1988. Congress focuses on protein [World Congress on Vegetable Protein Utilization in Human Foods and Animal Feedstuffs]. 65(12):1856-57. Dec.

• ***Summary:*** The week-long conference, held in Singapore in early October and sponsored by the American Oil Chemists' Society, drew approximately 360 persons from more than 48 nations.

General chairpersons were Lars H. Wiedermann of the American Soybean Association office in Tokyo, Japan, and Kenneth E. Beery of Central Soya Co. Inc. in Fort Wayne, Indiana. Proceedings of the congress will be published next year by the American Oil Chemists' Society.

2459. Okabe, Shiro. 1988. Editorial: A year end perspective. *Palawija News (Bogor, Indonesia)* 5(4):3. Dec.

• ***Summary:*** There were a number of developments in the field of CGPRT crops during 1988. Prices of soybean went up after initially low levels. Brazil established itself as a major player in the world market of soybean. The private sector has successfully engaged itself in the development of soybean in India, Indonesia, Thailand and the Philippines. In the area of research and development, the region has several active networks covering a large number of crops. These include the Asian Grain Legumes Network organized by ICRISAT, which now has firmly established itself in South and Southeast Asia. A positive sign is the news that the proposed Asia-Pacific Association for Agricultural Research Institutes (APAARI) has generated sufficient interest from the national agricultural research systems to

formally establish the association. Address: Director, CGPRT Centre, Bogor.

2460. *Palawija News (Bogor, Indonesia)*.1988. Role of CGPRT crops in developing countries. 5(4):4. Dec. [2 ref]
• ***Summary:*** RAPA stands for "Regional Office for Asia and the Pacific."

In the past two decades the socio-economic context of CGPRT crops has changed from semi-subsistence toward more commercially-oriented production. Some crops, notably maize, soybeans and cassava, have become important trade commodities.

The per capita availability of arable land in the region fell from 0.287 ha in 1972 to 0.270 ha in 1982. This is the lowest land-man ratio to be found among the major regions of the world. Since the start of the green revolution, while the area of irrigated land per capita rose 6.5% from 0.077 ha in 1972 to 0.082 ha in 1983, that of non-irrigated land per capita fell 10.5% from 0.210 ha in 1972 to 0.188 in 1982 (FAO RAPA 1985). These facts, combined with the stagnant or even diminishing yields of CGPRT crops, explain the growing income disparity between farmers on irrigated and non-irrigated land.

Ranking the top 8 individual CGPRT crops by subregion in 1984: In South Asia, pulses are 1st and soybeans are 7th. In Southeast Asia, maize is 1st and soybeans are 6th. In East Asia other coarse grains (millet, sorghum, etc.) are 1st and soybeans are 3rd. In the South Pacific, taro is 1st and soybeans are not listed.

CGPRT crops are grown mostly on the uplands and in remote areas, to which only limited government attention is usually paid.

The green revolution in the early seventies has made the production of rice, wheat and maize more profitable than of other food crops. Yields and harvested areas of these crops expanded most during the period from 1974 to 1984. Most CGPRT crops showed only marginal increases in yields while the harvested areas of some even decreased. The green revolution appears to have pushed secondary crops into marginal upland areas.

2461. *U.S. Imports for Consumption, Schedule A: Report IM146*.1988. U.S. imports of soy sauce during 1988. p. 872-74.
• ***Summary:*** Total U.S. imports of soy sauce (called "soy sauce, thin" by the report) during 1988 were 37,971,804 lb. This is almost double the figure of 19,613,000 lb in 1981. The value of this FOB at foreign ports of export was $15,095,348. The duty collected by the U.S. was $315,115. Countries from which more than 1 million lb were imported, ranked in descending order of amount, were: Japan 12,709,008 lb (33.5% of the total), Hong Kong 9,220,737 lb, China 7,760,972 lb, Taiwan 4,806,452 lb, and Thailand 1,423,150 lb. Address: U.S. International Trade Commission, Washington, DC.

2462. *FAO Yearbook–Production*.1988-2004. Serial/periodical. Rome, Italy: Food and Agricultural Organization of the United Nations. Yearly. ca. 350 p.

2463. Hayami, Yujiro; et al. 1988. Middlemen and peasants: The structure of the Indonesian soybean market. *Developing Economies (The)* 26(1):51-67. *

2464. Ko Swan Djien. 1988. Recollection of tempeh. *Onko Chishin* No. 25. p. 42-48. [11 ref. Eng]
• ***Summary:*** A brief review of the author's involvement in fundamental tempeh studies. During the late 1950s the author taught Technical Microbiology at the Bandung Inst. of Technology in Indonesia. In 1960 he was granted a sabbatical to study antibiotics and related fermentation processes at the Northern Regional Research Center (Peoria, Illinois) under Dr. Clifford W. Hesseltine. "Dr. Hesseltine's background was in conventional liquid agitated pure culture fermentation. But when Ko arrived, he had just finished his first experiments with a solid substrate fermentation process of an Asian soybean food, by studying aspects of miso fermentation with Dr. K. Shibasaki of Tohoku Univ. Dr. Hesseltine became utterly fascinated with the use of solid substrates and the application of pure mixed cultures in miso fermentation. This made him curious to know more about other non-Western fermented foods which were still unknown to many people in the Western world. During our first conversation, Dr. Hesseltine asked me cautiously, whether I was familiar with an Indonesian food which was made by fermentation of soybeans with a certain mould species. I immediately assumed that he had 'tempe' in mind. Since tempe is a regular ingredient in the Indonesian menu, it was not difficult for me to tell him about the culinary aspects of tempe. However, knowledge of the microbiological aspects was minimal, because basic background information was not yet available.

"Instead of discussing the latest developments of fermentation technology which was the purpose of my visit to the U.S.A., Dr. Hesseltine and I theorized about tempe fermentation and we became more and more fascinated by the still unknown aspects. We soon agreed that it might be more interesting to study fundamental principles of tempe fermentation during my period of practical training rather than starting a study of one of the many detailed aspects of a modern fermentation process. At that time we could not foresee that this decision was a contribution to sparking a wave of research activities with world wide interest."

This research by Ko and Hesseltine led to the discovery that *Rhizopus oligosporus* was the principal species of mold used for traditional tempeh fermentation in Indonesia. This led to development of a pure-culture tempeh starter/

inoculum. "An important aspect during these studies was the unexpected publicity given by the Indonesian press. It aroused curiosity and was a great stimulus to other universities and research institutes to study various aspects of tempe fermentation."

In 1968 the author joined the Agricultural University, Wageningen, Netherlands, where his research showed that *R. oligosporus* does not produce aflatoxins, and actually inhibits their production. A photo shows Ir. Ko Swan Djien. Address: Bandung Inst. of Technology, Indonesia, and Agricultural Univ., Wageningen, Netherlands.

2465. Rozi, Fachur; Laumans, Q.J.; Krisdiana, Ruly. 1988. Production economic aspects of soybean grown on tegal: A case study in Pasuruan District, East Java. *Penelitian Palawija* 3(2):105-15. *

2466. Aman, D.; Sultoni, A.; Hidajat, N.; Dauphin, F.; Morooka, Y.; Rachim, A.; Bottema, Taco (chief editor). 1988. The soybean commodity system in Indonesia. Revised ed. *CGPRT* No. 3. xvi + 83 p. 25 cm. Includes 40 tables and 19 figures. [32 ref. Eng]

• ***Summary:*** This is a revised and updated version of a study first published in 1985. Contents: Forward; Summary; 1. Introduction; 2. Trends in Soybean Production; 3. Farm Production Practices; 4. Input and Output Relations; 5. Marketing and Price Situation; 6. Utilization and Processing (Indonesian soybean foods; Traditional processing industry; Function and role of KOPTI; The feed industry); 7. Demand and Consumption; 8. Government Policy, Regulations and Support Programmes; 9. Discussion and Conclusion; Appendix; Glossary; References.

The purpose of the study was to clarify the position of soybeans in Indonesia. Until 1985, Indonesia depended largely on soybean imports, a situation which caused serious concern for the government. To improve the situation, the government launched a successful intensification and expansion program to increase soybean production and yield. Address: Regional Co-ordination Centre for Research and Development of Coarse Grains, Pulses, Roots and Tuber Crops in the Humid Tropics of Asia and the Pacific, Jalan Merdeka 99, Bogor 16111, Indonesia.

2467. Boxer, Charles R. 1988. Dutch merchants and mariners in Asia, 1602-1795. London: Variorum Reprints. 350 p. in various pagings Illust. Maps. 1 portrait. Index. 23 cm. *

• ***Summary:*** Hymowitz (2007/06) wrote: "Boxer points out that the Dutch East India Company exported soy sauce [from Japan] as early as 1673-1674. In 1673, the ship *In Laeren* (p. 333) carried 12 tubs of soy sauce as cargo and in 1674 the ship *In Hasenburg* (p. 334) had an unlisted amount of soy."

Note 1. These two ships loaded their soy sauce at Deshima, Nagasaki, Japan. The ship In Laeren sailed to Batavia. There is no record that either of the ships transported this soy sauce to Holland; they were used in the intra-Asiatic shipping route. Note 2. Charles Ralph Boxer was born in 1904.

2468. Cost, Bruce. 1988. Asian ingredients: Buying and cooking the staple foods of China, Japan and Southwest Asia. New York, NY: William Morrow & Co. 333 p. Illust. Index. 27 cm. [39 ref]

• ***Summary:*** Soy related: Soybean sprouts and recipe (p. 86). Beans, incl. soybeans (p. 146-50). Asian "dairy" (p. 186-87): The soybean and the coconut (incl. bean curd, doufu-nao, fermented bean curd / fu-ru, molded bean curd / chou dou-fu, dried bean curd / dou-fu gan, and bean curd skin [yuba]. Soybean milk.

Soybean sauces, condiments and pastes (p. 195-210): Salted and fermented black beans with recipes for "Roast chicken with black beans stuffed under the skin," and "Soft-shell crabs with ginger, lemon, and black beans" ("Fermented black beans, often flavored with bits of ginger and sometimes orange peel, are usually sold in 8-ounce plastic bags." Acceptable brands: Mee Chun or Koon Chun Sauce Factory. "Earthier and probably more classic are the Yang Jiang Preserved Beans (with ginger) from Kwangtung, China), bean sauce (other names: Yellow bean sauce, brown beans sauce, bean paste, jiang; two types are with the beans whole or ground), hot bean sauce / paste with recipe, hoisin sauce, sweet bean sauce (made with soybeans [probably tian mian jiang, p. 202], Taiwan), soy sauce (Chinese, Japanese, tamari; Highly recommended light soy sauce: Pearl River Bridge. Highly recommended dark: Pearl River Bridge Mushroom Soy, flavored with straw mushrooms), Java's ketjap and other soy sauces miso with recipe, yellow miso *(Shinshu miso),* white miso *(shiro miso, Kyoto shiro miso,* sweet white miso), red miso *(aka miso),* Hatcho miso [soybean miso], barley miso *(mugi miso),* fermented bean curd (white or red; also called preserved bean curd, bean cheese, doufu-ru or fu-ru {Mandarin}, fu yu {Cantonese}) with two recipes).

Concerning ketjap (p. 206): Tomato ketchup, although it may seem to be of Asian origin, may or may not come from a family of Asian pickled products. But the word "ketchup" is clearly of Asian origin. [Note: The modern Indonesian word for soy sauce is *kecap / ketjap / kechap.]* "It comes from the Malay *kechap,* which apparently derives from the *kôe-chiap* of a southern Chinese dialect (Amoy); both of these refer to the kind of briny liquid preserves that include fish and soy sauces." Throughout most of Southeast Asia, fish sauces are the standard condiment, in Indonesia (incl. Java) soy sauce is more widely used. Sweet Indonesian soy sauce *(ketjap manis),* which is very widely

used, is traditionally sweetened with palm syrup and seasoned with garlic, star anise, salam leaves, and galangal.

Also discusses: Seaweed (p. 165-70): Kelp (Laminaria), laver (Porphyra), wakame, dashi, hair vegetable / black moss / hairlike vegetable (China; Gracilaria verrucosa), agar-agar. Monosodium glutamate (p. 247)

Bruce Cost was born in 1945. A photo and brief biography appears on the inside rear dust jacket. Address: [San Francisco, California].

2469. Larcher, Jacques; Volper, S.; Aubin, J.P. 1988. Le soja en régions tropicales: une synthèse des recherches de l'IRAT [The soybean in tropical regions: A summary of research conducted by IRAT]. *Memoires & Travaux de l'IRAT (France)* No. 15. 185 p. [91 ref. Fre]

• ***Summary:*** IRAT stands for *Institut de Recherches Agronomiques Tropicales* (Tropical Institute of Agronomic Research). Contents: Varietal improvement: Introduction of varieties, screening varieties, creating new varieties. Cultural practices: Preparing the soil, water needs of the soybean, planting, harvest, production and storage of seeds. Cultural systems: Crop rotations, companion crops, times of working. Fertilizers: Mobilization minerals, diagnosis based on foliage, nitrogen fertilizers, phosphate fertilizers, potassium fertilizers, organic manure, preformulated manure. Inoculation: Effects of inoculation on the nodulation and the yield of soybeans, methods of inoculation, selection of stocks of *Rhizobium japonicum,* determination of the dose of inoculum suited to the field, production of inoculum, survival of *Rhizobium japonicum* in tropical soils. Crop protection: Bacterial diseases, fungal diseases, viral diseases, nematodes, insects, chemical defoliation, herbicides. Technology: Senegal, Cameroon.

Appendixes: 1. List of varieties. 2. List of the main soybean varieties introduced to Benin, Burkina Faso, Cameroon, Comoro Islands, Côte d'Ivoire, Ethiopia, French Guiana, Madagascar, Mali, Niger, Polynesia, Central African Republic, Reunion and Martinique, Senegal, Togo. 3. Norms of observation and methods employed by IRAT. 4. Improvement of the components of soybean yield. Technical guide for growing soybeans in Senegal, Côte d'Ivoire, and French Guyana.

The section titled "Introduction of Varieties" (p. 9) notes that between the first and second world wars, the French peasantry introduced the soybean to Madagascar and cultivated it in the regions of Ambatolampy, Antsirabé, and Ankazomiriotra. It is interesting to note that it was in the latter locality that the first attempts were made to transform soybeans into milk and cheese [soymilk and tofu] in Madagascar. In Cameroon, eleven varieties, which originated in the USA and East Asia, were introduced between 1924 and 1945.

In 1965 IRAT introduced the soybean into its research programs and began, as a first step, by establishing soybean varietal collections in the different countries where IRAT was working: 1966 in Senegal, Madagascar, and Cameroon. 1967 in the Central African Republic and Mali. 1968 in the Côte d'Ivoire. 1969 in Benin. 1971 in the Comoro Islands. 1972 in Ethiopia. 1974 in Togo and Niger. 1975 in Burkina Faso, Réunion, French Guiana, Martinique, and Polynesia. The first collections, established in 1966 from soybean varieties originating in Rwanda, the USA, Rhodesia, and Tanzania, were progressively disseminated to the other countries.

Subsequent participation of IRAT researchers in the international variety trials conducted by INTSOY (USA) and by IITA (Ibadan, Nigeria) enabled IRAT to diversify its genetic resources and to test, mainly through the INTSOY trials, the varieties that it had developed.

Varietal selection (p. 10-22): Senegal: From 1966 to 1970, 120 soybean varieties received were tested by CNRA of Bambey (Baol), then at Nioro du Rip (Sine-Saloum), where the best yields, of about 1,500 to 2,000 kg/ha were obtained with the variety Geduld. Starting in 1970 Bambey was abandoned and trials were continued at Séfa (Sefa, Casamance) and Synthiou Malème (in eastern Senegal), where the ecology was more favorable for soybean cultivation. Breeding of new varieties started in about 1972 in Senegal (see p. 22-33)

Central African Republic: In 1967, at the request of the Ministry of Rural Development, via FAO, 80 soybean varieties of very diverse origins were introduced and tested at the Grimari station. The variety Avoyelles yielded 1,218 kg/ha.

Mali: The varieties G15 and G115 (Jupiter) from Burkina were introduced to Mali in 1967. Then in 1969 IRAT introduced 26 new varieties, of which 11 originated in the Central African Republic and 15 in Senegal.

Côte d'Ivoire: From 1968 to 1977 IRAT introduced 171 soybean varieties to the Côte d'Ivoire.

Togo and Benin: These two contiguous countries have comparable ecologies. IRAT's with soybeans in Benin began in 1969. In 1970 IRAT introduced to Niaouli, Benin, 45 varieties originating in Taiwan, Central African Republic, Madagascar, and Senegal. This collection was continued from 1970 to 1974, because two crops a year were possible, at the stations of Niaouli and Ina in Benin, and 3 stations in Togo. In 1975 IRAT-Togo cooperated with INTSOY in the first soybean trials in Togo. The first seeds were planted at Davié in southern Togo on May 2, at Amoutchou in central Togo on May 7, and in Kitangbao in northern Togo on July 8. Togo. Table 12 shows the average yields from 1970 to 1974 from the varieties Columbia, Mandarin, Clark 63, and E 73. These yields were low due to the absence of any use of fertilizers or inoculants, and the poor germination of the seeds. [Note: From Whigham and Judy (1975) and Dumont (1981) we have learned the exact dates that soybeans were planted in Benin and Togo].

Comoro Islands: 63 soybean varieties from the Madagascar collection were introduced in 1971 and tested on Grand Comoro *(Comore)* and at Anjouan (800 meters altitude). At Anjouan the best variety was Biloxi, which had an average yield of 2,000 kg/ha. On Grand Comoro the yields were lower, about 1,500 kg/ha. Having little future, soybean research was stopped in 1976. Note: This document contains the earliest date seen for soybeans in the Comoro Islands, or the cultivation of soybeans in the Comoro Islands (1971) (one of two documents). The source of these soybeans was Madagascar.

Niger: In 1974 IRAT introduced from Senegal 17 varieties of various origins; the results were mediocre (in part from absence of inoculation): ICA Toroa 662 kg/ba, ICA Lili 312 kg/ha, Improved Pelican 335 kg/ha, Mandarin 300 kg/ha. Two INTSOY trials took place in 1975 at Maradi and Gaya. This time the yields were very encouraging; at Maradi the variety Forrest yielded 3,500 kg/ha.

Note: This document contains the earliest date seen for soybeans in Niger, or the cultivation of soybeans in Niger (1974). The first 17 varieties introduced originated in various countries.

Burkina Faso: The soybean was introduced to this remote country in 1960. At that time IRHO *(Institut de Recherches pour les Huiles et Oléagineux)* was in charge of experiments on this plant. In 1975 IRAT participated in an INTSOY trial at Farako-Ba; Jupiter gave the best yield, 2,405 kg/ha.

Réunion: Four varieties from the USA were tested in 1974, at the station of Mon Caprice, during two seasons. The best yield during the cool season was from Chippewa (1,780 kg/ha), and during the warm season it was from Amsoy (2,070 kg/ha).

Martinique: IRAT-Martinique participated in the 1975 INTSOY trials. Only one variety, Improved Pelican, with a yield of 2,150 kg/ha [sic, 2,154 kg/ha, planted 10 April 1975] seemed interesting, but since soybean cultivation was believed to have no future in the agriculture of the island, the experimentation was abandoned.

French Guiana: The first soybean trials began in 1975 with the introduction of 4 varieties: Jupiter, Acadian, and Improved Pelican from the USA, and Vada, which originated in Java [Indonesia]. From 1976 to 1983 IRAT-Guyane participated in INTSOY trials. In 1976 Jupiter gave the top yield of 3,440 kg/ha.

French Polynesia: From 1976 to 1979 the INTSOY trials continued during the two rainy seasons. The variety Davis gave the best overall average yields (4,260 kg/ha over 5 seasons), with a top yield of 5,286 kg/ha in 1976-77. Address: France.

2470. Philippine Council for Agriculture, Forestry and Natural Resources Research and Development. 1988. Mga Gamit ng UTAW Bilang Pagkain [The uses of soybeans as food]. Diliman, Quezon City, Philippines. 46 p. Illust. DA/ATI-PCARRD Farm Primer No. 3. Series of 1988. AC-R4-P-S-V-2-88. [3 ref. Tag]

• ***Summary:*** Part 1 (p. 1-20) of this Tagalog-language booklet, which contains many illustrations (line drawings), is titled "Soybean Products." It describes how to make basic soyfoods, such as soybean ketchup *(Ketsup na utaw),* soy coffee *(Kapeng utaw),* pastillas, soymilk curds (taho), tokwa (tofu), polboron (a confection usually made with powdered milk, but in this case using soybean powder), soymilk, soy flour (harinang utaw; note that utaw is word for soybean in Tagalog), tao-si (soy nuggets), soy sauce (toyo), and miso.

Part 2 (p. 25-45) titled "Soybean Recipes," includes chicken with miso, tofu with miso, tofu with mushroom soup, soymilk custard, fried meat (pork; Baboy), fried meat with miso, bamboo shoots with miso, baguio beans with miso, fried tofu with sweet & sour soy sauce, miso with noodle soup, chicken soup with tofu, and fried tofu with vegetable sauce. Address: Philippines.

2471. Rohidi, Tjetjep Rohendi. 1988. Laporan penelitian tingkah laku kesehatan dalam memproduksi, mendistribusi, dan mengonsumi bongkrek suatu kajian kasus di Desa Ajibarang Kulon, Kabupaten Banyumas, Propinsi Jawa Tengah [Report of a study on the socioeconomic, cultural, and health aspects of bongkrek (tempeh) in Kabupaten Banyumas, Kawa Tengah]. Semarang: Institut Keguruan dan limu Pendidikan Semarang, Departemen Pendidikan dan Kebudayan. viii + 158 leaves. Illust. Maps. 29 cm. [Ind]*

2472. Sulistyo, Joko; Taya, N.; Funane, K.; Kiuchi, K. 1988. Production of natto starter. *Nippon Shokuhin Kogyo Gakkaishi (J. of Japanese Society of Food Science and Technology)* 35(4):278-83. [12 ref. Eng; jap]

• ***Summary:*** 3 strains of *Bacillus natto* starter were incubated in 3 media, i.e. (1) soybean extract agar, (2) phytone agar, and (3) nutrient agar, to determine effect of media on natto quality. It was concluded that quality of natto produced from 1. and 2. was better than that of 3. Address: 1. National Biological Inst. of Indonesian Inst. of Science, P.O. Box 110, Bogor, Indonesia.

2473. **Product Name:** Nestlé Twin (Powdered Milk and Soya Drink).
**Manufacturer's Name:** Nestlé Philippines Inc.
**Manufacturer's Address:** Cabuyao, Laguna.
**Date of Introduction:** 1988?
**Ingredients:** Milk solids non-fat, soya solids, butter fat, vegetable fat, maltodextrine, sugar, calcium carbonate, salt, zinc sulfate, potassium iodide, vitamins, flavor.
**Wt/Vol., Packaging, Price:** 350 gm can.
**How Stored:** Shelf stable.

**Nutrition:** Per 100 gm powder/per serving of powder: Energy 499/162.2 kcla, protein 25.6/8.3 gm (24% of RDA for children), Carbohydrates 37.9/12.3 gm, total fat 28.0/9.1 gm, Ash (minerals) 5.5/1.8 gm, water 3.0/1.0 gm).
**New Product–Documentation:** Talk with Rachel Cabato. 1989. May 28. Nestlé has a plant in Luzon for making powdered soybean milk. This is mixed with cow's milk to make at least 3 products, which are sold in cans, both in the Philippines and overseas. Label sent by Rachel Cabato. 1989. Nov. 12 by 4 inches. Goes around a can. Full color illustration of a large pitcher of this soy-dairy blend being poured into a glass in the foreground. In the background are cows grazing in a grassy field on the left and rows of soybeans on the right. Snow-capped mountains are in the background. Front panel text: "A powdered blend of delicious filled milk and nutritious soya. Now even more delicious. Enriched with vitamins A, D-3 & minerals." Side panel: "Easy to prepare! Add 3 heaped tablespoons of Nestlé Twin to a glass of warm water and stir well." A table shows the amounts of each major vitamin and mineral: For adults ages 20-49. Calcium 56% of the RDA, vitamin D 42%, iodine 28%, vitamin B-2 (riboflavin) 24%, phosphorus 24%. Second label sent by Rachel Cabato. 1990. Jan. 11. 200 gm box with same content and graphics as can label.

2474. Purushothaman, Shoba. 1989. Soy industry's negative ads damp tropical-oil imports. *Wall Street Journal.* Jan. 17.
• ***Summary:*** "For two years, the U.S. soybean industry has attacked tropical oils, its chief rivals in the $3 billion-a-year American market for vegetable oils, with advertisements raising the specter of cholesterol... The campaign appears to have had a substantial impact. Imports of soy oil's main competitor, palm oil, were 44% lower last year than in 1986. More than a half-dozen big U.S. food companies have stopped using palm and other tropical oils over the past year or so, including Kellogg Co., PepsiCo Inc.'s Frito-Lay division, and Campbell Soup Co.'s Pepperidge Farm subsidiary...

"The American Soybean Association's campaign stands as a well-engineered marketing triumph, and the group is planning new moves against its rivals.

"It is also getting some powerful help. An independent group, the National Heart Savers Association, has run full-page ads recently in major newspapers with the blunt headline 'The Poisoning of America' and the names of products containing tropical oils. Heart Savers is funded, almost exclusively by Phil Sokolof, 66 years old, whose wealth comes from a family steel-products company, Phillips Manufacturing Co.

The soybean group's own campaign began after it became clear that cheaper palm and other tropical oils from the Far East were capturing a rapidly growing share of the U.S. vegetable-oil market. In 1979, the U.S. imported about 100,000 metric tons of palm oil. By 1985, that figure had more than doubled to 213,000 tons.

"The negative ads contributed to a quick slide for tropical oils. Imports of palm oil plunged 20% in 1987 and 24% last year."

2475. Shurtleff, William; Aoyagi, Akiko. comps. 1989. Bibliography of tempeh and tempeh products: 1,416 references from 1815 to 1989. Lafayette, California: Soyfoods Center. 177 p. Subject/geographical index. Author/company index. Partially annotated. Printed Jan. 19. 28 cm. [1416 ref]
• ***Summary:*** The most comprehensive bibliography on the subject. Contains all known commercial products. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549.

2476. Hughes, Bill. 1989. Marketing, research are seeds for banner soybean crop. *State (Columbia, South Carolina).* Feb. 1.
• ***Summary:*** American Soybean Assoc. president James Lee Adams told to a crowd of 350 farmers at the annual Soybean-Corn Expo. that Brazil and Malaysia are aggressively marketing their vegetable oil crops. "The palm oil growers in Malaysia are supporting their program with a 12½-cent per bushel checkoff (assessment)... Brazilian farmers have taken out full page ads in recent issues of *Time* magazine exhorting the value of their crop.

"Although the Soybean Association already has 11 foreign offices, Adams strongly suggested the group spend $600,000 to open another in Moscow to serve the Soviet Union."

2477. Williams, Linda. 1989. Importers' group launches palm oil defense. *Los Angeles Times.* Feb. 2.
• ***Summary:*** "Tropical oils have been accused of contributing to heart disease in America. The Malaysian Oil Palm Growers Assoc. has suffered a 44% decline in oil exports to the USA since 1986." Hill & Knowlton Inc. is the U.S. public relations firm coordinating the expensive campaign that urges Americans "not to be intimidated by scare tactics which are not based on scientific studies." Address: Staff writer.

2478. McGill, Douglas C. 1989. Tropical-oil exporters seek reprieve in U.S. *New York Times.* Feb. 3. p. D1.
• ***Summary:*** The leading producers of the world's 2.7 million tonnes (metric tons) of coconut oil are Philippines 39.8%, Indonesia 26.8%, India 6.9%, Malaysia 3.9%, and others 22.8%.

Leading producers of the world's 8.6 million tonnes of palm oil are Malaysia 56.6%, Indonesia 16.3%, Nigeria 7.5%, Latin America 5.7%, South America 4.0%, and Other 10.0%.

Malaysia and the Philippines "are waging a campaign to persuade Americans–and through them, major food companies, that tropical oils have no ill effects on health. But the battle already appears to be lost.

"Responding to complaints from consumer groups that palm oil and coconut oils raise cholesterol levels, most large American food processing companies have pledged to remove the oils from all their products...

"The Nabisco Company is the only major food processing company that has not announced its intention to move completely away from tropical oils...

"In full-page ads in the New York Times, The Wall Street Journal, USA Today and other newspapers this week and next week, the Malaysian Oil Palm Growers' Council disputes the idea that palm oil is unhealthy.

"The advertisement refers to eight scientific studies that the palm industry says prove that palm oil has no effect on cholesterol and sometimes actually lowers it. But Dr. Scott Grundy, a University of Texas Southwestern Medical School researcher who participated in three of the eight studies, said in an interview that the ad was misleading and that 'palm oil has to be called a cholesterol-raising fat.'...

"Tropical oils lengthen the shelf life of products, and also provide an array of other advantages that are hard to duplicate with unsaturated oils, like soybean, cottonseed and safflower oil.

"Solid at room temperature, tropical oils melt in the mouth, like chocolate, and as an ingredient in dough they can hold cake or cookie batter together in the oven. When sprayed, palm oil or coconut oil can extend the "bowl life" of a cereal by keeping it crunchy in milk."

2479. Malaysian Oil Palm Growers' Council. 1989. To the American people–The facts about palm oil (Ad). *Wall Street Journal.* Feb. 7. p. A23.

• ***Summary:*** This ad makes 9 points and presents a graph (based on 8 studies with no sources cited) which appears to show that consumption of palm oil reduces blood cholesterol. Among the points: "Initial scientific research has provided evidence that Palm Oil is a healthy and nutritious vegetable oil with positive anti-thrombotic properties... Palm Oil can be used in its natural form and, generally, does not require artificial hardening or hydrogenation. Polyunsaturated vegetable oils must be hydrogenated before they can be used for shortening or for any other form of solid fat products... Hydrogenation of polyunsaturated oils seems to promote saturation and creates *trans* fatty acids in oils exposed to such processes. Approximately 70% of the soybean oil consumed in the USA is hydrogenated... Palm Oil is extracted from the steam-sterilized fruit without the use of solvent, which is generally used when extracting polyunsaturated oils."

2480. Adams, James Lee. 1989. The soy agenda... From your ASA president. *Soybean Update.* Feb. 20. p. 3.

• ***Summary:*** The U.S. soybean market is under attack by foreigners. "Three fourths of U.S. consumers who buy soyoil don't realize it... The average [U.S.] farmer invests just three-fourths of one cent per bushel [of soybeans]. Canadian rapeseed growers are investing double! And the Malaysian palm producers are investing 10 times a much as you!"

2481. *Soybean Update.* 1989. U.S. consumers are not aware [of soy oil]. Feb. 27. p. 3. [1 ref]

• ***Summary:*** A new study of U.S. consumers commissioned by the American Soybean Assoc. "shows alarming news for your soybeans. Survey results show 85 pct of U.S. consumers can't name soyoil as a vegetable oil, while 77 pct of U.S. consumers who use soybean oil don't know it. And, 95 pct of U.S. dieticians recognize soyoil but list it seventh in what they recommend to customers. This low identity is worse than no respect... it's dangerous. It means other oils–like tropical fats (palm) and imported oils–can take over the most important source of your income...

"U.S. public relations firm tells ASA that the Malaysians are planning a major series of national newspaper ads in early March. Their ads will apparently focus on the "negatives" of hydrogenation. Malaysia's checkoff–equal to $.077/bu. of soybeans–is funding a $3.7 million U.S. campaign against soy vegetable oils."

2482. Dalodom, A.; Chainuvati, C.; Charnnarongkul, S. 1989. Rapid expansion of soybean production in Thailand. In: A.J. Pascale, ed. 1989. World Soybean Research Conference IV. Buenos Aires: Continuing Committee. xxviii + 2152 p. See p. 650-57. [9 ref]

• ***Summary:*** Soybean is an important field crop in Thailand. Production has increased from about 100,000 tonnes in 1980 to 366,400 tonnes in 1986, the peak year. Yields in the same period rose from 793 to 1,238 kg/ha. There are three seasons for soybean cultivation: early rainy season, late rainy season, and dry season.

Soybeans produced in Thailand are used in food products in two ways: First, the medium scale food industry produces soy milk and soy starch for local food mixtures. The other is family-scale food industry that produces fermented soybean chip for food ingredients, bean sprout, custard, curd, local soymilk and Tao si, etc. The main industries for soybean grain are oil and meal. Soybean oil annually produces about 40,000–45,000 tonnes. It can be categorized into 2 groups: 1. Sea food product canning that demands 15,000 tonnes of soybean oil a year. 2. Cooking oil, resin for light color paint and other canning uses which demand about 25,000–30,000 tonnes a year. Address: Dep. of Agricultural Extension, Bangkhen, Bangkok, Thailand.

2483. Ontario Soybean Growers' Marketing Board. 1989. 40 years of progress: Fortieth anniversary, 1949-1999. Chatham, Ontario, Canada: OSGMB. 49 p. 22 x 28 cm.
• ***Summary:*** Contents: A message from the Ontario Minister of Agriculture and Food (Jack Riddell). Chairman's message (Ted McGrail). History of soybeans in Ontario (p. 3). Year by year: 1948-1989–One page is devoted to each year. The 3-element / column format is the same for most years and pages, except when there is a photo of the new staff person or a special photo is added: (a) A portrait photo of the chairman for that year. (b) Brief statement of important developments that year (mostly soybean price, production, acreage, yield, support price or deficiency payments). (c) Names of the director(s) from each of the six districts–1. Elgin. 2. Essex. 3. Pelee Island. 4. Kent. 5. Lambton. 6. Middlesex. Page 47 briefly summarizes 40 years of progress.

Four graphs (p. 48-49) show changes related to Ontario soybeans from 1949 to 1989: (1) Soybean acreage grew from 104,000 acres to 1,290,000 acres; the most rapid growth occurred after 1976. Annual average yields and 5-year average yields have increased steadily–the 5-year average from about 18 bushels/acre in 1949 to about 36 bushels in 1989. Soybean production grew from about 3 million bushels in 1949 to a peak of about 45 million bushels in 1987. The soybean crop value (farm cash receipts) grew from almost nothing in 1949 to over $351 million in 1988; rapid growth began after 1971 and 1976.

Chronology of some important events extracted mainly from individual years.

"1949–The Ontario Soya-Bean Growers' Marketing Board was established under the Farm Products Marketing Act. Under the provisions of the new regulations eleven soybean growers were elected as directors to the board. Together they represented some 6,000 soybean producers in six Ontario districts. The first office of the board was located in the office of the Agricultural Representative in Essex, and Angus McKinney was the first secretary. K.A. Standing acted as assistant on a part-time basis. Board operations were financed during the 1949-50 crop year by one half cent per bushel license fee [like the later U.S. checkoff fee].

"1950–The license fee was increased [doubled] from one-half cent to one cent per bushel, the level at which it remained until 1959.

"1951–The first annual convention of soybean growers was held Feb. 15-16, 1951 at the Community Hall, Chatham [County of Kent]. Imports from the U.S. were totalling about 5 million bushels annually.

1952–K.A. Standing became general manager (with portrait photo). The board established its office in Chatham sharing facilities and staff of one secretary with the Ontario Seed Corn Marketing Board on Market Street. The first task was to set up a complete grower records system.

"1953–Expansion of office requirements resulted in a move to new quarters on Fourth Street in Chatham.

1954–The OSGMB organized the first export of Canadian soybeans. The shipment was made from Port Stanley [Ontario] to interests in the United Kingdom. Initiated to generate competition in the domestic market, exports were to continue in every succeeding year. Some 1,492,000 bushels of soybeans were exported during the 1954-55 crop year.

1956–The number of elected directors increased to 14 from 11.

1957–The average price of soybeans paid to growers dropped to $1.95 per bushel–the lowest since World War II. The board pressed for legislation to stabilize returns to growers.

"1958–The board was successful in having soybeans brought under the Agricultural Stabilization Act. The crop was supported at $2.10 per bushel. The average price paid to growers was $1.90, resulting in a deficiency payment of 19.6 cents per bushel for a total of $1,200,000 paid to growers. The office was moved from Fourth Street to Wellington Street West in Chatham. Otis McGregor became assistant secretary-manager (with portrait photo).

Note. Letter (e-mail) from Kim Cooper formerly of OSGMB. 2010. Feb. 18. The growers always had to pay a premium to take part in income stabilization programs. So it was not simply a government subsidy. At first, the premiums had to be paid up front, but after a few years, the premiums were deducted from the payout, if there was any payout.

1960–L.R. Addeman became information officer for both the soybean and wheat boards.

1963–The ban on coloured margarine is lifted in Ontario.

"1964–Increased emphasis was put on [soybean] research when federal and provincial programs were brought under a coordinated plan.

"1965–Domestic crushings reached a 16-year high at 20.8 million bushels, as did soybean imports at 16.5 million. There was no price support in 1965 and succeeding crops, the last having been applied to the 1964 crop at $2.15 per bushel."

1970–Canadian soybean production first tops 10 million bushels.

1973–The first shipment of Ontario soybeans (Harsoy variety) was made to Japan. The Ontario Soybean Symposium was held at Ridgetown College of Agricultural Technology, sponsored by the Board, the Ministry of Agriculture, and Food and Agriculture Canada. K.A. Standing became general manager of both the soybean and wheat boards and Otis McGregor was appointed marketing manager of both boards.

1974–D. Sanderson became secretary to the Ontario soybean and wheat boards.

1975–The Soybean Board established its own separate office in a rented building on Kell Drive in Chatham. Otis McGregor became secretary manager of the Soybean Board.

1977–The metric system started to be used in agriculture in Canada; metric ton (tonne) officially replaced bushel. "An Advance Payment Program was established for soybeans under the federal Advance Payments for Crops Act. The program provided interest free loans to producers who stored their soybean crop at harvest for future sale." A record high yield average of 39 bushels per acre was set. Mario Baletto became market information coordinator.

"1979–The Board initiated a program to promote soybeans as a food product and hired home economist Linda Lantz to manage the program. Soybeans were the featured crop at the Royal Agricultural Winter Fair.

"1980–Soybeans began trading duty free between Canada and the United States following the elimination of a 60 cent per bushel tariff, via the General Agreement on Tariffs and Trade" (GATT). Fred Brandenburg became assistant secretary manager.

"1982–The Board participated in a soybean export market development mission to Japan, Hong Kong, Malaysia, Singapore, and Korea; it was organized by the Ontario Ministry of Agriculture and Food. Continued low prices trigger stabilization payments of 38 cents per bushel federally and 37 cents per bushel provincially."

1983–Two new districts were formed, bringing the total to 8. District 7 ran east to the Quebec border reflecting the advance of soybean production to the north and east from its traditional area.

1984–A new office for the Board was erected at 180 Riverside Drive in Chatham. "A two-day conference–the Ontario Soybean Symposium–and an incoming mission of soybean buyers from the Far East [East Asia] and Europe were sponsored jointly" by OSGMB and OMAF. "Prices dropped again making a provincial stabilization payment of 36 cents per bushel necessary." Note: Stabilization support prices are based on an average of market prices for the past five years.

1985–Fred Brandenburg became secretary manager of the board and John Davidse became executive assistant to the board. "Ontario became self-sufficient in soybean production for the first time as the 37,000,000 bushel crop exceeded the 33,165,000 bushel crush. Low prices continued as did stabilization payments–42 cents per bushel from the federal program and 39 cents from the provincial program."

1986–"Ontario's single biggest soybean export sale of 50,000 tonnes was made to the USSR." Low soybean prices paid to producers continued. In addition to federal and provincial stabilization payments, "the Special Canadian Grains Program paid soybean growers on the basis of 18 cents per bushel."

1987–Tino Breuer became marketing specialist. Districts were again redistributed to reflect the average soybean production in each.

1989–The Board celebrates its 40th birthday with a new logo and a change in the spelling of its name from "Soya-Bean" to "Soybean." 15 directors now represent 24,000 growers in 8 districts across the province. 1,280,000 acres of soybeans were grown in 1988–more than 14 times as many as in 1948. Soybeans are Ontario's #1 cash crop, worth over $350 million in farm cash receipts in 1988. Address: P.O. Box 1199, Chatham, Ontario, Canada N7M 5L8. Phone: 519-352-7730.

2484. Shanmugasundaram, S.; Tsou, S.C.S.; Cheng, S.H. 1989. Vegetable soybeans in the East. In: A.J. Pascale, ed. 1989. World Soybean Research Conference IV. Buenos Aires: Continuing Committee. xxviii + 2152 p. See p. 1979-86. [12 ref]

• ***Summary:*** "Soybeans harvested and used green, between the R6 and R7 growth stages are termed vegetable soybeans. Japan, Korea, China, Thailand and Nepal currently grow and consume vegetable soybeans... For the Japanese consumer, vegetable soybeans have two or more seeded pods, bright green pod wall after blanching or cooking, large seed, gray pubescence, colorless hilum, specific pod length and width and no more than 175 pods per 500 gm. The outer pod coat should be devoid of any blemishes. After boiling, the taste should be slightly sweet and not oily. A number of seed companies, especially in Japan breed vegetable soybeans. AVRDC is currently developing vegetable soybeans that are adapted to the tropics and subtropics...

"The whole plant is harvested and the leaves are stripped; the stems with pods are bundled and sold in Japan and Thailand. In Taiwan, Nepal, China and Korea, the pods are stripped from the plant and marketed... The majority of the vegetable soybeans in Taiwan are frozen in the pod and exported to Japan...

"In terms of nutrient content, the vegetable soybean can be considered as an excellent source of thiamine, a good source of protein, riboflavin, iron and phosphorus. It has adequate vitamin C; it is fair in calcium, but poor in vitamin A.

"In Japan, the area devoted to vegetable soybean increased from 6,980 hectares in 1967 to 14,000 hectares in 1986 including those planted in vinyl houses... The total vegetable soybean requirement in Japan is about 130,000 to 150,000 tons of green pod per annum. The production in Japan varies from 110,000 to 120,000 tons. To meet the domestic demand, Japan imports about 30,000 to 50,000 tons... The amount of frozen vegetable soybeans exported from Taiwan in 1981 was worth US $21 million and reached almost US $63 million in 1987. The domestic Taiwanese

consumption of vegetable soybean also steadily increased from 4,700 tons in 1984 to more than 13,000 tons in 1987...

"At present, there are 27 frozen food processing companies in Taiwan which process frozen vegetable soybeans... Five major processors handle 2,713 tons to 11,552 tons per annum...

"In Japan, vegetable soybean varietal development is conducted by the private seed companies. During the past 30 years the seed companies in Japan developed more than 50 new vegetable soybean varieties. Currently, the most popular ones to name a few are: Tsurunoko, Ryokkoh, Kegon, Hatsutaka, Taisho shiroge, Nakate Kaori, Suzumo, Enrei, Fukuda, Raityo, Shirobato, Tamasudare, Hakutyo and Shiratsuyu." Address: 1-2. Asian Vegetable R&D Center, P.O. Box 205, Taipei 10099, Taiwan; 3. Council of Agriculture, 37 Nan-Hai Rd., Taipei 10728, Taiwan.

2485. Calvert, Ken. 1989. Utilisation of low grade wheat. Report on laboratory production of tempeh in Southland. Renertech, R.D. 2, Winton 9662, New Zealand. 3 p. March 20. Unpublished manuscript.

• ***Summary:*** Dr. Richard Beyer at Otago Univ. in Dunedin suggested that waste of low grade wheat and breadcrumbs might be minimized if they were made into tempeh. An Indonesian student of his had made tempeh from these substrates. Soy Foods of Christchurch makes commercial soy tempeh. Calvert has spent the last 3 months 4-8 hours/ week using a variety of locally grown materials to make tempeh. Address: Winton, New Zealand.

2486. Heriyanto, -; Krisdiana, Ruly; Manshuri, A. Chozi; Soejono, Irian. 1989. Sensitivity of soybean production in East Java to price changes. *Palawija News (Bogor, Indonesia)* 6(1):3-6. March. [1 ref. Eng]

• ***Summary:*** "Conclusions: Based on the results of data analysis of the five alternative crop enterprises (rice, peanut, soybean, soybean intercropped with corn, and peanut intercropped with corn) the following conclusions can be made.

"1. Compared with other food crops in the post-rainy and dry seasons in the survey period, soybean is more profitable. More specifically, with current price ratios, the planting of soybean as a monocrop is more profitable than an intercrop of corn and soybean or any other crop. If farmers actually grow soybean as an intercrop, this means that they consider the risk involved in growing a monocrop to be greater than the difference in income they would have received by raising a soybean monocrop.

"2. Peanut and rice are competitive crops with soybean, within the range of their current feasible price changes. By setting the price of soybean at Rp 650/kg, for example, while increasing the price of peanut to Rp 1575/kg or the price of rice to more than Rp 160/kg, farmers would reduce the area of soybean crop and substitute it with peanut or rice, respectively. Shifts in cropping areas result if farmers are profit-oriented. Within the limit of reasonable price changes, the critical price of soybean is around Rp 915/kg. At lower prices, substitution with peanut and rice crops for some of the soybean area becomes feasible.

"3. At the current price ratio and production technologies, corn does not seem to be very competitive with soybean. Only when soybean prices are very low (i.e. less than Rp 650/kg), does corn become economically feasible to enter the local cropping pattern. At soybean prices around Rp 483/kg, half of the crop area would be occupied by corn during the dry season.

"4. The production, of soybean at the farm level depends on technology application, in addition to the area cropped. Current soybean farm technology has resulted in low farm yields compared with the experimental plots. This implies that the cost per unit of production at the farm level could be reduced by using the improved technology. This would result in greater competitiveness of soybean relative to other crops.

"5. In order to achieve self-sufficiency in soybean production, the government of Indonesia should not only consider the application of improved and appropriate technologies, but also a suitable price policy which may be imposed upon soybean and the competing crops. The latter is especially true, if self sufficiency in more than one crop production is being considered, and where an optimal reallocation of farm resources is needed. To solve these problems, linear programming techniques may also be used in planning appropriate policy changes." Address: 1-2. Malang Research Inst. for Food Crops (MARIF); 3. CGPRT Centre.

2487. Okada, Noriyuki. 1989. Role of microorganisms in tempeh manufacture–Isolation of vitamin B-12 producing bacteria. *JARQ (Japan Agricultural Research Quarterly)* 22(4):310-16. March. [12 ref. Eng]

• ***Summary:*** The vitamin B-12 content of tempeh made in Indonesia was found to be 4.6 micrograms (mcg) per 100 gm fresh weight, much higher than any other vegetarian food tested. But this was based on one sample transported slowly from Indonesia to Japan and its smell was no good when the value was measured. A sample brought quickly from Indonesia with good smell contained 0.7 mcg/100 gm. A sample prepared in Japan with tempeh starter from Indonesia contained only 0.05 mcg. And tempeh prepared in Japan with *Rhizopus oligosporus* NRRL 2710 contained 0.03 to 0.06 mcg/100 gm. Other vegetarian foods containing significant amounts of vitamin B-12 were thua-nao (Thailand) 1.5 mcg and fermented tofu (Singapore, also called Sufu) 1.1 mcg. Flesh-based foods with a high B-12 content included Ka-pi shrimp paste (Thailand) 5.3 mcg, fermented shrimp (Thailand) 2.5 mcg, and fish sauce, 3 month fermentation (Thailand) 2.4 mcg. The vitamin B-12

in vegetarian foods is produced by the fermentation process and it increases during fermentation. Flesh foods contain their own B-12. The daily requirement of vitamin B-12 for adults is estimated to be 3 mcg.

Bacteria that produced vitamin B-12 in tempeh were isolated and identified. The most prolific producer was *Klebsiella pneumoniae,* which had a maximum relative B-12 productivity of 1350. All prolific producers were members of the genus *Klebsiella* but some *Bacillus* species also produced B-12. The author suggests that intraspecific cell fusion techniques might be used to transfer this ability to *Bacillus natto,* the natto bacterium, which is presently unable to produce vitamin B-12. Address: Dep. of Applied Microbiology, National Food Research Inst., Tsukuba, Ibaraki 305, Japan.

2488. *Crop Science.* 1989. Theodore Hymowitz: Frank N. Meyer Memorial Award. 29(2):522-23. March/April.
• ***Summary:*** "Theodore Hymowitz was born 16 Feb. 1934 in New York City. His parents Ethel and Bernard emigrated to the USA in their youth from Poland. Theodore graduated from the Crown Heights Yeshivah and Boys High School, Brooklyn, New York, in 1948 and 1951, respectively. As a young boy he often visited nearby Prospect Park, the botanical gardens, zoo and museum and developed a lifelong interest in plants and animals.

"He received the B.S. degree in agriculture from Cornell Univ. in 1955 and M.S. degree in agricultural chemistry and soils from the Univ. of Arizona in 1957. Thereafter he was drafted into the U.S. Army for 2 years. Following basic training at Fort Benning, Georgia, he was stationed at the Quartermaster Research and Engineering Center, Natick, Massachusetts, where he worked as a chemist in a microbiology laboratory.

"Upon discharge from the Army in 1959, he enrolled at Oklahoma State Univ. where he received his Ph.D. in genetics and plant breeding in 1963. At Oklahoma State he was greatly influenced by the potential of plant introductions by his advisor, Dr. Ralph S. Matlock, and by Dr. Jack R. Harlan, a Frank N. Meyer Medalist. As a graduate student he was a Loeb Foundation Scholar and a Fulbright Scholar in India. At the Indian Agricultural Research Institute, New Delhi, in the laboratory of Dr. M.S. Swaminathan, he conducted cytological research on the genus *Cyamopsis* [which includes guar] and under the tutelage of Prof. H.B. Singh, the father of plant introductions in India, he collected guar germplasm. The entire guar collection was sent to the USA and placed in the PI [Plant Introduction] system. The guar research conducted at Oklahoma State Univ. and in India was incorporated into a book coauthored with Dr. R.L. Whistler, published by Purdue Univ. Press in 1979.

"The development of the transdomestication concept was the main feature of Dr. Hymowitz's research on guar. The transdomestication concept is defined as the movement by humans of a wild species from its indigenous area to another region where it subsequently is domesticated. Guar and the tomato are examples of possible transdomesticates.

"From 1964 through 1966, Dr. Hymowitz was employed as an agronomist by the IRI Research Institute, Campinas, Brazil. In Brazil he spent 2 years collecting, identifying and maintaining legumes having potential forage value and sent a collection of about 750 accessions to the USA to be placed in the PI system. Dr. Hymowitz was also a technical advisor to the Brazilian National Soybean Commission.

"Upon joining the faculty at the Univ. of Illinois in early 1967, he was immediately sent to India for 6 months to initiate soybean production experiments at the Uttar Pradesh Agricultural Univ., Pantnagar and J. Nehru Agricultural Univ., Jabalpur. His final report and published research papers become the model for the establishment of the International Soybean Program (INTSOY) at the Univ. of Illinois. In addition he collected soybean in the Kumaon Hills of Uttar Pradesh, a physically demanding expedition since the soybean were collected from fields on mountain terraces from 1100 to 2500 meters above sea level. The soybean collected were incorporated into the PI system.

"Upon his return to the Univ. of Illinois, Dr. Hymowitz initiated a project to investigate the variation in and genetics of antinutritional and biologically active components of soybean seed. Under his direction, his graduate students and colleagues were able to elucidate the mode of inheritance of soybean seed lacking or having very low amounts of the Kunitz trypsin inhibitor, lectin, β-amylase, lipoxygenase-I and urease...

"In 1974, Dr. Hymowitz and colleagues were the first to report the use of a near-infrared light reflectance instrument to estimate simultaneously the oil and protein concentration in corn, soybean, and oat seed...

"From 1972 through 1976, Dr. Hymowitz visited major herbaria in Asia, Africa and Europe in order to examine their *Glycine* specimens. During these years he also worked in the Univ. of Illinois library, examining floras, monographs, maps, historical documents, floral check lists, and plate tectonic and island biogeographical literature in order to determine the most promising exploration sites and time of year to collect wild botanical relatives of the soybean. From January to March, 1977 he made his first of three exploration trips to Australia. Since then, he or his colleagues have made *Glycine* exploration trips to Fiji, Tonga, Vanuatu, New Caledonia, Papua New Guinea, Philippines, Taiwan and the nearby Pescadores Islands, Marianas and Ryukyu Islands, and Japan. Thus far, the genomic relationships of 11 out of 14 currently recognized species in the genus *Glycine* have been elucidated by utilizing cytogenetic, morphological, isozyme and RFLP

(Restriction Fragment Length Polymorphisms; see definition below) approaches...

"In 1982, Dr. Hymowitz reported the first successful interspecific hybrid between the soybean and a wild perennial species from Australia, *G. tomentella*... Dr. Hymowitz is the curator of the USDA wild perennial *Glycine* collection at the Univ. of Illinois... Dr. Hymowitz has also taken a keen interest in the history of the soybean and this has led to the discovery of the first introduction of the soybean into North America by Samuel Bowen in 1765. In further historical research he documented that the soybean was first planted in Illinois by John H. Lea in 1851. Subsequently these seeds were disseminated throughout the Corn Belt.

"Dr. Hymowitz has advised 11 students for the M.S. degree and eight students for the Ph.D...

"In 1974-1975 he was a visiting professor at the Hebrew Univ. of Jerusalem, Rehovot, Israel. In 1981 he received the outstanding research award from the Land of Lincoln Soybean Assoc. He is the author or coauthor of more than 200 research articles or chapters in books. The research conducted by Dr. Hymowitz is interdisciplinary, spanning the broad areas of chemistry, genetics, taxonomy, cytogenetics, plant breeding, and history of the genus *Glycine* and many other legumes."

2489. **Product Name:** Texas Tofu (Vacuum Packed in a Box).
**Manufacturer's Name:** Energy Sprouts.
**Manufacturer's Address:** 3602 High Point, San Antonio, TX 78217. Phone: 512-654-3963.
**Date of Introduction:** 1989. April.
**Ingredients:** Soybeans, water, calcium sulfate (a natural mineral).
**Wt/Vol., Packaging, Price:** 16 oz vacuum pack inside a 4-color box.
**How Stored:** Refrigerated.
**Nutrition:** Per 2 oz.: Calories 41, cholesterol 0, calcium 71 mg, carbohydrates 1.3 gm, potassium 24 mg, protein 4.5 gm, fat 2.3 gm, iron 1.1 mg, sodium 4 mg.
**New Product–Documentation:** Talk with Bob Phipps. 1988. Sept. 22. In August he received a $192,000 loan to expand his sprout business to include tofu production. He plans to have these three products on the market by November (Thanksgiving), 1988. Previously he has distributed tofu made by Banyan, but he feels their quality is declining. He will probably get his tofu and soymilk system from Sun Youth Machinery Co. in Taiwan via Bean Machines. They have a 4-color tofu equipment catalog featuring stainless steel equipment. They say they are a subcontractor for Takai and they make excellent bean sprout equipment. The population of San Antonio is mostly Hispanics; its hard to sell healthy foods.

Talk with Bob Phipps. 1989. Feb. 27. Most of his tofu customers will be Vietnamese. They like a firmer tofu. He had problems earlier with his tofu not coagulating. The cause: His thermometer was off by 10ºC, so he was cooking his milk at much too high a temperature. Talk with followed by letter and labels from Tracy McFadden, marketing specialist at Energy Sprouts. 1989. July 20. Their tofu was launched as Texas Tofu in about April 1989. It is sold in a box with a cartoon on it. The company has not yet started to work on the soymilk or tofu burgers. But they do send out a recipe booklet, have a videotape on how to prepare lasagna with Texas Tofu that they rotate to stores (where it doubles sales to 8 from 4 cases/week average), and their tofu was certified organic on 23 June 1989 by the Texas Dep. of Agriculture. Label. 1989. 6 by 4.25 by 2 inch high box. Full color outer stiff paper box. On the front panel a cartoon cowboy asks "What the heck is tofu?" Slogans: Delicious recipes–quickly prepared. No cholesterol. Sodium free Low calorie. No preservatives. On the back and one side panel the cartoon cowboy asks, "How the heck do I fix tofu?" Under the title "Delicious 20-minute recipes for Texas Tofu" are Lazy Day Lasagna, Easy Enchiladas, Texas Rice Pudding, and Wake-up Drink (with frozen banana and orange juice). One another side the cowboy asks, "How the heck do I store tofu?" (refrigerated or frozen). On one end panel he asks, "Why the heck should I eat tofu?" Nutritional composition is given.

Talk with Bob Phipps. He is now making a firm, vacuum-packed tofu and sales are excellent. He sells 2,400 boxes (each 1 lb) a week plus another 600 lb/week in bulk to restaurants. An estimated 75% of the box buyers are Caucasian Americans. Asian Americans want a water pack product so he also distributes such a product made by Banyan. He is happy with the quality and price of his all-stainless steel tofu system from Sun Youth in Taiwan but their written materials are useless, terrible. They don't seem to know anything about making tofu. Their specialty is bean sprouts. Talk with Bob Phipps. 1989. Sept. 20. He is very glad that he went with vacuum packaging; no problems with the Multi-Vac $12,0000 double-chamber machine that he bought through Cryovac. Almost no leakers. One man can package 6 cakes/minute. The main advantage of vacuum packaging is that first-time tofu users are not turned off by a cake tofu floating in a pale yellow liquid. Vacuum packing make tofu look rather like cheese. He dates his tofu for a 21-day shelf life.

2490. Garrett, Lynn J. 1989. Commodity feature: Soybean and soybean meal update for East Asia. *World Oilseed Situation and Market Highlights.* April. p. 40-45.
• ***Summary:*** In this excellent report, the most recent import figures are for crop year 1988-89. Countries discussed are Japan, Taiwan, Republic of Korea, Indonesia, and

Philippines. Address: Agricultural Economist, USDA Foreign Agricultural Service (FAS). Phone: 202-720-2852.

2491. **Product Name:** Farmer's Dairy & Fruits Tahotti Frutti [Mango, Sago with Vanilla, Lanka (Jackfruit), Buko (Young Coconut), and Piña (Pineapple)].
**Manufacturer's Name:** Laguna Processing Center.
**Manufacturer's Address:** Plant: Km 71, Alaminos, Laguna, Philippines. Offices: The Livelihood Corporation, Hanston Building, Emerald Ave., Pasig 1600 Metro Manila, Philippines. Phone: 673-21-06.
**Date of Introduction:** 1989. April.
**Ingredients:** Soya milk, natural fruit bits and puree, sugar, agar-agar.
**Wt/Vol., Packaging, Price:** 160 gm plastic cup with plastic lid. Retails for 3.50 to 4.50 pesos/cup (5/89).
**How Stored:** Refrigerated, 9 day shelf life at 4ºC.
**New Product–Documentation:** Talk with Rachel M. Cabato, senior director of The Livelihood Corporation. 1989. May 28. She was an AFS student in the United States and has played a key role in the development and marketing of this product. The manufacturer is a dairy co-op whose main product is fresh milk and dairy products (yoghurt, *pastillas de leche,* chocolate milk, *queso de Laguna,* soft cheese or *kesong puti).* They collect 1 ton a day of fresh dairy milk. To make this non-fermented yogurt-like product, agar is mixed into hot soymilk, then the mixture is poured into cups. When it has set a little, the fruit mixture is poured on the top. Though on the market for only 1 month, the product seems to be doing well. Soybeans, developed by Nestlé in the Philippines to have relatively little beany flavor, are used. Tahotti Fruitti is the only fresh branded soy product presently sold in the Philippines.

Poster sent by Rachel Cabato. 1989. Tahotti Fruitti. 6.25 by 8.5 inches. Color photo of 6 cups of the product surrounded by various fruits. "The better alternative to junk foods! Tahotti Frutti is a special formulation of the popular taho. Contains only the choicest soya beans. Delicately processed to preserve its real nourishing goodness. Hygienically packed in individual cups. Your choice of mango, langka, pina, buko or sago toppings and sweetening arnibal. Rich in protein, carbohydrates, calcium, phosphorus, iron, thiamine, riboflavin and niacin. Low calories just perfect for the figure conscious. Absolutely no Plaster of Paris! No additives. No preservatives! From the makers of fresh, natural, and nourishing products. The only way nature meant it to be!"

Label. 1989, May. Plastic cup. Green, orange, and blue on white. "Tahotti Frutti is a specially formulated taho [tofu]. No additives. No preservatives. The only way nature meant it to be." Follow-up letter with Label from Rachel Cabato. 1989. Nov. 14. The product is now being sold at some 10 outlets, mostly schools. "The variety of soybean used to make this product is popularly known as SJ2. Its milk does not have the unpleasant 'beany' aftertaste that other beans grown here have.

"We are developing soya milk and soya burger, the latter using pulp / solid materials left after extracting the milk. Initial market tests are encouraging."

2492. Toriano, Peter. 1989. Japanese food firms cook up new strategies for U.S. consumers. *Economic World.* April. p. 22-26.
• ***Summary:*** "Riding the success of tasty, low-priced food products, the Japanese eye a bigger helping of the U.S. grocery mart." Two of the most popular Japanese food products have been soy sauce, ramen noodles, and tofu. "Nissin sold more Cup O'Noodles in the United States last year than McDonald's sold hamburgers nationally... Japanese food companies and food products are slipping under America's door unnoticed... The Japanese start selling their food products in the U.S. to a small, very concentrated ethnic market... While Kikkoman can trace exports of soy sauce to the U.S. as far back as 1869, most Japanese food companies did not export to or manufacture products in the United States in significant quantities until the 1970s...

"American food product companies focus on their competitors, whereas the Japanese tend to focus on what the customer wants...

"Kikkoman, one of Japan's largest food-related companies, is involved with wines and liquors, pharmaceuticals, health foods and a chain of restaurants. In addition to its other products, Kikkoman has introduced a shelf-stable tofu, instant miso soup and a rice wine for use in cooking.

"Kenzaburo Mogi, planning manager of Kikkoman's foreign operations department, says tofu could become as big a market as soy sauce for Kikkoman in the U.S. in the years to come. In the U.S., Kikkoman also owns 80% share of JFC (Japan Food Corp.), a major distributor of oriental food products... Consumption of Kikkoman's soy sauce has increased fivefold since 1972... On average, each Japanese consumes about 2.5 gallons of soy sauce every year; the average American consumes less than 10 oz...

"Almost a quarter of Kikkoman's total business now is outside Japan: two-thirds in the U.S. and most of the rest in Southeast Asia. The company also is targeting production in Europe, Australia and China...

"Ajinomoto Co, Japan's largest food processor, has been selling abroad since 1909, when its first overseas office opened in New York... Until the 1960s, Ajinomoto's main product was MSG (monosodium glutamate). Today, it has a more diversified line-up, with about 41% of sales coming from processed foods, and 26% from seasonings... The predominant products the firm manufactures in the U.S. are amino acids for pharmaceutical use...

"Kibun Products International Inc., a subsidiary of Kibun Company Ltd. Japan, is a major manufacturer of

surimi in the U.S... Kibun is a multi-billion-dollar, 50-year-old food products company with worldwide operations totalling $2,000 million annually...

"Morinaga Nutritional Foods Inc., a subsidiary of Morinaga Milk Industry Co. Ltd., the Borden of Japan, is selling its tofu in air-tight containers that prolong freshness, eliminate water changes and is bacteria-free...

"'This could be the food of the future, replacing dairy and meat as major sources of nutrition," says Kent Cooper, spokesman for Hakuhodo Advertising America Inc. in Los Angeles, which handles Morinaga's account...

"Faith Popcorn, chairman of BrainReserve Inc., a marketing consulting company to Fortune 500 companies says America is eating healthier and is more and more concerned with where food products originate and what that does to the Earth, known as the graining/greening of America. 'Vegetarianism is growing like crazy. Americans are changing from flesh food to health food.'"

2493. Cabato, Rachel M. 1989. Nestlé's work with soybeans and soyfoods in The Philippines (Interview). *SoyaScan Notes.* May 28. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Nestlé has a large soybean farm in Cotabato, Mindanoa, where they are doing extensive research to breed soybeans having a low beany flavor. Nestlé is also working with IRRI. Some 300 farmers each plant 4-10 hectares of soybeans; Nestlé gives them the seeds and fertilizers, then buys back the beans. The price is based on Nestlé's quality standards.

Nestlé has a plant in Luzon for making powdered soybean milk. This is mixed with cow's milk to make at least 3 products, which are sold in cans, both in the Philippines and overseas. Nestlé has contributed a great deal toward development of soya in the Philippines. Follow-up letter from Rachel Cabato. 1989. Nov. 14. The only Nestlé soya product currently on the market is Nestlé Twin, a powdered blend of filled milk and soya solids. It can be used for both adults and children. Address: Senior Director, The Livelihood Corp., Hanston Building, Emerald Ave., Pasig 1600 Metro Manila, Philippines. Phone: 673-21-06.

2494. McCarthy, Michael J. 1989. RJR Nabisco to see Chun King brand in $52 million pact: Venture in Singapore to buy maker of Oriental food in deteriorating market. *Wall Street Journal.* June 22. p. B6.

• ***Summary:*** Kohlberg Kravis Roberts & Co. (KKR) acquired RJR Nabisco Inc. acquired earlier this year. The new owners wanted to reduce RJR's overall debt by $5.5 billion within the next year, and they were under government orders to do so, so as not to reduce competition in the product area.

It is not surprising that KKR decided to keep La Coy which is the leader in the canned Oriental-food market, with an estimated 54% share–according to a memorandum prepared by KKR for its lenders last December–compared with only 19% for Chun King. Address: Staff Reporter.

2495. Le, Quang-Hanh; Phuong, N.X.; Guyen, D.V.; Cuong, N.V. 1989. Soybean yield gap analysis project in Vietnam. *Palawija News (Bogor, Indonesia)* 6(2):6-7. June.

• ***Summary:*** "Soybean yields at farmers' fields are generally much lower than those indicated by trials at research stations. In Vietnam the figure in 1969 was 0.7 tonnes per ha at farmers' fields and 1.47 tonnes per ha at most research stations. This yield difference is termed a yield gap.

"This project was conducted in Vietnam from 1975 to 1986 by the Agriculture Research Institute of Vietnam. The objectives of the study were:

"To identify and characterize both agronomic and economic constraints in selected sites and to measure their impact on yield.

" To select technology to increase soybean yield which would minimize the gap between the yield obtained in the experimental station and that in the farmers' fields.

"To identify the most suitable technology for farmers and to facilitate the transfer and adoption of this technology by farmers.

"To recommend policies to alleviate major constraints and improve soybean productivity." Address: National Pulse Crop Research Centre of Vietnam.

2496. Nanseki, Teruaki; Morooka, Y.; Zakaria, A.K.; Kosugi, S. 1989. Comparative advantage analysis of soybean in an upland area of West Java: A case study of mathematical programming approach. *Palawija News (Bogor, Indonesia)* 6(2):3-6. June. [2 ref]

• ***Summary:*** "Economic evaluations on the comparative advantage of selected crops provide a basis for the following analyses: (1) to identify constraints on the adoption of improved and/or new technology by farmers; (2) to identify the most suitable technology for farmers: and (3) to evaluate the effects of both economic and technological change on the farming system in advance. Many research projects on agriculture in developing economies contain these analyses as a core part." Address: 1-2. National Agriculture Research Center, Japan; 3. Bogor Research Inst. for Food Crops; 4. CGPRT Centre, Bogor, Indonesia.

2497. Sarobol, Nantawan; Virakul, P.; Potan, N.; Benjasil, V.; Setarath, P.; Dechates, S. 1989. Preliminary survey on Soybean Yield Gap Analysis in Thailand. *Palawija News (Bogor, Indonesia)* 6(2):1-3. June.

• ***Summary:*** "In 1987, 70% of the area under soybean was confined to rainfed land. From 1972/1973 to 19861 1987, soybean yield increased 2.75% annually and production increased 8.8% annually. However, the production of

soybean in Thailand is only half of the demand for consumption. In the foreseeable future this soybean cultivation is unlikely to change much and the bulk of soybean production will continue to come from the rainfed areas. Therefore, any attempt to increase soybean productivity should consider soybean grown under adverse rainfed conditions, as well as to improve productivity in the traditional area of low input management under irrigated conditions."

2498. Welters, Sjon. 1989. Soyfoods in Europe: Influenced by a colonial past. *Soya Newsletter (Bar Harbor, Maine).* May/June. p. 1, 12-15. [1 ref]

• ***Summary:*** This is a historical overview of the introduction of soyfoods to Europe since 1945. The Indonesians who immigrated to the Netherlands after World War II played a major role in introducing soyfoods (especially tofu, tempeh, and a sweet soy sauce called ketjap) to that country and to Europe. Ketjap was the most popular soyfood in Indonesia. Asian immigrants started small manufacturing companies, restaurants, and importing companies (such as Conimex and Heuschen Schrouff). The macrobiotic movement also played a key role in introducing soyfoods, especially soy sauce, miso, and tofu. In Belgium, the Gevaert family founded Lima and began to make miso on a large scale, but a fire and other financial problems soon forced them to close the plant. Only recently have they started to make miso again.

During the 1970s, especially in Belgium and the Netherlands, inspired by the macrobiotic movement and with information from books by Shurtleff and Aoyagi, a new generation of non-Asian tofu makers emerged. "The first tofu shop in Europe owned and operated by non-Orientals was Manna Natuurvoeding. Opened in Amsterdam in 1977, Manna was a macrobiotic manufacturer, distributor, and retailer run by a non-profit foundation. Soon after opening, Manna was visited by entrepreneurs from Germany, England, Portugal, Denmark, France, Sweden, Austria, and Italy, hoping to learn about making tofu."

During the early 1980s, tempeh was rediscovered. "Yakso Farms in the Netherlands was one of the first non-Oriental companies to produce tempeh, made from organic soybeans, and to process it into spreads, paté, sauces, and marinated products."

In the mid-1980s the focus shifted from production to marketing and to second-generation soyfoods. Most European soyfoods are made with organic soybeans. Address: President, Craft International Consultants, 21 Wetherbee St., Acton, Massachusetts 01720. Phone: 617-264-9511.

2499. Ebata, Junko. 1989. History of Japan's Tempeh Discussion Society and Tempeh Research Society (Interview). *SoyaScan Notes.* July 3. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** The first meeting of the Tempeh Discussion Society *(Tenpe Danwa-kai)* was held on 30 Jan. 1984 at Kyushu University. The most active founding members in the following years were Dr. Tadao Watanabe and Dr. Kiku Murata.

The purpose of the society was to establish a platform for discussion of matters related to tempeh. The first meeting was held at Kyushu University, the second in Tokyo, the third at Osaka Teikoku Joshi Daigaku, the fourth at Marusan-Ai in Okazaki, and the fifth at *Kasuga-cho Shoko-kai* (Hikami-gun, Kasuga-cho, Kuroi, Hyogo-ken). Most of the group's members were affiliated with a university, a food manufacturing company, or a government research laboratory. In 1988 the group changed its name to Tempeh Research Society *(Tenpe Kenkyu-kai)* in order to establish a more formal, research-oriented feeling and to attract new members. The 16 founding members of the new society were: Goro Kanasugi (Takuma-kai), Makio Takato (Takashin Shokuhin), Yasuko Torii (Shizen Shoku Hyoron-ka), Masaharu Horii (Norinsho Sogo Kenkyujo), Teruo Ohta (Fuji Seiyu K.K.), Eiichi Kimura (Daizu Kyokyu Antei Kyokai), Gyo Nikaido and Mikitoshi Iwatsuki (Marusan-Ai K.K.), Hajime Kashio (Nagoya Eiyo Senmon Gakko), Kiku Murata (Teikoku Gaku-en, Kyoiku-ken, Moriguchi City, Osaka), Toshiie Maeda (Tempeh Sonjuku), Machiko Asano (Teikoku Joshi Daigaku), Teijiro Miyamoto (Osaka Shidai), Tadao Watanabe (Torigoe Seifun and Kyushu Univ.), Kazuko Noguchi (Saga Joshi Tandai), Asao Matsuoka (Kassui? Joshi Tandai), and Naokazu Ohta (Kumamoto Joshi Daigaku).

The first meeting under the new name was held on 25 Feb. 1989 in Tokyo. Talks on tempeh were presented by Yasuko Torii, Nobuyuki Okada, and Toshiie Maeda. On 31 Dec. 1988 the Society had 58 members, increasing to 77 by Feb. 1989. During 1989 meetings are planned on June 24 at Osaka City Univ. and on September 1 at Teikoku Joshi Daigaku (Moriguchi city, Osaka prefecture). The group will attend the Second Asian Non-Salt Fermented Soybean Symposium at Jakarta, Indonesia. Address: Prof., Faculty of Science of Living, Osaka City Univ. Sugimoto 3-3-138, Sumiyoshi-ku, Osaka 558, Japan. Phone: 06-605-2811.

2500. Akiyama, Dean M. 1989. Soybean meal utilization by marine shrimp. In: T.H. Applewhite, ed. 1989. Proceedings of the World Congress on Vegetable Protein Utilization in Human Foods and Animal Feedstuffs. Champaign, IL: American Oil Chemists' Society. xii + 575 p. See p. 252-65. Contains 13 graphs and 24 tables. [29 ref]

• ***Summary:*** Contents: Abstract. Introduction. Digestibility studies of soybean meal and other feedstuffs. Basic nutritional research on soybean meal. Applied nutritional research on soybean meal. Discussion.

Soybean meal is gradually replacing fish meal and other marine meals in marine shrimp feeds because it is considerably less expensive and contains high quality protein. Address: American Soybean Assoc., 541 Orchard Road #11-03, Liat Towers, Singapore 0923.

2501. Babji, Abdul Salam Hj.; Letchumanan, S. 1989. Evaluation of nutritive value of local and soy-beef hamburgers. In: T.H. Applewhite, ed. 1989. Proceedings of the World Congress on Vegetable Protein Utilization in Human Foods and Animal Feedstuffs. Champaign, IL: American Oil Chemists' Society. xii + 575 p. See p. 237-42. Contains 8 tables and 3 figures. [22 ref]
• ***Summary:*** Contents: Abstract. Introduction. Methods and materials: Proximate analysis, rat diet preparation, PER-assay, *in vivo* apparent protein digestibility, *in vitro* protein digestibility, measurement of pH reduction by the 4 enzymes system. Result and discussion. A photo shows one of the authors. Address: Dep. of Food Science and Nutrition, Univ. Kebangsaan Malaysia Bangi, 43600, Malaysia.

2502. Bushman, Don H.; Collado, C.M. 1989. Soybean meal as the only supplementary protein source for poultry feeds in the People's Republic of China (PRC). In: T.H. Applewhite, ed. 1989. Proceedings of the World Congress on Vegetable Protein Utilization in Human Foods and Animal Feedstuffs. Champaign, IL: American Oil Chemists' Society. xii + 575 p. See p. 468-73. [1 ref]
• ***Summary:*** Contents: Abstract. Introduction. Broiler trials. Layer trials. "Five broiler and three layer trials were conducted to determine the feasibility of eliminating fish meal from poultry diets in China, the effect of soybean meal quality, and the economic efficiency of using high energy diets for broilers. High quality soybean meal significantly increased weight gain of broilers and egg production in layers compared to similar diets containing fish meal." A photo shows one of the authors.

Note: Don Bushman was head of the American Soybean Association office in Beijing, China. He had previously been head of the ASA office in Singapore. Address: American Soybean Assoc. 1. Beijing, People's Republic of China 100004; 2. Singapore 0923.

2503. Carver, Larry A.; Akiyama, D.M.; Dominy, W.G. 1989. Processing of wet shrimp heads and squid viscera with soy meal by a dry extrusion process. In: T.H. Applewhite, ed. 1989. Proceedings of the World Congress on Vegetable Protein Utilization in Human Foods and Animal Feedstuffs. Champaign, IL: American Oil Chemists' Society. xii + 575 p. See p. 167-70. [13 ref]
• ***Summary:*** Contents: Abstract. Introduction. Materials and methods. Results and discussion. Address: 1. Medipharm USA, 10215 Dennis Drive, Des Moines, Iowa 50322; 2. American Soybean Assoc., 541 Orchard Road #11-03, Liat Towers, Republic of Singapore 0923; 3. The Oceanic Inst., Makapuu Point, P.O. Box 25280, Honolulu, Hawaii 96825.

2504. Chew, Chan Kwee. 1989. Drying of vegetable food proteins. In: T.H. Applewhite, ed. 1989. Proceedings of the World Congress on Vegetable Protein Utilization in Human Foods and Animal Feedstuffs. Champaign, IL: American Oil Chemists' Society. xii + 575 p. See p. 548-52.
• ***Summary:*** Contents: Traditional drying methods: Tall form drying, wide bodies single stage drying, compact dryer. New developments–spray dryers with integrated fluid bed. Address: Niro Atmoizer Food and Dairy Inc., No. 11 Joo Kon Circle, Singapore.

2505. Coffey, Rory. 1989. Lupins as an energy-rich protein source for feed and food. In: T.H. Applewhite, ed. 1989. Proceedings of the World Congress on Vegetable Protein Utilization in Human Foods and Animal Feedstuffs. Champaign, IL: American Oil Chemists' Society. xii + 575 p. See p. 410-14.
• ***Summary:*** Contents: Abstract. Introduction. Lupin consumption and usage. Dehulled lupin. Human consumption: Lupin concentrate, miso soup, lupin tempeh, lupin flour.

Miso soup: Although about 200,000 tons of soybeans are used each year in Japan to make miso soup, there is a problem with oxidation, which causes discoloring. The Shinshu Research Institute has investigated the use of lupins as a substitute for soybeans in an attempt to solve this problem. Oxidation does not occur with lupins and to date results have been encouraging. Table 8 shows a sensory evaluation of the two types of miso (high score is more favorable): Color–Lupin 12, soy 0; Taste–Lupin 10, soy 2; Aroma–Lupin 7, soy 5; Texture–Lupin 6, soy 6.

Lupin tempeh: In 1986 an Indonesian company began to investigate the feasibility of using lupins as a substitute for soybeans in making tempeh–with the assistance of the Grain Pool of Western Australia and R. Yu of the Victorian Food Research Institute. Despite some problems at the beginning, the efforts by all 3 parties have proved successful and the Indonesian company is now using a significant tonnage of lupins to make tempeh.

Lupin flour: In 1987, the Grain Pool initiated an evaluation of lupin flour in human food products.

Lupins have been grown and used in Western Australia for over 30 years. After extensive genetic engineering, the composition of the present day varieties is far superior to those grown originally. Over 90% of the lupins grown in Western Australia, and all that are available for export, are varieties from the species *Lupinus angustifolius*, a sweet, white, narrow leaf lupin.

In terms of world lupin production in 1985, Australia has the largest area (606,000 ha), followed by the USSR

(280,000), and Europe (148,000). In the USSR and Eastern Europe much of the lupins are grown for forage or green manure; not much grain is not harvested. A photo shows R. Coffey. Address: Grain Pool of Western Australia, Grain Pool Bldg., 172 St. George's Terrace, Perth 6000, Western Australia, Australia.

2506. deKieffer, Donald E. 1989. Government-imposed restrictions on international trade in proteins. In: T.H. Applewhite, ed. 1989. Proceedings of the World Congress on Vegetable Protein Utilization in Human Foods and Animal Feedstuffs. Champaign, IL: American Oil Chemists' Society. xii + 575 p. See p. 17-24.

• ***Summary:*** Contents: Abstract. Introduction (Theory of competitive advantage, cartelization, deregulation). The problem: World oversupply of protein products. Government interventions in oilseeds: The European Community (proposed EC consumption tax, European import barriers, EC policy on rapeseed, Spain's domestic consumption quota, Spain's export subsidies, Portugal's domestic consumption quota), Brazil (differential export taxes, preferential export financing, tax exemptions and deductions, minimum price system), Argentina (the Reembolso, the differential export tax system, price support system), Malaysia (differential export duty system), Japan, the United States (the guaranteed loan program, PL-480 and GSM credit programs, tropical oils bill, the drought bill, import barriers), Canada. Government interventions in dairy trade: European Community, United States, Canada. Government interventions in dairy trade. Discussion.

"Japan is a major importer of oilseeds and oilseed products... Imports of U.S. soybeans for crushing alone amounted to $784 million last year." However Japan "maintains a monopolistic import regime that combines high tariffs and nontariff trade barriers designed to protect Japan's processing industries." Japan's government "requires that formula feed contain specific amounts of domestic cornmeal and 2% fish meal for on-farm mixing intended for resale. These requirements limit the incorporation of alternative products in the mixture. The U.S., for example, has been able to export soybeans to Japan, but not soymeal. If Japanese farmers were able to eliminate expensive fish meal from the feed, exporters argue, they could replace it with imported soybean meal."

A photo shows Donald deKieffer. Address: Pillsbury, Madison & Sutro, Suite 1100, 1667 K St. N.W., Washington, DC 20006.

2507. Devendra, C. 1989. Efficiency in feed resource utilization and animal production. In: T.H. Applewhite, ed. 1989. Proceedings of the World Congress on Vegetable Protein Utilization in Human Foods and Animal Feedstuffs. Champaign, IL: American Oil Chemists' Society. xii + 575 p. See p. 392-400. [36 ref]

• ***Summary:*** Contents: Abstract. Introduction. Animal populations in Asia. Intensifying feed resource utilization.

The various animals that are used as sources of food by humans can be divided into two basic groups: Ruminants (Milch buffalo [river], water buffalo [swamp], cattle, goats, sheep), and nonruminants (chickens, ducks, and pigs). In 1945 poultry required 3.5 units of feed to produce 1 unit of live weight gain, and pigs required 4.1 units. In 1988 these figures had dropped to 2.0 and 2.3 units respectively. In Asia, the chicken population is growing at by far the fastest rate (8.3% a year from 1977-1987), largely because chickens are the most efficient converters of feed to food. Ducks are growing at the next highest rate (2.9% a year), followed by goats (1.9%), and buffalo (1.8%).

A photo shows C. Devendra. Address: Agriculture, Food and Nutrition Sciences Div., International Development Research Center, Tanglin P.O. Box 101, Singapore 9124.

2508. Karta, Susani K. 1989. Traditional Chinese soyfood. In: T.H. Applewhite, ed. 1989. Proceedings of the World Congress on Vegetable Protein Utilization in Human Foods and Animal Feedstuffs. Champaign, IL: American Oil Chemists' Society. xii + 575 p. See p. 382-87. [18 ref]

• ***Summary:*** Contents: Abstract. Introduction. Variables in manufacturing tofu: Soybean variable, processing variable, maceration and extraction (soaking and grinding) stages, filtration and heating stages, coagulation stages, types and concentration of coagulants used in tofu manufacturing. Tofu products.

Table 3 shows 1987 consumption of soybeans as foods in Asian countries. The results are presented here in descending order of per capita consumption: Per capita soybean consumption, country (population), total soybean consumption in 1,000 tonnes. 13.3 kg/capita, Taiwan (19.6 million), 260,000 tonnes. 9.3 kg/capita, Japan (122.2 million), 1,141,000 tonnes. 9.0 kg/capita, Indonesia (175 million), 1,575,000 tonnes. 7.8 kg/capita, South Korea (42.1 million), 330,000 tonnes. 7.7 kg/capita, Singapore (2.6 million), 20,000 tonnes. 6.9 kg/capita, China (1,062 million), 7,325,000 tonnes. 3.4 kg/capita, Malaysia (55 million), 55,000 tonnes. 2.2 kg/capita, Thailand (53.6 million), 118,000 tonnes. 0.3 kg/capita, Philippines (61.5 million), 18,000 tonnes.

In China, fried tofu is called Tou-Pok. Address: American Soybean Assoc., 541 Orchard Rd., #11-03 Liat Towers, Singapore 0923, Republic of Singapore.

2509. Leelahagul, Preeya; Tanphaichitr, V. 1989. Nutrition complementation with vegetable protein. In: T.H. Applewhite, ed. 1989. Proceedings of the World Congress on Vegetable Protein Utilization in Human Foods and Animal Feedstuffs. Champaign, IL: American Oil Chemists'

Society. xii + 575 p. See p. 216-19. Contains 4 tables. [20 ref]
• ***Summary:*** Contents: Abstract. Introduction. Functions and requirements of protein. Legume supplementation in children. Soybean supplementation in adolescents. Soybean as the major dietary protein source in adults. Soy protein isolate as the sole protein source in health and disease. Acknowledgments. Address: Div. of Nutrition and Biochemical of Medicine, Dep. of Medicine and Research Center, Faculty of Medicine, Ramathibodi Hospital, Mahidol Univ., Rama 6 Rd., Bangkok 10400, Thailand.

2510. Winarno, F.G. 1989. Production and utilization of tempeh in Indonesian foods. In: T.H. Applewhite, ed. 1989. Proceedings of the World Congress on Vegetable Protein Utilization in Human Foods and Animal Feedstuffs. Champaign, IL: American Oil Chemists' Society. xii + 575 p. See p. 363-68. Contains 1 table and 2 pictures. [18 ref]
• ***Summary:*** Contents: Abstract. Introduction. Tempeh. Tempeh making: Microorganisms involved, starter for tempeh production. Tempeh preparation: Traditional, pilot plant production, losses and yields. Utilization and storage stability: Harvesting and storage. Tempeh in Indonesian foods: Nutritive value, storage stability. Problems of contamination.

"The total annual consumption of tempeh is about a half million tons... Most of the 41,000 cottage industries that make fresh tempeh daily are family run and employ about 128,000 workers. Each small cottage industry employs about three workers and uses approximately 11 lb (5 kg) of dry soybeans per day to produce 21 lb (10 kg) of fresh tempeh. The large cottage industries employ 10 to 20 workers and use 600 to 1,100 lb (500 kg) of dry soybeans per day to produce tempeh. The average retail price of tempeh is about US $0.25 per kg (1)." A photo shows F.G. Winarno. Address: Food Technology Development Center, Bogor Agricultural Inst., Kampus Darmaga, P.O. Box 61, Bogor, Indonesia.

2511. Montague, Sandy. 1989. Asians and soybeans in Australia (Interview). *SoyaScan Notes.* Aug. 30. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Prior to 1973 the Australian government had a "white Australia" policy that prevented Asians, blacks, and Indians from immigrating. After the racially discriminatory immigration policies were abandoned in 1973 (the year the U.S. lost the Vietnam war and withdrew its troops), the main group of Asians to enter Australia were Vietnamese. Today (according to the *World Almanac)* Asians constitute only 2% of Australia's population. Any any person who now wishes to immigrate must have either money, a skill/ occupation, or relatives in Australia. Thus the Asian soyfoods market in Australia is quite small and must cater to Vietnamese.

The key factor in growing soybeans in Australia is the availability and price of water. During the last 2-3 years the price of water has tripled. Thus rice, which requires less water than soybeans, is taking over soybean acreage.

Sandy sells rhizobium inoculants to Australian soybean growers. Three natural foods importers in Sydney import miso; they want organic miso. Address: Nutri-Life, "Teangri" Bethanga, VIC 3691, Australia.

2512. Karta, Susani K. 1989. Nutrition aspects of soy fibre. Lecture presented at 14th International Congress of Nutrition. Held 20-26 Aug. 1989 at Seoul, Korea. *
• ***Summary:*** An overview of the many functional, nutritional, and physiological benefits of soy fiber. "Soluble fibers such as gums and pectins, lower plasma cholesterol and normalize blood glucose but are difficult to incorporate into foods and are not well accepted by human subjects. Insoluble fiber, such as wheat bran, are effective in the prevention and treatment of constipation but are also well accepted long term by humans. Soya fiber offers the physiological effects of both soluble and insoluble fibers."

Published in ASA [American Soybean Association] Technical Bulletin, Vol. HN9 1990 (MC(P) No. 8/1/90). Address: American Soybean Assoc., 541 Orchard Rd., #11-03 Liat Towers, Singapore 0923, Republic of Singapore.

2513. Channel 26. 1989. Tofu in Thailand. Television broadcast. Sept. 9. California.
• ***Summary:*** This Japanese documentary on Thailand shows a tribe in northern Thailand coagulating soymilk by simmering a plant or herb (named *yaukane* in the Japanese katakana transliteration) in water then using the resulting liquid as the coagulant. The curds are eaten as such rather than being pressed to make tofu.

2514. Johnson, Dale W. 1989. General uses of whole soybeans. In: E.W. Lusas, D.R. Erickson, and Wai-Kit Nip, eds. 1989. Food Uses of Whole Oil and Protein Seeds. Champaign-Urbana, IL: American Oil Chemists' Society. vii + 401 p. See p. 12-29. Chap. 2. Proceedings of the Short Course on Food Uses of Whole Oil and Protein Seeds held at Makaha, Hawaii, May 11-14, 1986. [35 ref]
• ***Summary:*** Contents: Introduction: Introduction. Oriental nonfermented products: Yuba, kinako Thai desserts (tofu guan, med khanoon), Thai foods (protein crisp, cooked baby food, canned evaporated soybean milk, taow-huey, kanom ping kaset). Fermented foods: Natto, hama-natto, tao tjo (a miso-type product made in Indonesia and Thailand), ontjom (made from peanuts, coconut press cake, or okara), kochu chang, ketjap, sufu, yogurt-type products, tauco, soy sauce, miso, tempeh. Western world type products. Full fat soy flour (enzyme active, heat treated). Soybean hulls. Whole soybeans in animal feed. Chapatty [chapati]. Full fat soy grits. Heat treatment of soybeans. Heat treatment and

texturizing. Low-fat products. Snacks (soynuts–dry roasted or oil roasted, plain or seasoned). Soybean sprouts. Soy butter [soynut butter]. Combinations of soybeans and cereals. Soybeans as vegetables (mao-tou, edamame, or fresh green soybean). Defatted products. Nutrition. Soybean handling and equipment considerations. Solvent plant considerations. Address: Food Ingredients (Minnesota) Inc., 2121 Toledo Ave. North, Golden Valley, Minnesota 55422.

2515. Lindner, Anders B.J. 1989. A modern soymilk plant. In: E.W. Lusas, D.R. Erickson, and Wai-Kit Nip, eds. 1989. Food Uses of Whole Oil and Protein Seeds. Champaign-Urbana, IL: American Oil Chemists' Society. vii + 401 p. See p. 91-97. Chap. 5. Proceedings of the Short Course on Food Uses of Whole Oil and Protein Seeds held at Makaha, Hawaii, May 11-14, 1986.
Address: Soya Technology Systems Ltd., #11-06 Cathay Building, 11 Dhoby Ghaut, Singapore 0922.

2516. Winarno, F.G. 1989. Production and uses of soybean tempeh. In: E.W. Lusas, D.R. Erickson, and Wai-Kit Nip, eds. 1989. Food Uses of Whole Oil and Protein Seeds. Champaign-Urbana, IL: American Oil Chemists' Society. vii + 401 p. See p. 102-17. Chap. 7. Proceedings of the Short Course on Food Uses of Whole Oil and Protein Seeds held at Makaha, Hawaii, May 11-14, 1986. [35 ref]
• ***Summary:*** Contents: Introduction and early history. Methods of preparation: Active microorganisms, tempeh starter, tempeh making/production. Material balances, losses, and yield. Shelf life of tempeh and tempeh products. Conclusions. Address: Food Technology Development Center, Bogor Agricultural Univ., P.O. Box 61, Indonesia.

2517. *SoyaScan Notes.*1989. Influence of Japanese and Japan on soyfoods in America (Overview). Dec. 7. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** The Soyfood Center's SoyaScan database presently contains 30,790 publications and commercial products related to soya. Of these, 876 (2.9%) concern the influence of Asian-Americans (Japanese, Chinese, Koreans, or Indonesians) or their home countries on soyfoods. Of these 876 records, 638 (73%) concern Japanese influence, compared with 178 (20%) that concern Chinese influence–including Chinese from Taiwan, Hong Kong, Singapore, etc. Thus Japanese influence on soyfoods in America is much greater than that of any other Asian cultural group. We can identify at least seven major areas of influence:

1. Soyfoods Terminology. It is interesting to note that many of the most popular soyfoods in America are most widely known by their Japanese names. We say tofu (not doufu or bean curd), miso (not jiang or soybean paste), natto, okara (not soy pulp), yuba (not doufu-p'i or soybean skin). Even "soy" (as in soy sauce) is derived from the Japanese word "shoyu." Increasingly Americans interested in natural foods also use the terms shoyu and tamari to distinguish them from HVP soy sauce.

2. Kikkoman. By far the most influential Japanese soyfoods company in America today is Kikkoman, just as soy sauce is by far the most important soyfood product. Kikkoman was also the first Japanese company to introduce soyfoods to America. In 1868 the first Japanese immigrants to Hawaii took kegs of Kikkoman brand shoyu with them. In 1879 Kikkoman brand shoyu was registered in California, where it was exported to Japanese immigrants. Exports rose steadily, until between 1949 and 1954 exports of Kikkoman shoyu to the U.S. ranged from 213,000 to 305,000 gallons a year. Kikkoman's first real attempt to reach any foreign market dates from 1956 when, during the U.S. presidential elections, Kikkoman ran television ads to promote its product to mainstream American audiences as a seasoning for meat, fish, and poultry. In 1957 Kikkoman International Incl., a new sales company was established in San Francisco. Sales skyrocketed. In 1973 Kikkoman opened a huge modern shoyu plant at Walworth, Wisconsin. In 1976 Kikkoman passed La Choy to become America's best-selling soy sauce.

3. Introducing Soyfoods to Hawaii. The first Japanese who arrived in Hawaii in 1868 brought shoyu and miso with them. The earliest known soyfoods company there was a shoyu brewery started in 1891 in Honolulu by Jihachi Shimada. This was also the earliest known soyfoods company started by a Japanese anywhere in the Western world. Hawaii became part of the USA in 1898 by annexation. Hawaii and California were the first two areas in the U.S. where soyfoods became widely available. During the 20th century, Japanese started roughly 183 companies in Hawaii making shoyu, miso, and tofu–far more than Chinese (6) or Koreans (2). They developed innovative new products–such as sweet Hawaiian-style shoyu and miso. These products profoundly influenced the food life of Hawaii.

4. Soyfood Manufacturers in the USA. The earliest known soyfoods manufacturer in the Continental USA was a company (the name is unknown) run by the wife of Chieko Hirata that started making tofu in Sacramento in about 1895. The second earliest was Yamamori Jozo-sho, which started making shoyu in San Jose, California, in 1897. Many of the earliest soyfoods companies in America were run by Japanese Americans. By 1942 at least 158 soyfoods manufacturing companies had been started in America by Asian Americans; of these, 143 (91%) were run by Japanese Americans. When *The Book of Tofu* was published in 1975, it listed 55 tofu companies in America, all run by Asian-Americans; 39 were Japanese- and 16 were Chinese-run. Today America's two largest tofu companies are both run by Japanese Americans: Azumaya Co. in San Francisco, and House Foods & Yamauchi Inc. in Los Angeles. Hawaii's three largest tofu companies are also run

by Japanese Americans: Aloha Tofu Co., Kanai Tofu Factory, and Hawaii Tofu. Morinaga Nutritional Foods in Los Angeles and Kikkoman Foods in San Francisco both import large amounts of aseptically packaged long-life silken tofu from Japan.

Another major manufacturer is San-Jirushi Corp. of Kuwana, Mie-ken. In the late 1970s San Jirushi started exporting tamari and soybean miso to America. They set up an office in the early 1980s and began to promote their product as "real" tamari to industrial food processors and the natural foods market. In Sept. 1987 the company opened a state-of-the art tamari plant in Richmond, Virginia, with a capacity of 1 million gallons a year. The company now has 75% of the industrial soy sauce market in America.

In Oct. 1986 a major new joint stock company named American Soy Products began producing Edensoy soymilk in Clinton, Michigan. It was a joint venture between Eden Foods and 4 Japanese companies: Marusan Ai, Kawatetsu Shoji, Muso Shokuhin, and Seikensha. Edensoy has since become America's best-selling soymilk. Prior to 1986 much of the soymilk sold in America was made in Japan.

Finally, three of America's 4 largest miso manufacturers are run by Japanese-Americans. The largest is Miyako Oriental Foods in Los Angeles. The other two are located in Hawaii.

5. Soyfoods Imports from Japan. The first importers of shoyu and miso were Japanese distributors such as Japan Foods Corp., Mutual Trading Co. and Nishimoto. But starting in 1962 American macrobiotic and natural foods companies started to import large amounts of shoyu and miso. Pioneers were Chico-San, Erewhon, Eden Foods, Westbrae, Edward & Sons, Tree of Life, and Great Eastern Sun. U.S. imports of soy sauce from Japan jumped from 1.7 million lb (174,400 gallons, worth $317,000) in 1949, to 18.6 million lb (1,897,000 gallons, worth $3,116,000) in 1972, an 11-fold increase in quantity during only 23 years.

6. Teachers and Information. Many Americans first learned about soyfoods from Japanese teachers, especially macrobiotic teachers, such as George and Lima Ohsawa, Michio and Aveline Kushi, Herman and Cornellia Aihara, and Noboru Muramoto. All have written many influential books and lectured and taught extensively since the 1960s. In addition, many young Americans learned how to *make* soyfoods from these macrobiotic teachers. Moreover, Japan is Asia's best source of information about soyfoods. For example, the Soyfoods Center's SoyaScan database contains 5,095 publications and products about soya and Japan, compared with 1,867 on soya and China or Taiwan.

7. Tofu Equipment Manufacturers. Hundreds of tofu companies have started in America since the mid-1970s. The majority of these are run by Caucasian Americans and most use specialized tofu equipment made in Japan by Takai Tofu & Soymilk Equipment Co., or by Sato Shoji.

2518. CGPRT Centre; Central Research Institute for Food Crops. 1989. Bibliography on soybean research in Indonesia 1978-1988. *CGPRT Working Paper* No. 3. 134 p. Dec. [568 ref]

• ***Summary:*** Contents: Foreword. Acknowledgements. Reader's guide. Section I: References listed in alphabetical order by author. Section II: References arranged under broad subject headings as listed below: Agronomy (146 records), breeding (74), general (79), mixed cropping/intercropping (27), pests and diseases (167 records), post harvest and seed technology (26), socio-economics (37), utilization and processing (12). These documents are available in Indonesia; many are written in Indonesian.

"This bibliography is the result of close cooperation between the documentation section of the CGPRT Centre and the libraries of CRIFC (Central Research Institute for Food Crops, Bogor), BORIF (Bogor Research Institute for Food Crops), MARIF (Malang Research Institute for Food Crops, Malang, East Java), and CAER (Centre for Agro-Economic Research) under the guidance of Dr. Sumarno." Address: Indonesia.

2519. Kuntjoro, Sri Utami; Kusnadi, N.; Sayogyo, -. 1989. Demand for corn, cassava and soybean in human consumption: A case study in Java, Indonesia. *CGPRT Working Paper* No. 2. xvii + 116 p. Dec. 25 cm. [19 ref]

• ***Summary:*** Contains much original, detailed information and statistics on consumption, demand, and demand elasticity for secondary food crops *(palawija)* in Indonesia. The main secondary food crops are soybeans (including the soybean products *tahu* {tofu}, *tempe* {tempeh}, *kecap* {soysauce}, and *tauco* {Indonesian-style miso}), corn, cassava, and peanuts. "Pulses, soybean in particular, represent (after cereals) the most important source of vegetable protein for the people of Indonesia. On the whole, soybeans are consumed in the form of tahu (bean curd), tempe (fermented soybean) and kecap (soysauce). Among low-income households, tahu and tempe, which are relatively cheap in price, are (after cereals) a major source of vegetable protein. According to Sayogyo (1985), tempe is also popular among people in the high income groups.

The National Socio-Economic Survey (Susenas), conducted by the Central Bureau of Statistics, collects socio-economic data from a large number of households throughout Indonesia. The use of chemical fertilizer on soybeans has increased from 5.19 kg/ha in 1973 to 80.39 kg/ha in 1982. Per capita consumption of soybeans has risen from 3.28 kg/year in 1968 to 4.45 kg/year in 1983. In the peak year, 1979, it was 5.33 kg/year.

Table 4.2 shows protein consumption from secondary food crops in 5 Javanese provinces in 1981. The amount of protein contributed daily per capita to the Indonesian diet by soyfoods (in the forms of tempeh, tofu, soybeans, soy sauce [kecap], and miso [tauco]) is greatest in Yogyakarta (22.57

gm; 61.1% of total protein consumption), followed by Central Java (14.57 gm; 37.4% of total), Greater Jakarta (13.78 gm; 33.3% of total), East Java (12.96 gm; 32.8% of total), and West Java (6.44 gm; 14.9% of total). As people's income rises, they tend to consume more soyfoods. Soyfoods provide Tempeh makes the greatest contribution to protein intake in every province, followed by tofu, soybeans, soy sauce (kecap), and tauco (Indonesian miso). Tempeh makes the greatest contribution in Yogyakarta, where it provides 17.86 gm/capita/day of protein, or 60% of the protein supplied by secondary crops, and more than any other single source. The amount of daily protein per capita contributed by tempeh is next most important in Central Java (11.48 gm/day), followed by East Java (9.28), Greater Jakarta (8.98), and West Java (4.16). Tofu makes its greatest protein contribution in Greater Jakarta (4.54 gm/day), followed by Yogyakarta (3.57), East Java (3.49), Central Java (2.80), and West Java (1.99). Address: Agricultural economists, Bogor Univ. of Agriculture.

2520. Altemeier, Klaus; Bottema, J.W.T.; Adinugroho, B.; Daris, N. 1989. Quality and price determinants of secondary crops in Indonesia. *CGPRT Working Paper* No. 1. 57 p. *
• ***Summary:*** This paper reports on extensive research conducted in East and West Java covering grain quality and implicit prices of maize, soybean and groundnut. Government quality standards are compared to traders practices and the quality checks run by animal feed and Tahu and Tempe industries. It is concluded that domestic quality of maize, soybean and groundnut falls below quality of imported grains. Floor prices are indicated to be of theoretical value only, because domestic prices never move below floor prices. It is suggested a policy on nutritional standards be considered, which could have a beneficial effect for all participants in the market system.

2521. Heriyanto, -; Krisdiana, Ruly; Manshuri, A. Chozi; Soejono, Irian. 1989. Sensitivity of soybean production in East Java to price changes. *CGPRT* No. 20. 42 p. *
• ***Summary:*** The study investigates the competitiveness of soybean against alternative crops in contributing to farmers incomes. Soybean was discovered to be more competitive than alternative crops and comparable to rice and peanut at current prices. With the use of improved technologies, soybean production should become more competitive. Address: 1-2. Malang Research Inst. for Food Crops (MARIF); 3. CGPRT Centre.

2522. Hosen, Nasrul; et al. 1989. Agro-economic profile and prospects to improve food crops production in selected lowland rainfed climate areas of Sumatra: A socio-economic report. Surakami, West Sumatra, Indonesia: Surakami Research Institute for Food Crops. 97 p. *

2523. Kumar, P.S.; Hymowitz, T. 1989. Where are the diploid (2n = 2x = 20) genome donors of Glycine Willd. (Leguminosae, Papilionoideae)? *Euphytica* 40:221-26. [21 ref]
• ***Summary:*** "There are about 16 genera in the subtribe Glycininae, tribe Phaseoleae, family Leguminosae. The overwhelming reason for the economic importance of the subtribe Glycininae is due to the cultivated soybean, Glycine max (L.) Merrill. The soybean, its wild annual counterpart and most of wild perennial members of the genus Glycine carry 2n = 40 chromosomes. It is reasonable to assume that the base number of the genus is x = 10. However Glycine plants carrying 2n = 20 have not been reported. Herein we report on the 2n chromosome situation of the remaining 15 genera in the subtribe Glycininae and two genera *(Galactia, Ophrestia)* once thought to be allied with Glycine. Certain species in *Dumasia, Galactia* and *Ophrestia* were found to carry 2n = 20 chromosomes. All the other genera carry 2n = 22, 28 or 44 chromosomes. The 2n chromosome number of *Teyleria* (44) and *Pseudeminia* (22) is being reported for the first time."

The subgenus *Glycine* contains 12 wild perennial species. Ten of the species are "indigenous to Australia and carry 2n = 40 chromosomes. *Glycine tabacina* (Labell.) Benth. with 2n = 40, 80 chromosomes, has been found in Australia, Taiwan, South Pacific Islands (New Caledonia, Fiji, Tonga, Vanuatu) and West Central Pacific Islands (Mariana, Ryukyu [southern Japan]). All accessions of *G. tabacina* collected outside of Australia are tetraploid (2n = 80) and even within Australia, tetraploids predominate over the diploid forms. *Glycine tomentella* has been found in Australia (2n = 38, 40, 78, 80), Papua New Guinea (2n = 40, 78, 80), Philippines (2n = 80), and Taiwan (2n = 80). Singh et al. (1987) demonstrated that the complexes of *G. tabacina* and *G. tomentella* evolved through allopolyploidization." Address: Dep. of Agronomy, Univ. of Illinois, 1102 S. Goodwin Ave., Urbana, IL 61801.

2524. Sarobol, Nantawan; Virakul, P.; Potan, N.; Benjasil, V.; Setarath, P.; Dechates, S. 1989. Preliminary survey on soybean yield gap analysis in Thailand. CGPRT Centre, Jalan Merdeka 99, Bogor, Indonesia. 57 p. *
• ***Summary:*** This survey was conducted in 1987 in Thailand's 6 major soybean producing provinces. The results show that 70% of the area under soybean is confined to rainfed land. From 1972/1973 to 1986/1987, soybean yield has increased 2.75% annually and production has increased 8.8% annually. However, the production of soybean in Thailand meets only half of the demand for consumption. This survey reveals that a yield gap exists in both rainfed and irrigated soybean areas. This gap can be narrowed and bridged by paying more attention to: (1) proper drainage and soil moisture conservation; (2) integrated pest management; (3) efficient education

extension efforts; and (4) measures to protect growers from price fluctuations.

2525. Echols, John M.; Shadily, Hassan. 1989. An Indonesian-English dictionary. Third ed. Ithaca, New York, and London: Cornell University Press. xix + 618 p. 24 cm. [Ind; Eng]

• ***Summary:*** Soy-related words include: (1) bijan (sesame; also wijen or bijen). (2) bungkil kedelai (soybean meal). (3) kacang (pea, bean, peanut), including kacang asin (salted peanuts), kacang atom or kacang ganéfo (peanuts fried in batter), kacang goréng (peanuts fried crisp), kacang hijau or kacang ijo (mung bean), kacang kedelai (soybean), kacang tanah (peanut). (4) kécap (soy sauce; kecap ayam {chicken prepared with soy sauce}). (5) kecipir (four-sided bean eaten as a vegetable [winged bean; *Psophocarpus tetragonolobus]).* (6) kedelai, kedelé (soybean). (7) oncom (fermented cake made from soybean sediment). (8) ragi (yeast, fermentation agent). (9) tahu (tofu, soybean curd), including tahu goréng (fried tofu), tahu isi (tofu filled with meat), tahu kuning (firm yellow tofu), tahu pong (deep-fried puffy tofu), tahu témpé (tofu and tempeh).

(10) tahua (a by-product of tofu similar to yogurt in consistency). (11) takoa, takoah (see takua). (12) takua (firm spiced tofu). (13) taosi (see tauci [soy nuggets]). (14) tapai, tapé (sweet cake made of slightly fermented rice or tubers). (15) tauci, tauco, taucyo (fermented bean paste [like miso] used as a condiment).

Note: This is the earliest (and only) English-language document seen (Feb. 2009) that uses the word "taucyo" to refer to Indonesian-style miso. "Taoci" probably refers to soy nuggets, not to miso.

(16) taugé (bean sprouts). (17) témpé (fermented soybean cake, tempeh; something trivial and unimportant or low grade in quality; *Dlm jaman penjajahan org Indo témpé pribumi* = "During the colonial times the Eurasians considered the natives to be no better than tempeh"). Address: 1. Ithaca, New York; 2. Jakarta, Indonesia.

2526. Food and Agricultural Organization of the United Nations. 1989. Soybeans: Area harvested, yield, and production. *FAO Yearbook–Production (Rome, Italy)* 43:155.

• ***Summary:*** The following nations are listed for the first time as soybean producers in the *FAO Production Yearbook.* * = Unofficial figure. Venezuela: Harvested 2,000* ha in 1987, 2,000* ha in 1988, and 7,000* ha in 1989.

Greece: Harvested 2,000 ha in 1987, 3,000 ha in 1988, and 6,000 ha in 1989.

Name changes: Burma is changed to Myanmar.

2527. Fukushima, Danji. 1989. Introduction of soy sauce to Japan (Document part). In: K. Steinkraus, ed. 1989. Industrialization of Indigenous Fermented Foods. New York and Basel: Marcel Dekker, Inc. xii + 439 p. See p. 9-10.

• ***Summary:*** "There is no literature on the exact time chiang and shih (soy nuggets) were introduced into Japan. In 702 AD, however, the Hishiotsukasa, the Bureau for the Regulation of Production, Trade and Taxation of Hishio, was established by the Taiho-Ritsuryo, one of Japan's earliest constitutions. This bureau was located at the imperial palace and produced various kinds of hishio (chiang) which was consumed by the imperial household. Among these products, the word 'misho' is found with the words 'chiang' and 'shih.' It should be noted that the word 'misho,' which is very close to the present word 'miso,' is found as one of the products in the bureau. Misho is also found in *Engishiki,* the enforcement regulation of the statutes, which was completed in 927 AD and became effective in 967 Japan. The first appearance of the present word 'miso,' was in *Nihon-Sandai-Jitsuroku,* a Japanese dictionary published in 1597 during the Muromachi period. In the Edo period (1603-1867), several pieces of literature describing miso and shoyu were written, such as *Wakan Sansai Zue* (Narushima, 1712), *Honcho Shokkan* (Hitomi, 1695), *Mankin Sangyotai* (Miake, 1732), *Yoshu Fushi* (Kurokawa, 1682), and the like. The manufacturing processes described in these works are close to the present methods for producing miso and koikuchi-shoyu, thus it is presumed that the basic manufacturing processes of today's Japanese soy sauce had been formed by the early 17th century.

"In the second half of the 17th century, large-scale, industrial production of soy sauce began for consumption in large cities such as Edo (now Tokyo). Surprisingly enough, there are written records that soy sauce had been exported to India, southeast Asia, and Europe as early as the middle of the Edo period [the Edo Period was from 1600 to 1868] (Noda Shoyu Co. 1953). According to documents of the Dutch East India Company stored in the Archives in the Hague, Holland, soy sauce was exported [by Dutch merchants] from Nagasaki in the Kyushu district of Japan to several parts of India: Coromandel in 1668 and 1716, Ceylon in 1670 and 1699, Surat in 1717, Bengal in 1699, and Nagappattinam [Nagapattinam] in 1699. Carl Thunberg, a ship's doctor for the Dutch East India Company who stayed in Japan for a year and a half from 1775 to 1776, published a book of travels in 1796 (Thunberg, 1796). According to his book, a large quantity of soy sauce was shipped to Batavia (the former name for Djakarta [and Dutch capital of the East Indies]), India, and European countries." Address: Managing Director, Kikkoman Corp., Chiyoda-ku, Tokyo, Japan.

2528. Kadam, S.S.; Adsule, R.N.; Salunkhe, D.K. 1989. Utilization. In: D.K. Salunkhe and S.S. Kadam, eds. 1989. CRC Handbook of World Food Legumes: Nutritional

Chemistry, Processing Technology, and Utilization. Vol. III. Boca Raton, Florida: CRC Press, Inc. 323 p. See p. 271-310. [188 ref]

• ***Summary:*** Contents: Introduction. Whole beans: Whole beans as a food, milk and milk products (incl. soymilk, tofu, kori-tofu, soyogurt, tairu [fermented soymilk in Malaysia], fermented soy cheese), microorganisms, nutritive value, fermented soy cheese, beverage, yogurt, other products, fermented foods, microorganisms, physicochemical changes, nutritional composition and quality, toxicological aspects, preparation, microorganisms, chemical composition, nutritional value. Cotyledons: Traditional products, soups, fermented foods, confectionery products. Flours: Composite flours (incl. soy flour), papad, pasta, traditional products.

Note: According to the author's definition: "A papad is a thin, wafer-like product, usually circular in shape, rolled from a legume-based dough and other farinaceous materials, with added salt, spices, and condiments. In India it is either toasted or deep-fat fried to a crispness which produces a crackle when *papad* is eaten. Papads are also known as "appalam" in south India... Black gram flour is the most indispensable constituent of *papad* dough because of the mucilaginous substance it contains." Address: 1-2. Dep. of Biochemistry, Mahatma Phule Agricultural Univ., Rahuri, Maharashtra, India; 3. Dep. of Nutrition and Food Sciences, Utah State Univ., Logan, Utah.

2529. Routhier, Nicole. 1989. The foods of Vietnam. New York, NY: Stewart, Tabori & Chang. 239 p. Foreword by Craig Claiborne. Illust. (Photos by Martin Jacobs, mostly color). Index. 29 cm.

• ***Summary:*** An excellent and graphically beautiful book, with more than 150 authentic, traditional Vietnamese recipes. The book is dedicated to the fond memory of her mother, Tran-Thi-Cuc. Vietnam's cooking has been influenced by the various nations that have occupied or conquered the country over the Centuries–and especially the Chinese and French. Yet the Vietnamese have been able to assimilate each of these imports to create their own unique cuisine.

Introduction (by the author): Vietnam "is shaped like an elongated letter *S*, with two wide river deltas, the Red River delta in the north and the Mekong River delta in the south, separated from each other by a long, narrow stretch of mountainous coastal land." The deltas are the country's most fertile, agriculturally productive, and populous regions. The Monsoons (seasonal winds) produce a dry winter season and a wet summer. The north has a temperate climate and a cold winter, whereas the south is tropical.

Vietnam's land area is slightly smaller than that of Japan, and about three fourth's the size of California.

Vietnamese food and cookery owes much to the French colonialists, who ruled the country for almost a century (1859-1954). "In the old trading port of Cholon, the French built a new city as the central market for all of Indochina, and Saigon (now Ho Chi Minh City) was dubbed 'the Paris of the Orient'" (p. 8-9).

"The Vietnamese are quick to point out that their cuisine, like their country, is divided into three regions, each with a distinct culinary tradition." Yet these regional differences are not an important as they are in China. "In the north, the influence of China is most evident." One popular northern dish is stuffed bean curd (Dau Hu Nhoi). The main city in Central Japan is Hue, where cookery has been brought to a high level of sophistication. The cookery of the tropical south is simpler than that of the north and center, but also spicier, and the food consists of a wealth of tropical fruits, vegetables, herbs and spices. The French influence is best seen here.

Soy related recipes: Color photo of crisp fried bean curd in tomato sauce (p. 15). Color photo of Bean curd and Chinese chive buds soup (Canh dau phu he, with 6 ounces soft bean curd {tofu}, p. 50; recipe p. 55).

The chapter titled "Vegetarian recipes" (p. 167-89) contains many tofu recipes. Vegetarian stir fry (La han chay, with 2 squares {8 ounces} semisoft bean curd {tofu}, p. 168). Crisp-fried bean curd in tomato sauce (Dau phu soy ca chua, with 1 pound firm bean curd {tofu}, p. 171). Braised bean curd (Dau phu kho, with 1 pound firm bean curd {tofu}, p. 172). Stir-fried bean curd with lemon grass on crisp cellophane noodles (Dau phu xao xa ot chay, with 2 pounds firm bean curd, p. 179). Stuffed bean curd (Dau phu nhoi, with 2 pounds firm bean curd {tofu}, p. 185. Note: "This centuries-old recipe is a Vietnamese adaptation of a well-known Hakka dish; there was a mass migration to northern Vietnam by both Cantonese and Hakkas in the 17th century).

Desserts: Jellied bean curd with ginger syrup (Dau hu nuoc duong, with ½ cup dried soybeans, ¼ cup rice flour, and 1 teaspoon gypsum {see p. 232; this calcined calcium sulfate is sold at Chinese pharmacies} dissolved in 1 teaspoon cold water in a small water to curd / coagulate the hot soymilk, p. 201).

Sauces: Sweet and sour dipping sauce (Soy chua ngot, with 2 tablespoons soy sauce and 2 tablespoons nuoc mam {Vietnamese fish sauce}, p. 214). Soybean and ginger sauce (Nuoc *tuong*, with ¼ cup *tuong* {fermented soy bean sauce, see p. 234} and 1 tablespoons nuoc mam {Vietnamese fish sauce}, p. 215).

Appendix (p. 228-36) includes a glossary of basic Vietnamese foods, including: Bean curd / tofu (dau hu. "You can do absolutely anything with bean curd,..." The three types are pressed, firm, and semi-soft). Chile paste (*tuong* ot tuoi. "A fiery hot mixture of mashed fresh red chilies, garlic, salt and soybean oil. Do not confuse this product with the Chinese hot bean paste). Fish sauce (nuoc mam. It is like Thai nam pla but stronger). Hoisin sauce (A

"sweet, piquant brown paste made from soybeans, red beans, sugar, garlic, vinegar, chile, sesame oil and flour"). Oyster sauce (Made from oyster extract, soy sauce, sugar and vinegar). Soybeans, dried (Dau nanh. Sold in oriental groceries). Soybean sauce *(tuong.* This traditional fermented Vietnamese sauce is made from ground soybeans, water, roasted rice flour, and salt. "It is sold, bottled, only in Vietnamese groceries." Do not confuse *tuong* "with the saltier, thicker Chinese ground bean paste." Vietnamese vegetarians commonly use *tuong* in place of fish or shrimp sauces). Soy sauce (si dau. Where soy sauce is called for in this cookbook, use Japanese Kikkoman or "light" soy sauce. Regular Chinese soy sauce "is dark and stains food black").

About the author: Nicole "was born in Saigon to a Vietnamese mother and French father. At a very early age she developed a great interest in cooking from her mother, who owned a [small, French-Vietnamese] restaurant in Laos. As a teenager, Ms. Routhier lived in France and Belgium, where she became versed in European styles of food preparation" (with portrait photo. inside rear dust jacket). Although she had a formal French education, she spoke only Vietnamese with her mother and nanny at home. She learned about cooking from her nanny, a native of Hue, and her mother, from Haiphong, both home cooks of the first order. In Laos, when the chef let her help in the kitchen of her mother's restaurant, she knew what her true calling would be. She grew up during the Vietnam war, and experienced hard times, especially after her father left home. "During the war, food was scarce and we ate what we could. Sometimes we had to hide in the village bomb shelter for days if not weeks on end, and rice was often the only food available... I was hungry and terrified at the idea of lacking food. That childhood fear never abandoned me." Later she knew better times, traveling with her family in Europe and Asia, and learning about food. "In Vietnamese tradition (as in most of Southeast Asia), recipes are never written but simply taught to the children by letting them help in the family kitchen" (from the Preface, p. 5). In the mid-1980s she had the good fortune to meet Craig Claiborne. When they first met, she was a student at the Culinary Institute of America in Hyde Park. She subsequently became a professional chef and cooking teacher (from the Foreword, by Craig Claiborne, written May 1989, p. 4) She is married to Anthony Laudin, and now teaches cooking in Manhattan, New York City. Address: Professional Chef and Culinary Teacher in New York City.

2530. Steinkraus, Keith H. 1990. Re: Current work with fermented foods and biological control/IPM. Letter to William Shurtleff at Soyfoods Center, Feb. 25. 1 p.
• ***Summary:*** Dr. Steinkraus retired on 1 July 1989 (not by choice but by law) but is still busy in the area of indigenous fermented foods. He and wife Maxine have 5 children. In Oct. 1988 they moved from Geneva, New York, to Ithaca. Keith moved his laboratory equipment to the Dyce Laboratory at Ithaca, in the Department of Entomology. He has worked on biological control of insects since 1952, so the Department welcomed him. He has also been doing some work on African fermented foods for Nestlé, and will teach this year at Gadjah Mada University in Bogor, Indonesia (which is offering a workshop on Indigenous Fermented Foods). Also discusses his activities last year in Japan, Thailand, Wales, and Czechoslovakia. Address: 15 Cornell St., Ithaca, NY 14850; and Cornell Univ., Geneva, New York. Phone: 607-273-6736.

2531. Arbianto, Purwo. 1990. Preliminary studies on the genetic system of *Rhizopus* Sp. In: Hermana, Mien K.M.S. Mahmud, and Darwin Karyadi, eds. 1990. Second Asian Symposium on Non-Salted Soybean Fermentation. Bogor, Indonesia: Nutrition Research and Development Centre. vii + 116 p. See p. 83-90. Held 13-15 Feb. 1990 in Jakarta, Indonesia. 23 cm. [9 ref. Eng]
• ***Summary:*** The goal of this study is the mass production of inocula using modern methods. Discusses: Protoplast formation. DNA isolation. Regeneration and identification. Fig. 1 shows the three ecosystems considered to be part of the tempe fermentation. Contains 8 tables. Address: Chemistry Dep., Bandung Inst. of Technology (ITB).

2532. Fardiaz, Srikandi; Pangestu, W.; Suliantari, -. 1990. A study of the bacterial flora of overfermented soybean tempe. In: Hermana, Mien K.M.S. Mahmud, and Darwin Karyadi, eds. 1990. Second Asian Symposium on Non-Salted Soybean Fermentation. Bogor, Indonesia: Nutrition Research and Development Centre. vii + 116 p. See p. 14-19. Held 13-15 Feb. 1990 in Jakarta, Indonesia. 23 cm. [6 ref. Eng]
• ***Summary:*** "In some areas of Indonesia, particularly in Central Java, fermentation tempe is prolonged" to produce a particular flavor and texture, "and the overfermented tempe is used as a flavor ingredient in some foods such as mixed vegetable soup / curry (sayur lodeh), hot sauce (sambal tumpang) and other foods."

"Samples of tempe were collected from different area in Bogor, and divided into two parts, on part was put into polyethylene bags and the other part was wrapped in banana leaves. All tempe samples were stored at room temperature and analyzed every two days for chemical and microbiological characteristics."

"There was no significant difference in the gram positive bacterial counts (about 10 million to 10 million CFU {Colony Forming Units} per gram), but significant increases in gram negative bacterial counts and *Staphylococcus* counts were detected–though they were far below the counts that usually cause food poisoning. For each graph or table, one data set is for tempe in polyethylene bags and another for tempe in banana leaves.

Figures show: (1) Graph–"Changes in pH, moisture and total volatile nitrogen of tempe during prolonged incubation at room temperature [in Indonesia] for four days." (2) Bar chart–"Changes in gram negative bacterial counts of tempe during prolonged incubation at room temperature for four days." (3) (2) Bar chart–"Changes in *Staphylococcus* counts of tempe during prolonged incubation at room temperature for four days."

Tables show: (1) Number of isolates identified as gram negative bacteria after 0, 2, and 4 days. (2) Identified bacteria isolated from overfermented tempe: *Escherichia coli. E. freundii. Enterobacter aerogenes. Staphylococcus. Vibrio cholerae. Proteus morganii. P. vulgaris.*

Note: Most pathogenic bacteria in humans are gram-positive organisms. Classically, six gram-positive genera are typically pathogenic in humans. Two of these, Streptococcus and Staphylococcus, are cocci (sphere-shaped bacteria). The remaining organisms are bacilli (rod-shaped bacteria) and can be subdivided based on their ability to form spores. The non-spore formers are Corynebacterium and Listeria (a coccobacillus), while Bacillus and Clostridium produce spores. The main gram-negative bacterium that is a pathogen for humans is Escherichia coli (Source: Wikipedia May 2010). Address: Dep. of Food Technology and Human Nutrition, Bogor Agricultural Univ., Bogor, Indonesia.

2533. Hermana, -; Mahmud, Mien K.M.S.; Karyadi, Darwin. eds. 1990. Second Asian Symposium on Non-Salted Soybean Fermentation. Bogor, Indonesia: Nutrition Research and Development Centre. vii + 116 p. Held 13-15 Feb. 1990 in Jakarta, Indonesia. 23 cm. [89 ref. Eng]
• ***Summary:*** The chairman of this symposium is Prof. Darwin Karyadi, M.D., PhD. His Foreword notes that this is actually the third such symposium; the first was the Symposium on Tempe, held on 14-16 April 1985 in Jakarta. These proceedings consist of 15 papers, each cited separately, plus one page of Acknowledgements at the end. Address: Nutrition Research and Development Centre, Jalan Dr. Sumeru 63, Bogor 16111, Indonesia.

2534. Karta, Susani K. 1990. The market prospective for tempe in the year 2000. In: Hermana, Mien K.M.S. Mahmud, and Darwin Karyadi, eds. 1990. Second Asian Symposium on Non-Salted Soybean Fermentation. Bogor, Indonesia: Nutrition Research and Development Centre. vii + 116 p. See p. 94-104. Held 13-15 Feb. 1990 in Jakarta, Indonesia. 23 cm. [11 ref. Eng]
• ***Summary:*** A very interesting paper. Contents: Introduction. Market situation for tempe in Indonesia. Health and nutritional significance of tempe. Tempe for weaning food. Constraints and trends in the market development of tempe. Recommended guidelines and strategies. Ideas for the diversification of tempe utilization (Tempe as a food ingredient, new tempe food opportunities).

Tempe "is a key protein source in the rice-diet of the people of Indonesia. It is consumed by millions of people of various ages and socio-economic status. It has gained popularity in the Netherlands, Japan, Malaysia, Singapore and other areas where Indonesians have settled. It has also slowly been making its way into the American diet, particularly, in the vegetarian, cholesterol-free and low-fat food product markets."

"Indonesia with a population of 177 million people (in 1988) and an annual population growth rate of 2%, is the largest tempe producer in the world and has the largest soyfood market in the region. In 1983, Indonesians consumed about 0.9 million MT of soybeans as food, which increased to about 1.5 million MT in 1988 (Table 1). About 50 percent of the total soybeans consumed was in the form of tempe, 40% as tofu and the remaining 10% was used for making soy sauce and tauco (a fermented whole soybean condiment). In 1988, the estimated soybean consumption for tempe was around 764,000 MT which amounted to an average per capita consumption of 6.45 kg of tempe (equivalent to 4.3 kg soybeans). In the past five years the consumption of soyfood has increased by an average of 10% annually."

"Acute diarrheal disease is one of the leading causes of childhood mortality and morbidity in developing countries and is a major contributor of malnutrition. Approximately 25% of the growth differential between children in selected developing countries can be explained by diarrhea. The mortality and morbidity data from a total of 193 surveys carried out in 49 countries since 1981 by WHO (1986) indicate that, on average, a child under 5 years of age suffer 3.5 episodes of diarrhea per year and that about one-third of deaths in this age group are diarrhea associated.

"Investigations worldwide have found diarrhea incidence peaking between the ages of 6 months to 3 years."

Tables: (1) Indonesian soybean production, imports, and consumption as food, 1983-1988. Soybean production increased from 536,000 tonnes (metric tons) in 1983 to 1,179,000 tonnes in 1988–more than double. Soybean imports, which were 391,000 tonnes in 1983, rose to a peak of 400,000 tonnes in 1984, then decreased to 350,000 tonnes in 1988. Consumption of soybeans as food increased from 927,000 tonnes in 1983 to 1,528,000 tonnes in 1988. Per-capita consumption figures are not given. Source: ASA estimates and BULOG statistics. (2) Nutritional composition of tempe (100 gm edible portion). (3) The essential amino-acid composition of tempe compared with the FAO/WHO reference pattern (expressed in milligrams per gram of nitrogen). (4) Fatty acids in soy tempe. (5) Global and regional population in 1980 and estimated number (millions) and distribution of diarrheal diseases. (6) Household Health Survey illness data by different age

groups in Indonesia. (7) Potential demand for tempe flour in weaning food in the year 2000, Indonesia. (8) Demographic estimates for Asian developing countries. (9) Estimated number (millions) of children under age 5 in Asian developing countries. (10) Projected potential use of tempe flour in weaning food in Asian developing countries in the year 2010. Address: American Soybean Assoc., Singapore.

2535. Kodyat, Benny A.; Sukaton, A.; Latief, D. 1990. Traditional fermented soybean (tempe) for increasing nutritional status of children in Indonesia. In: Hermana, Mien K.M.S. Mahmud, and Darwin Karyadi, eds. 1990. Second Asian Symposium on Non-Salted Soybean Fermentation. Bogor, Indonesia: Nutrition Research and Development Centre. vii + 116 p. See p. 110-15. Held 13-15 Feb. 1990 in Jakarta, Indonesia. 23 cm. [Eng]

• ***Summary:*** Contents: Primary health care strategy. Nutrition problems in Indonesia (for main types). Food and nutrition policy. The objectives of food and nutrition strategy. Magnitude of the PEM (Protein Energy Malnutrition). problem. Programme strategy on PEM control. Tempe for increasing nutritional status of children (a pilot project).

A map shows Protein Energy Malnutrition areas in Indonesia. It is divided into three types of areas based on prevalence: (1) Less than 7%. (2) 7-11%. (3) Greater than 11%. On Java, only west Java is greater than 11%. But most of the other islands have greater than 11%. Address: Directorate of Community Nutrition, Ministry of Health, Republic of Indonesia.

2536. Murata, Kiku; Asano, Machiko; Fukakura, Noriko. 1990. Activities of Tempe Study Group and popularity of tempe in Japan. In: Hermana, Mien K.M.S. Mahmud, and Darwin Karyadi, eds. 1990. Second Asian Symposium on Non-Salted Soybean Fermentation. Bogor, Indonesia: Nutrition Research and Development Centre. vii + 116 p. See p. 1-3. Held 13-15 Feb. 1990 in Jakarta, Indonesia. 23 cm. [13 ref. Eng]

• ***Summary:*** In 1985 the First Asian Symposium on Non-Salted Soybean Fermentation was held in Tsukuba, Japan. In 1998 the Tempe Study Group was started in Japan by various people interested in tempe. "Seventy seven people became regular members (for a membership one has to pay ¥2,000/fiscal year) and 12 supporting members. In 1989 fiscal year there are 85 regular and 10 supporting members (who have to pay at least ¥10,000/fiscal year).

"The Tempe Study Group had the first Tempe Study Meeting at a lecture hall of Yukijirushi Milk Co. Ltd. in Tokyo, Feb. '89. The second Meeting was held at Kenkyu Koryu Center of Osaka City University in Osaka, in June 1989. The third Meeting was held at Teikoku Gakuen, together with the regular meeting of Kansai Cereal Science Study Group in September 1989, having party serving various tempe dishes. Each time there were 70-100 participants from all over Japan who were very active in discussions. The subjects and speakers were as follows:

"For the first meeting, 1. Y. Torii; About her visit to Natural Foods EXPO at Los Angeles in April 1988. 2. K. Okada; Studies on Isolation of Specific Gene from Tempe. 3. T. Maeda; Works on Tempe in our Village.

"For the second Meeting, 1. M. Terashima; The Status quo on Soyprotein and its Foods in Japan. 2. E. Katoh; On Frying Tempe in Reduced pressure. 3. S. Kawabata; Tempe made of Tofu Residue and Its Utilization. 4. M. Matsuo; High Fiber Biscuit Adding Tempe made of Tofu Residue.

"For the third Meeting, 1. T. Watanabe; Science of Tempe. 2. K. Murata; Chemistry of Tempe and Its Edible Value. 3. M. Iwatsuki; Problem on Production and Selling Tempe on the Market.

"However, according to our survey of 3,000 people in 27 groups on 10% knew tempe. Among them, in 7 groups, 20-25% of the people liked tempe, as shown in Table 1. Therefore, I feel that we need more efforts to let people know tempe and how to handle or eat tempe." A table shows the results of the survey of 3,000 people as described above. In the 7 groups, 50% knew about tempeh, but only 20-25% of the total said they liked it. Address: 1. Research Inst. for Education, Teikoku Gakuen; 2. Teikoku Women's Univ., Moriguchi City. All: Osaka, Japan.

2537. Onghokham, -. 1990. Historical and social roots of tempe. In: Hermana, Mien K.M.S. Mahmud, and Darwin Karyadi, eds. 1990. Second Asian Symposium on Non-Salted Soybean Fermentation. Bogor, Indonesia: Nutrition Research and Development Centre. vii + 116 p. See p. 71-76. Held 13-15 Feb. 1990 in Jakarta, Indonesia. 23 cm. [12 ref. Eng]

• ***Summary:*** He begins by admitting that this is a field that he knows almost nothing about. Originally tempe, like eggs, was a low-class food in Indonesia. The late President Sukarno denounced tempe by appealing to Indonesians not to be a tempe nation *(bangsa tempe)*–meaning servile, weak, and inefficient. Yet Sukarno loved to eat tempe, as does the current President Suharto. And his remark had no effect on tempe consumption in Java.

Indeed things have changed since Sukarno's time, and tempe has nowadays become such a part of the Javanese diet that even the middle and upper classes eat it. And every market eating stall *(warung)* as well as every big restaurant (such as Handayani) that serves Javanese food must serve at least one tempe dish–if not more. Address: Univ. of Indonesia.

2538. Pawiroharsono, Suyanto; Siregar, E.; Matondang, T.H. 1990. Investigation of isoflavone and microorganisms in tempe. In: Hermana, Mien K.M.S. Mahmud, and Darwin Karyadi, eds. 1990. Second Asian Symposium on Non-

Salted Soybean Fermentation. Bogor, Indonesia: Nutrition Research and Development Centre. vii + 116 p. See p. 77-82. Held 13-15 Feb. 1990 in Jakarta, Indonesia. 23 cm. [8 ref. Eng]

• ***Summary:*** The aim of this investigation is to determine the interrelationship between the microorganisms present in tempe and its content of biologically active substances, mainly of the isoflavonoid compound, Factor-2.

Tempe samples were taken from 14 towns and cities throughout Java and Sumatra. Tables show: (1) Isoflavone analysis of tempe by TLC (thin layer chromatography). Based on 26 samples from many places, values are given for daidzein, Faktor-2, genistein, and glycitein. (2) Microorganisms isolated from 20 tempe samples. For each gives the number of strains of bacteria, yeasts, fungi, and total. (3) Data recapitulation of 20 tempe samples. Tempe with the highest content of Factor-2 as made with inoculum from LIPI (National Chemistry Institution).

"2. Most of the tempe samples inoculated with inoculum from LIPI contain relatively more strains of yeast and fewer strains of bacteria and mold. This may relate to the raw materials used in the production of LIPI inoculum, which is steamed rice.

"3. The other types of inoculum, particularly those from Tegal and Pekalongan, contain fewer strains of yeasts and more strains of bacteria." Address: Indonesia.

2539. Slamet, Dewi Sabita; Enliza, A.; Komari, -. 1990. Tempe spread. In: Hermana, Mien K.M.S. Mahmud, and Darwin Karyadi, eds. 1990. Second Asian Symposium on Non-Salted Soybean Fermentation. Bogor, Indonesia: Nutrition Research and Development Centre. vii + 116 p. See p. 91-93. Held 13-15 Feb. 1990 in Jakarta, Indonesia. 23 cm. [6 ref. Eng]

• ***Summary:*** Describes how to make a tempe spread supplemented with grated carrots. The carrots (in the proportion of 4 tempe to 2 carrots) add an attractive color plus the nutritional value of carotene. Citric acid and sugar are also added.

Tables: (1) Results of organoleptic test of tempe spread (percentage). (2) Moisture, protein, carotene and pH of tempe spread (in 100 g wet basis). (3) Mineral content of tempe spread (4:2). Address: 1. Nutrition Research and Development Center, Bogor; 2. Academy of Nutrition, Jakarta, Indonesia.

2540. Soejono, Irlan; Kagatsume, Masaru. 1990. Shifts and development in trade of various food crops in East Asia, 1960-1984. *CGPRT Working Paper* No. 5. xviii + 168 p. Feb. 28 cm.

• ***Summary:*** For each country discussed, this book gives information on: Production and supply of coarse grains, pulses, and root and tuber crops. Consumption and demand. Trade and trade elasticities. Forecast and policy implications: Prediction on import demand, indication of policy implications. Countries: Japan (p. 1-28). People's Republic of China (p. 29-42). Republic of Korea (p. 43-62). Taiwan (p. 63-79). The Territory of Hong Kong (p. 81-92). Appendixes (p. 95-165). References (p. 167-68).

Summary: As people in the East Asia subregion become more affluent and westernized, they consume less food grains directly and more livestock products.

Japan: Japanese rice production peaked in 1963 at 13.42 million tons, but surpluses have continued to grow. The government has tried various schemes to induce farmers to switch from rice other crops, including soybeans. A graph (p. 6) shows that soybean production in Japan dropped from 418,000 tonnes in 1960 to 100,000 tonnes in 1976. Because of the Rice Farming Diversification Policy, soybean production since 1976 has increased, rising to 238,000 tonnes in 1984. The graph also shows harvested area and yield during this period. A graph (p. 13) shows the total demand for soybeans in Japan and its components, 1960-1984. The total demand has increased steadily from 1.517 million tonnes in 1960 to 4.814 million tonnes in 1984. About 80% of this demand (3.952 million tonnes in 1984) was for soybeans to be processed. About 90% of these (3.765 million tons in 1984) were crushed into oil and meal. Small and relatively static amounts were processed to make miso (182,000 tonnes) and soy sauce (5,000 tonnes) in 1984. Address: 1. Senior Agricultural Economist, CGPRT Centre, Jl. Merdeka 145, Bogor 16111, Indonesia; 2. National Research Inst. of Agricultural Economics and the Ministry of Agriculture, Forestry and Fisheries of Japan.

2541. Sudigbia, I.; Sumantri, Ag.; Karyadi, D. 1990. The use of tempe in medical practice. In: Hermana, Mien K.M.S. Mahmud, and Darwin Karyadi, eds. 1990. Second Asian Symposium on Non-Salted Soybean Fermentation. Bogor, Indonesia: Nutrition Research and Development Centre. vii + 116 p. See p. 105-09. Held 13-15 Feb. 1990 in Jakarta, Indonesia. 23 cm. [7 ref. Eng]

• ***Summary:*** Contents: Introduction. Tempe in oral rehydration treatment. Tempe in nutritional therapy (use of a tempe formulated food in nutritional management of chronic diarrhea). Discussion.

Tables: (1) Composition of tempe formulated food and its nutritive value. (2) Effect of tempe formulated food on acute diarrheal cases. (3) The mean values of body weight gain and nutritional status in 3 months evaluation. (4) Nutritional impact of food mixtures.

Figure 1 shows the growth velocity of children fed with four different foods every 3 months after diarrhea. Address: 1. Child Health Dep., Medical Faculty, Diponegoro Univ.; Nutrition Research and Development Centre, Ministry of Health.

2542. Timotius, K.H.; Farley, Peter. 1990. Extracellular enzymes of *Rhizopus oligosporus,* a review. In: Hermana, Mien K.M.S. Mahmud, and Darwin Karyadi, eds. 1990. Second Asian Symposium on Non-Salted Soybean Fermentation. Bogor, Indonesia: Nutrition Research and Development Centre. vii + 116 p. See p. 57-62. Held 13-15 Feb. 1990 in Jakarta, Indonesia. 23 cm. [9 ref. Eng]

• ***Summary:*** Contents: Introduction. Amylase. Protease. Lipase. Contains 7 graphs and one bar chart. *Rhizopus oligosporus* "produces extracellular enzymes such as amylase, protease, and lipase. These enzymes are also very important, because they make the substrate into a more digestible food. Soluble substances increase during tempe fermentation." Address: Faculty of Biology, Satya Wacana Christian Univ., Salatiga 50711, Indonesia.

2543. Lindner, Boudewijn; van der Marel, Jan. 1990. A little history and some new developments at Solnuts B.V. (Interview). *SoyaScan Notes.* March 19. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Lindner joined the company in 1989. Production is expanding in America, but not as rapidly as in Tilburg, where the plant is running at maximum capacity, which is 2,000 kg/hour, two shifts, 5 days a week, 25 weeks a year. This comes to 4,000,000 kg/year. They also make Solflour (whole soy flour). And in the same plant, they also make pre-cooked and instant rice products half the time. They are now planning to build a second plant next year, probably in Belgium. Solnuts is the only company in Europe making dry roasted soynuts, but a company in Switzerland is looking at their success and trying to imitate it. Their product would only be suited for the bread and baking industry. Several small companies make oil roasted soynuts. The product is used in baked goods, in cereals such as Muesli, and in salad toppings.

Solnuts B.V. acquired Witte Wonder about 5 years ago [on 1 April 1986], and is now in the process of selling it in the form of a management buyout. The present president and future owner will be Wim Bakker. The agreement should be signed in 1-2 weeks. Witte Wonder does not belong to the core activities of the company.

Lindner sees Solnuts as a product that has worldwide potential. For example, he just got back from Singapore, where they exhibited at the Food Ingredients Asia Show. They got 97 good leads from 14 countries, and he will soon be returning to appoint the first 3 importer-distributors. He can easily see starting a plant in Asia within 5 years once the sales reach a certain level.

The main reason people prefer Solnuts to peanuts or tree nuts is because of the nutritional profile; high protein, low calories, and low fat. The key is the growing health consciousness. The price of Solnuts (plain halves) is similar to that of peanuts, but the aim now is no longer to replace peanuts. Rather Solnuts are marketed on their own merits.

The company is moving away from private labeling the product for other companies in Europe, and focusing on the Solnuts brand. They want to avoid many distributors competing with one another and with Solnuts, and with the attendant price cutting. Today 90% of the company's output is sold under the Solnuts brand. He does not know of a product named Benenuts sold by Innoval/Sojalpe. Cacoja in France sells Solnuts in consumer packs under their own brand. The market for snacks and flavored halves is growing.

Note: Boud Lindner was educated in the USA and speaks excellent English. Address: 1. Managing Director, Solnuts B.V., P.O. Box 5066, Swaardvenstraat 41, 5004 EB Tilburg, The Netherlands; 2. Director, Solnuts, Inc., 711 Seventh Street, Hudson, Iowa 50643. Phone: 1. 011 311 368 4991; 2. 800-643-3503.

2544. Westra, Marianne. 1990. Early history and current work of Vanka-Kawat B.V. (Interview). *SoyaScan Notes.* March 29. Conducted by William Shurtleff of Soyfoods Center. Followed by letters on 1 June and 2 July 1990.

• ***Summary:*** This company was founded in 1958, and has been in business for 33 years. They began as both an importer and a manufacturer. The original products they made were tofu (tahoe) and soy sauce (both sweet and salty varieties). In 1958 they began to make the following types of soy sauce: Ketchap Kaki Tiga, Ketjap A, Ketjap Benteng Manis, Ketjap Benteng Asin, Yellow Label Soy, and Tiger Brand Soy. They were still making all of these varieties in 1990.

At the time they started the business, they think there were other manufacturers of soy products in the Netherlands, but they don't remember the names of any companies of individuals. There were small, local Chinese companies that made tofu before they did, and at least one company that made soy sauce before they did. Their mailing address and head office address have not changed since 1958. The mailing address is: Dr. Augustijnlaan 40, 2283 CH Rijswijk, Netherlands (near The Hague). In 1984 Vanka-Kawat was thought to be the second largest tofu maker in Europe and in the Netherlands (after Heuschen-Schrouff), producing 10,500 kg/week. They discontinued tofu production in March 1985 after coming to an agreement with Heuschen-Schrouff, because it was more economical for Vanka-Kawat to let Heuschen-Schrouff (which had all the equipment and knowledge) produce the tofu which Vanka-Kawat sold. They now buy their tofu from Heuschen-Schrouff. They also make sambals, and other foods. They have never made taotjo or miso, but they do import it. And they have never made tempe/tempeh, but they do buy it from the "first Dutch Tempeh factory" and then sell it.

They are not related to Linn Oriental Products (also called Soy-Lin or Lin Tahoe) in Westbroek, but they think

that company started in about 1970. The company still exists; the owner is Chinese, but they do not know if it is Mr. Lin. Mr. G.L. Van Kasteren is the best man to talk to about soyfoods. He speaks good English.

This company, which is run by Indonesian-Dutch, imports foods from throughout Asia, though they started with Indonesia, and exports to West Germany, Belgium, France, England, and the USA.

Note: Anneke de Weerd says (April 1991) that the two most popular types of soy sauce in the Netherlands are ketjap manis and ketjap benteng; ketjap asin is not well known. Address: Head Office: 3e van de Kunstraat 18, 2521 BB Den Haag (The Hague), Netherlands. Phone: 70-388-8804.

2545. Welters, Sjon. 1990. The tofu industry and market in the Netherlands (Interview). *SoyaScan Notes.* March 30. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** The largest tofu manufacturer in Europe and the Netherlands is Heuschen-Schrouff (pronounced HEW-shun Shroof; "HEW" is pronounced like "who" and "Schrouff" rhymes with "roof"). They make an estimated 35,000 to 40,000 kg/week (75-90,000 lb/week) of tofu.

De Morgenstond is Holland's second largest tofu producer. They are a "new-age" type company that started making tofu in about 1980 or 1981. They make vacuum pack tofu and various tofu products such as Saté. They make about 2,250 kg/week of tofu. Sjon helped them move into their now plant in March 1989. The original owner was Wout (rhymes with "laut") Gerritsma. The present owners are partners Frits Steunenberg and Mauk Den Bok.

Lin Tahoe (Soy Lin) is a traditional Indonesian tofu company that makes an estimated 1,000 kg/week of calcium chloride tofu.

Manna is now a brand of Akwarius Almere, which buys about 1,000 to 1,400 kg/week of tofu (formerly probably from Yakso, now perhaps De Morgenstond). There are probably 3-4 other similar regional Indonesian tofu companies that supply the Toko (supermarket or grocery store) with tofu, and are about the same size as Lin.

There are two companies that make large amounts of second-generation tofu products using tofu that they buy from original manufacturers. The larger of these two in volume is Witte Wonder (pronounced Vitte Vander; "Vander" rhymes with "Ponder"), which made tofu until recently but now focuses on making tofu dressings, etc. They buy their tofu from Heuschen-Schrouff. Note: Solnuts is now selling the company to the management, Wim Bakker. Originally, Witte Wonder was a foundation (Stichting); they had one company making tofu, another making seitan, plus a natural foods store and a restaurant. The tofu company started to expand so fast that they made it into a separate corporation named Witte Wonder, owned by Cees (pronounced "case") Van Rest and his father. As the company grew even more and needed a new plant, Solnuts came in as an investor. When even more money was needed, Cees sold the majority ownership to Solnuts. Solnuts put in a manager that Cees couldn't work with, so Cees left and Wim Bakker, the current president, took over.

The other company, Yakso, has a more diverse product line. Yakso is owned by a big Dutch cheese company named Frans Andriga (the same as the name of the man who owns it); the company is a cheese importer-exporter. Yakso's managing director is Cees Mideelweert, who took over from Yakso Farm. Yakso occupies the same building as De Morgenstond (De Oppers 58, 8471 ZM Wolvega). When they moved into this building, they stopped making the basic tofu (which they now buy from De Morgenstond) and focused on second-generation tofu products.

Companies that no longer produce tofu are Hwergelmir Foundation, Michel Horemaus (he used to be the tofu maker at Manna), Stichting Oost-West Centrum (they used to make tofu for their restaurant next door), Tempeh Productions Inc. (they used to sell tofu made by Heuschen-Schrouff), Terra Natural Foods (started by Rob Jansen) is now owned by Centaur, which also owns Macrobio (a distributor, importer-exporter); it is said that Centaur is largely owned or supported by Saudi Arabians. Terra now imports and exports soybeans. Sjon thinks they never made tofu.

Sjon estimates the total amount of tofu produced in Holland be about 45,000 kg/week of tofu, the growth rate of production to be about 8% per year, and the total consumption to be about 34,000 kg/week. Remember that Heuschen-Schrouff exports quite a lot of this tofu, so total Dutch tofu consumption will be less than production. The tofu is sold at the country's 800 natural food stores, all Indonesian food stores, and many mainstream Dutch supermarkets. Address: Craft International Consultants, 21 Wetherbee St., Acton, Massachusetts 01720. Phone: 508-264-9511.

2546. Areekul, S.; Pattanamatum, S.; Cheeramakara, C.; Churdchue, K.; Nitayapabskoon, S.; Chongsanguan, M. 1990. The source and content of vitamin B-12 in the tempehs. *J. Med Assoc Thai* 73(3):152-56. March. * Address: Dep. of Tropical Radioisotopes, Faculty of Tropical Medicine, Mahidol Univ., Bangkok, Thailand.

2547. **Product Name:** Stir-Fry Sauce, Stir Fry Spicy Sauce for Seafood, Chinese BBQ Sauce, and Steak Sauce.
**Manufacturer's Name:** Merrychef Foods SDN BHD.
**Manufacturer's Address:** 118A Jalan Burhanuddin Helmi, Taman Tun Dr., Ismail, 6000 Kuala Lumpur, Malaysia. Phone: 03 719-7540.
**Date of Introduction:** 1990. April.
**Wt/Vol., Packaging, Price:** 250 gm glass bottles.
**How Stored:** Shelf stable.

**New Product–Documentation:** Spot in SoyaFoods. 1991. Spring. p. 4. "Stir fry sauces from Merrychef." "Merrychef Foods produces a whole range of sauces for Western and Oriental cooking, most of which are exported. Their 'Chinese' range of 'stir fry,' 'BBQ,' and steak sauces are mainly based on soya and have been available in the UK for about a year and in Australia, Japan and Germany for a few months. Merrychef hopes to export to the U.S. this year as well as to supply the home market... Varieties include stir fry for meat, vegetables, sea food, Chinese BBQ and steak sauce."

2548. Kjellker Gimre, Monica. 1990. Re: Complete soymilk or soybase plants installed by Alfa-Laval worldwide from 1979–1989. Letters to William Shurtleff at Soyfoods Center, May 30 and Aug. 24–in reply to inquiry. 1 p. Typed, with signature on letterhead.

• ***Summary:*** The following plants are listed chronologically by year of start-up, and within each year, alphabetically by country. Start-up–Country–Company–Product–Capacity (liters/hour)

1979–Malaysia–Lam Soon–soymilk–5,000

1980–Thailand–Kickapoo–soymilk–4,000

*All plants made from 1984 on use Alfa-Laval's new Soyal design.*

1985–West Germany–Ice cream maker [Schoeller]–soybase–3,000

1985–Switzerland–Soyana–soybase–1,000

1986–China–Guangzhou Cannery [Guangdong]–soymilk–2,500, 2 dec.*

1986–France–Cacoja–soybase–1,500

1987–China–Jin Jiang Foodstuffs Factory–soymilk–2,500

1987–India- Noble Soya–soymilk–4,000, 2 dec.*

1988–Argentina–Alimentos de soja–soymilk–4,500

1988–China–Jiangmen Foodstuff Factory–soymilk–2,500, 2 dec.*

1988–China–Wuhan Guan Sheng Yuan Foodstuff Factory–soymilk–2,500, 2 dec.*

1988–France–Innoval–soybase–1,500

1988–Nepal–Indreni–soymilk–2,500

1988–Nigeria–Sona Dairies–soymilk–4,500

1989–Australia–Sanitarium Foods–soybase–500

1990–France–Dairy Co-op**–soybase–500

* = 2 decanter centrifuges per system to boost the protein yield. The systems made before 1984 were for more traditional soymilk. Those made afterwards no longer require that the soybeans be soaked, and the "new" soyabase line in designed primarily for producing a non-beany soymilk, but it can be easily adjusted to give a traditional soymilk. "Soybase" is the product that comes out of the Soyal soyabase line after grinding, separation in one or more decanters, and deactivation of enzymes like trypsin inhibitors. This base is more concentrated than soymilk (9-12% solids/dry matter) and is what is used as the raw material for any soy-based product. "Soymilk" is a blended drink, often containing sugar, and standardized to a protein level required by the market. Soybase would only be run through an ultrafiltration unit to (1) remove phytic acid and oligosaccharides, or (2) to remove moisture and increase the percentage solids, as to make tofu. ** The plant owned by the Dairy Co-op in France is secret, but the base it produces will be used mostly for research on calf milk replacers and on replacing cow's milk in certain dairy products. This dairy does not have any products on the market. Address: R&D manager, Alfa-Laval East Asia Pte. Ltd., 11 Joo Koon Circle, Singapore 2262. Phone: 86 22 711.

2549. Kjellker Gimre, Monica. 1990. Re: Current developments at Alfa-Laval. Letter to William Shurtleff at Soyfoods Center, May 30. 2 p. Typed, with signature on letterhead. Plus 2 brochures.

• ***Summary:*** John Wilson is presently working a special projects in Jamaica. The former agreement with Kibun is no longer active nor in effect.

"Right now Alfa-Laval's soya application group is concentrating on technological support and development work. The general knowledge of soya is now so well spread throughout our organization that it is taken care of by our normal sales organization channels in market companies and Lund. The support and development work here is taken care of by our R&D Centre in Singapore where we have pilot plant facilities for all types of soya products. I have been head of this R&D Centre since June 1989." Address: R&D manager, Alfa-Laval East Asia Pte. Ltd., 11 Joo Koon Circle, Singapore 2262. Phone: 86 22 711.

2550. *SoyaFoods (ASA, Europe).*1990. Phytelepathas. 1(1):4. Spring/Summer.

• ***Summary:*** "Set up in 1901 as a French Law Association, Phytelephas is now an organization committed to the development of techniques and use of soya for human and animal consumption throughout Europe and in developing countries.

"It is supported by the Organisation Nationale des Oléagineux (ONIDOL) and by the Centre Nationale des Jeunes Agriculteurs (CNJ).

"Activities are varied covering the sponsorship of research and development, providing technical and commercial information to assist companies and also promotional activities. One of its most recent events was a Conference on 'Soya in South East Asia' which was held on 5-6 March in Le Havre.

"For further information please contact Phytelephas, BP 147, 76051 Le Havre Cedex, France. Tel: 33 35 43 01 11 and Fax: 33 35 55 26 26."

2551. Vanka-Kawat B.V. 1990. Topmerken in de Aziatische levensmiddelen: Prijslist [The top brands in Asiatic foods: Price list]. 3e v.d. Kunstraat 18, 2521 BB Den Haag, Netherlands. 22 p. [Dut]

• ***Summary:*** The subtitle is "Import-Export Asian Food Specialties." Imported items are listed by country of origin. Non-imported are listed by product type: China: Pearl River mushroom soy, soy superior, and superior soy. Philippines: Silver Swan soy sauce. Hong Kong: Best black soy, Best light soy, Best soy light, Best soy sauce, Black soy, Black soy yellow label, Hoi sin sauce Meechung, Taotjo bean sauce. Japan: Akamiso, Kikkoman menmi, Kikkoman shoyu, Kikkoman steak sauce, Kikkoman teriyaki sauce, Marukin soy sauce, Morinaga silken tofu, Nagatani-en aka-miso, shiro-miso, Teriyaki sauce. Ketjap: Ketjap kaki tiga, Ketjap A, Ketjap 'A' manis, Ketjap benteng asin, Ketjap benteng manis, Ketjap vital, Superior soy, Tiger brand soy, Yellow label. Singapore: Salted soy beans sin sin, Taotjo bean sauce, Taotjo flower brand, Taotjo taksan. Taiwan: Black beans fermented [soy nuggets], Soy sauce ve wong, Tahoe amigo, Tauge [sprouts]. Fresh products: Vacuum packet fresh tofu. Fresh tempeh. Address: The Hague, Netherlands. Phone: 070-388- 88 04.

2552. Wilson, John. 1990. Re: Changes in the food department at Alfa-Laval. Letter to William Shurtleff at Soyfoods Center, June 15. 1 p.

• ***Summary:*** "I am here on a two year assignment from UNIDO (United Nations Industrial Development Organization) to assist the food processing industry in Jamaica. During those two years, I am on leave of absence from Alfa-Laval in Sweden.

"The food department of Alfa-Laval in general and the soya application in particular has undergone and is undergoing considerable restructuring, part of the reason for which is to match the tremendous market changes in Eastern Europe.

"Goeran Leufstadt, who was the original chief of the soya research laboratory from 1982 to 1985 and subsequently chief of the Singapore food lab from 1985 to 1989 is now chief of the food department F. F. which has the product responsibility for soya foods." Address: Food Processing Expert, International Projects Coordinator for UNIDO, Jamaica, c/o JAMPRO Ltd., Jamaica's Economic Development Agency, 35 Trafalgar Rd., Kingston 10, Jamaica. Phone: (809) 929-7190.

2553. Cardenas, Danilo C. 1990. Status of the Philippine soyfood industry. Paper presented at the International Conference on Soybean Processing and Utilization. Held 25-29 June 1990 at the Jilin Academy of Agricultural Sciences, Gongzhuling, China. *

Address: Supervising Science Research Specialist, Philippine Council for Agriculture, Forestry, and Natural Resources Research and Development (PCARRD), Los Baños, Laguna 3720, Philippines.

2554. Hymowitz, T.; Singh, R.J.; Larkin, R.P. 1990. Long distance dispersal: The case for the allopolyploid *Glycine tabacina* (Labill.) Benth. and *G. tomentella* Hayata in the West-Central Pacific. *Micronesica (Guam)* 23(1):5-13. June. [39 ref]

• ***Summary:*** The subgenus *Glycine* currently contains 15 inbreeding wild perennial relatives of the soybean. These are *Glycine albicans, G. arenaria, G. argyrea, G. canescens, G. clandestina, G. curvata, G. cyrtoloba, G. falcata, G. hirticaulis, G. lactovirens, G. latifolia, G. latrobeana, G. microphylla, G. tabacina*, and *G. tomentella*.

Fourteen of these are diploids (2n = 40) and endemic to the Australian region. However the allopolyploid types (2n = 80) of *G. tabacina* and *G. tomentella* have a wider distribution. *G. tabacina* contains both diploid and tetraploid (2n = 80) members. The diploid forms of *G. tabacina* are found only in Australia, however the tetraploid members of *G. tabacina* have a wider distribution. They are found in the Pescadores Archipelago (Taiwan), the islands of Quemoy and Amoy just off the cost of Fujian Province (China), Ryukyu Islands (Japan), and the Mariana Islands of Tinian and Saipan in the West-Central Pacific. The tetraploid forms of *G. tabacina* are also found in Australia and the South Pacific Islands of New Caledonia, Vanuatu, Fiji, Tonga, and Niue.

*G. tomentella* is composed of four cytotypes: 2n = 38, 40, 78 and 80. Only the 38-chromosome form is found in Australia. The 40- and 78-chromosomes are found both in Australia and in nearby Papua New Guinea. The tetraploid forms of *G. tomentella* occur in Australia, Papua New Guinea, the Philippines, and Taiwan.

No diploid perennial *Glycine* species have been found outside of Australia. This the questions arises concerning the origin of the allopolyploid forms of both *G. tabacina* and *G. tomentella* in the West-Central Pacific. The seed of wild perennial *Glycine* do not float on water nor do they possess any mechanism for long distance dispersal by air currents. They do not stick to the coats of animals and it is unlikely they were transported by humans because the literature makes no mention of uses of wild perennial *Glycine* species by humans.

"Plate tectonics and biogeography: After the breakup of Pangaea, the universal land mass, Australia, New Zealand and Antarctica were united with South America and with India-Madagascar-Africa, forming Gondawanaland (100 m.y. BP [100 million years before the present]), a Southern Hemisphere land mass. The West-Central Pacific is associated with Laurasia, a Northern Hemisphere land mass.

"New Zealand and New Caledonia separated from Australia and Antarctica about 80 m.y. BP and moved north-eastward reaching their present position about 60 m.y. BP.

Australia and Antarctica separated about 49 m.y. BP. As Australia moved northward it entered a zone of reduced precipitation and increased aridity. The Australian plate collided with the Asian plate 10 to 12 m.y. BP. Most probably during this epoch, Miocene, some legumes entered Australia directly from Asia. At that time, Australia was widely separated from South America, India, Madagascar and Africa...

"According to Lackey (1977, p. 85) both 'the subgenus *Glycine* and the subgenus *Soja* are probably derived from *Pueraria*-like ancestors in tropical Asia. From this tropical center, species in the subgenus *Glycine* have successfully invaded Australia and associated areas, and the wild form in the subgenus *Soja* has invaded central and northern Asia.' *Glycine* species (2n = 40) are diploidized polyploids with x = 10."

It has been demonstrated that the allopolyploidization of *Glycine* species (2n = 80) took place only in Australia. "Thus, perennial *Glycine* found a niche in tropical and subtropical Australia. Radiation of *Glycine* species, followed by allopolyploidization of the species, resulted in the *G. tabacina* and *G. tomentella species complexes."*

Long-distance dispersal of *Glycine* seeds from Australia across the equator was probably performed by migratory birds–with shorebirds being the most promising candidates. It has been shown that seeds such as *Glycine* larger than 1 mm and having a hard seedcoat can be retained in the digestive tract of some shorebirds for more than 100 hours then excreted in viable form. With flight speeds of 30-60 miles per hour, the seeds could be transported 3,000 to 6,000 miles per flight. The birds may also pick up small, light seeds in mud adhering to their feet.

For comments on this paper see the March 1995 interview with Prof. Hymowitz titled "Plate tectonics and the dissemination of the soybean." Address: 1-2. Dep. of Agronomy, Univ. of Illinois, Urbana, IL 61801; 3. State of Illinois Natural History Survey, Section of Wildlife Research, Urbana, IL 61801.

2555. Karta, Susani K. 1990. The market prospective for tempeh in the year 2000. In: Ontario Ministry of Agriculture and Food, ed. 1990. Soybean Buyers Mission from New Markets, July 1-7, 1990. Tokyo, Japan: Ontario Ministry of Agriculture and Food. 61 p. July. See p. 19-33.
• ***Summary:*** Contents: Introduction. Market situation for tempeh in Indonesia. Health and nutritional significance of tempeh. Tempeh for weaning food. Constraints and trends in the market development of tempeh. Recommended guidelines and strategies. Ideas for the diversification of tempeh utilization: Tempeh as a food ingredient, new tempeh food opportunities.

Tempeh flour (dried, ground tempeh) used in weaning foods could dramatically reduce the diarrheal diseases among children in Indonesia and other countries. The author estimates the potential demand for tempeh flour in weaning foods used for this purpose in the year 2000 to be 27,720 tonnes in Indonesia and 470,880 tonnes in all Asian developing countries. This assumes average tempeh flour consumption of 10 gm/day per child or 3.6 kg/year per child.

In 1983 Indonesians consumed about 927,000 tonnes of soybean as food, increasing to 1,528,000 tonnes in 1958. About 50% of these soybeans were used to make tempeh, and 40% to make tofu; the remaining 10% were used to make soy sauce and "tauco" (a fermented whole soybean condiment [Indonesian miso]). In 1988 the average Indonesian consumed 6.45 kg/year of tempeh (equivalent to 4.3 kg of soybeans). In the past 5 years, consumption of soyfoods in Indonesia has increased by an average of 10% annually.

According to a 1988 report from the Indonesian Ministry of Agriculture, the average daily per capita consumption of calories is still below the recommended Indonesian guidelines. In 1988, calorie consumption was only 1,794 calories/capita/day, or about 28% below the recommended 2,500 calories. Protein intake was about 43.3 grams/capita/day, or about 21% below the recommended 55 gm. "Consumption levels of traditional soyfood such as tempeh will continue to grow as the population attempts to meet its protein needs. Moreover, in view of the purchasing power of the average Indonesian consumer, we can expect a continuing increase in the demand for tempeh as it is widely available at a much more affordable price than animal protein... For tempeh manufacturing, imported soybeans are preferred because they are larger and cleaner." Address: MSc, RD, Manager, P.T. Indofood Interna Corp., Jl. Ancol No. 4-5, Ancol Barat Jakarta Utara 14430 Indonesia. Phone: 690-1365.

2556. Loh, Michael. 1990. An overview of export opportunities in the new markets. In: Ontario Ministry of Agriculture and Food, ed. 1990. Soybean Buyers Mission from New Markets, July 1-7, 1990. Tokyo, Japan: Ontario Ministry of Agriculture and Food. 61 p. July. See p. 10-12. [Eng]
• ***Summary:*** It has been almost 20 years since the first container load of soybeans grown in Ontario was shipped to Japan. By the end of 1989, Ontario was exporting more than $25 million worth of soybeans to Japan, Hong Kong, Malaysia, and Singapore. Now the new markets for Ontario soybeans are Korea, Taiwan, the Philippines, and Indonesia.

In Korea, trade restrictions have eased on soybeans and other agricultural products. With hefty trade surpluses, Korea is under pressure to balance trade. Korea soybean imports jumped from only 428,000 tons in 1979 to 1,100,000 tons in 1989. About 120,000 tons of the imported soybeans are for food use, as follows: Tofu 100,000 tons (83% of the total), soymilk 17,000 tons, and soy sprouts

2,000 tons. Nearly all of Korea's soybean imports come from the USA.

Taiwan ranks second, after Japan, in terms of best prospects for agricultural exports. The strong Taiwanese currency has made exports less expensive. Burgeoning trade surpluses have led to increasing pressures from trading partners, like the USA, to balance trade. So Taiwan has liberalized imports by lowering tariffs and eliminating non-tariff barriers. "U.S. soybean exporters took advantage of their dominant market position in Taiwan to expand sales. Backed by aggressive trade negotiators, the American soybean industry has enhanced its competitive position by securing a 5-year supply agreement contract with the Government of Taiwan. The agreement calls for the purchase of 5.7 million tons of U.S. soybeans over a five-year period from July 1, 1986 to June 30, 1991. As a result the United States has over 75% of the market share. Taiwan's annual requirements of food soybeans are estimated at 250,000–300,000 tons. With recent market opening measures announced by the Taiwanese government, direct sales of food soybeans to end-users are now permitted."

Philippines: In Feb. 1987 Michael led a mission to the Philippines, and contacted a buyer. Ontario soybeans were first shipped to that country later in 1987. The Philippines import about 10,000 to 15,000 tons/year of soybeans for food use, and this is expected to increase in the near future. Filipro, Inc., which is the Philippines' licensee for Nestle S.A., reported increasing market acceptance of its re-launched powdered soya milk product Vita (chocolate flavor), and a soy-based baby cereal named Ceresoy.

Indonesia: Ontario soybeans (worth $4.2 million) were first sold to Indonesia in 1980 after Canada's first mission there that year. 90% of the 1.7 to 2.0 million tons of soybeans required by Indonesia are used for food. Tempeh is a delicious Indonesian food and Indonesia requires over 750,000 tons/year of soybeans to make tempeh. Address: Senior Representative, Asia/Pacific Region, Ontario Ministry of Agriculture and Food (OMAF), Tokyo, Japan.

2557. Ontario Ministry of Agriculture and Food. 1990. Soybean buyers mission from new markets, July 1-7, 1990. Tokyo, Japan: Ontario Ministry of Agriculture and Food. 61 p. 30 cm. Saddle stitched. [Eng]

• ***Summary:*** This conference took place in Ontario, Canada. On the mission were two buyers each from Indonesia (P.T. Indofood Interna Corp., BULOG), Philippines (Universal Robina Corp., Paritas Trading Corp.), and Taiwan (Sun Ford Mfg. Corp, Great Wall Enterprise Co.). Michael Loh of OMAF/Tokyo was the mission leader. Contents: Background and purpose. Mission members. Itinerary. Seminar agenda. Canada's soybean industry, by Fred Brandenburg of OSGMB. An overview of export opportunities in the new markets (Korea, Taiwan, Philippines, Indonesia), by Michael Loh of OMAF, Tokyo. Role of Taiwan Soybean Importers, by Laurence Hsiao of Sun Ford Conglomerate Corp. Soybean market in Indonesia, by A. Saifullah of BULOG, Indonesia. The market prospective for tempeh in the year 2000, by Ms. Susani K. Karta, manager, P.T. Indofood Interna Corp. (Indonesia). Appendix: 1. Ontario soybean suppliers (directory of 15 exporters). 2. Useful contacts. 3. Ontario soybean oil crushers (ADM, Victory Soya Mills, Central Soya of Canada). 4. Role of the Ontario Soybean Growers' Marketing Board. 5. Development of soybean varieties (incl. Harovinton for tofu, Canatto, Nattawa, and Nattosan for natto). 6. Market trends in the development of traditional soyfood, by Susani K. Karta (ASA, Singapore; Originally presented at the ASEAN Food Conference, Oct. 1988, Bangkok, Thailand). 7. Reference materials for doing business in Asia/Pacific. Address: Tokyo, Japan.

2558. Saifullah, Agus. 1990. Soybean market in Indonesia. In: Ontario Ministry of Agriculture and Food, ed. 1990. Soybean Buyers Mission from New Markets, July 1-7, 1990. Tokyo, Japan: Ontario Ministry of Agriculture and Food. 61 p. July. See p. 16-18. [Eng]

• ***Summary:*** Contents: Market size. Major soybean products. Sources of imports. Domestic prices. Addendum: BULOG's objective and functions.

The size of the Indonesian soybean market is about 1.7 to 2.0 million tonnes. From 1985 to 1989 soybean production in Indonesia grew from 870,000 tonnes to 1,275,000 tonnes (about 11.6% per year), imports grew from 330,000 tonnes to 384,000 tonnes (with a peak of 475,000 tonnes in 1988), and soybean consumption grew by 7.8% per year. About 90% of total soybean consumption is used for food, and the remaining 10% is crushed for oil or used for feed. Of the soybeans used for food, about 90% are used for tempeh and tofu.

Since 1986 China has been the major source of soybeans imported to Indonesia, followed by the USA and Vietnam. Soybeans can only be imported by BULOG (the National Logistics Agency) to protect Indonesian soybean producers from low world market prices. Imports are used only to make up for shortfalls in domestic production–not to lower prices.

In 1986 and 1987 the price of soybeans imported from China was lower than the price of soybeans imported from the USA; but from 1988 to 1990 the price from the USA was lower than that from China. In 1990/91 the average import price of soybeans (in US dollars per metric ton, C&F) from various countries was: China $277.70, USA $253.00, and Vietnam $294.20.

To stimulate domestic soybean production, the Indonesian Government sets floor prices for soybeans. In 1990 the price is Rp.400 per kg or about $220 per ton. However the producer price has been well above the floor

price for many years. In the central producing area in East Java, the producer prices is presently about Rp.800 per kg (US$440 per tonne), while the wholesale price in the Jakarta market was Rp.950,000 per tonne (US$527.8 per tonne) in early June, 1990.

BULOG's main objectives are to reduce price instability and to stimulate domestic production of rice, sugar, wheat, and secondary crops including soybeans. The Agency maintains a national reserve or buffer stock. Address: Market & Price Analysis Bureau, BULOG, Badan Urusan Logistik, Jl. Jend, Gatot Subroto 49, Jakarta, Indonesia. Phone: 489-5499.

2559. Fehlberg, Eric C. 1990. Re: Seventh-day Adventist health food companies worldwide. Letter to William Shurtleff at Soyfoods Center, Aug. 17. 4 p. Typed, with signature on letterhead.

• ***Summary:*** Discusses Nutana in Holland and Denmark. Nutana of Norway, formerly known as Dagens Kost, was renamed Nutana Norge in 1982. Sahm Yook Foods is the official name of the Korean Food Factory. Alimentos Colpac is the official name of the food factory in Navojoa, Sonora, Mexico; it was established in 1969. The Montemorelos Branch is known as Alimentos Integronaturales y Panificadora la Carlota; it was established in 1981.

Granose Foods Ltd. of England moved from Stanborough Park, Watford, Herts, to Howard Way, Newport Pagnell, Bucks., in Jan. 1989. The official opening date was 9 July 1989.

PHAG (of Switzerland) is written in all upper-case letters; it is not an abbreviation of anything. Glaxo Ltd. India has nothing to do with the Seventh-day Adventist church.

DE-VAU-GE was primarily responsible for setting up the Adventist food industry in Spain and the Kolett's brand is packed specifically for the Spanish market. DVG has two brand names which are manufactured for the reform or natural foods market in Europe: Granovita and Bosen. The products under the Bosen label were originally made in their bakery.

Pan American Health Service in Honduras still produces soymilk. Mountain View College in the Philippines is still making meat analogues and perhaps soya milk–but only for their own use. Bandung College (now called Bandung Academy) in Indonesia is still in operation and they may be making soya products. Two years ago they wanted very much to start a food factory, but it did not happen. The Hong Kong Hospital is still operating and they still manufacture small amounts of food, basically for their own use. South China College has a long history. It was established in 1903 as Bethel Girls' School, but underwent several name changes and changes of location due to political turmoil and the Sino-Japanese war of 1937, followed by the violence of the Second World War.

"Eventually it was re-established at Clear Water Bay in Kowloon, in 1958 and a college curriculum introduced in 1962. Its name was changed to South China Union College in 1964. In 1981 they officially adopted its name and has been called Hong Kong Adventist College since then. It still operates today, and possibly manufactures small quantities of food, basically for their own use." Address: Director, International Health Food Assoc., Seventh-day Adventist General Conference, 12501 Old Columbia Pike, Silver Spring, Maryland 20904.

2560. Sian, N.K.; Ishak, S. 1990. Effect of pH on yield, chemical composition, and boiling resistance of soybean protein-lipid film. *Cereal Foods World* 35(8):748, 750, 752. Aug. [11 ref]

• ***Summary:*** The weight of film (yuba or *fucuk),* a protein product consumed in Malaysia, increases when the pH of the soymilk reaches 2.0. At the time of the formation of the film, the content of protein, carbohydrates, ash, and moisture increase, and the oil content decreases. The boiling resistance of the films to cooking in water decreased as the pH of the soy milk became more acidic (pH 2.0) or alkaline (pH 7.5, 9.0, 11.0) than its natural pH (6.7). Address: Dep. of Food Science & Nutrition, Faculty of Life Sciences, Univ. of Kebangsaan Malaysia, 43600 UKM, Bangi, Selangor, Malaysia.

2561. Soeripto, Sri Wahyuni. comp. 1990. Bibliography of socio-economic aspects of secondary crops. *CGPRT Working Paper* No. 8. xi + 96 p. Aug. 25 cm. [581* ref]

• ***Summary:*** The bibliography presents a sample of documents and papers available in the CGPRT Centre reference library. This bibliography is unique in the sense that it cites a large number of documents from the so-called "grey" literature, which are difficult for researchers to access. Documents can be made available by the Centre on request. The bibliography does not pretend to be exhaustive and only draws on the Centre's available resources.

Contents: Foreword. Acknowledgements. Readers' guide. Section I: Author and title references listed in alphabetical order. Subject index. Section II: Bibliographies and abstracts. Agricultural statistics of Indonesia. Journals and newsletters. CGPRT Centre publications. Contains 28 references to publications on soybeans. Address: Librarian, CGPRT Centre, Bogor, Indonesia.

2562. Torii, Yasuko. 1990. [Re: New developments with tempeh and natto in Japan]. Letters to William Shurtleff at Soyfoods Center, Sept. 2 and 23. 2 p. [Jap; eng+]

• ***Summary:*** In Japan, tempeh has not become popular. Marusan-Ai has stopped making tempeh. What a shame that Mr. Kanasugi, who was so enthusiastic about tempeh, has

just passed away. The Tempeh Study Group (Kenkyukai) is still meeting 2-3 times a year and trying to popularize tempeh.

On the other hand, natto is becoming very popular and production is increasing rapidly. Natto groups are sponsoring various events to help popularize natto outside Japan.

Mrs. Torii traveled to Budapest, Hungary in early September to attend an IFOAM Conference on organic farming, which is spreading in Eastern Europe. There she enjoyed tasty chilled tofu *(Hiya-yakko)* and met a person who knows a lot about tofu. At an international agricultural fair, she found that soyfoods were becoming popular. The booths offering roasted soybean snacks and soya burgers were crowded. She saw an attractive soy cookbook containing color photos, and met a man who is translating *The Book of Tofu* into Hungarian. The Kombinat was doing a lot to develop and popularize soyfoods.

In Feb. she went to Indonesia with other members of the Tempeh Study Group to attend a symposium on soybean fermentation. It was very interesting. Address: Kamitsuchidana 324, Ayase-shi, Kanagawa-ken 252, Japan. Phone: 0467-76-0811.

2563. American Soybean Assoc., China. 1990. Re: The soymilk industry and market in China. Letter to William Shurtleff at Soyfoods Center, Sept. 13. 3 p. [Eng]
• ***Summary:*** There are more than 100 soymilk processing lines in China, of which 34 have been imported from Sweden, Japan, etc. Each year China produces about 100,000 tonnes of soymilk. (Processing capacity is even larger.) Of this total, 60,000 tonnes are produced in the provinces of Guangdong (Kwangtung), Fujian (Fukien), and Guangxi (Kwangsi), all in southern China.

The five largest soymilk manufacturers in China, in descending order of capacity, are: 1. Wuhan Guan Sheng Yuan Foodstuff Factory (20,000 liters/hour capacity); 2. Fuoshan Foodstuff Factory (12,000 liters/hour; Product name: Vita Milk); 3. Guangzhou Cannery (2,000 liters/hour; Product name: Hong Bao; Equipment from Alfa-Laval); 4. Jiangmen Foodstuff Factory (2,000 liters/hour); 5. Jin Jiang Foodstuff Factory (2,000 liters/hour).

All of the soymilk made by large companies in China is sold in bottles; none is sold in aseptic packages, plastic bags, or by street vendors. Most of this soymilk is consumed in China, but 5,000 to 10,000 tonnes (5-10%) is exported to Japan and Southeast Asia each year. A new trend is to develop instant soybean powder [probably powdered soymilk] for the people of northern China, who do not like soymilk. Address: Citic International Building, 25th Floor, Room 4, 19 Jianguomenwai Street, Beijing 100004, China. Phone: 512-7125.

2564. Hymowitz, Ted. 1990. Carolus Linnaeus, George Clifford, and the arrival of soybeans in Europe (Interview). *SoyaScan Notes.* Oct. 1. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** We know very little about how the early soybeans got to Europe. As a young man in Sweden, Linnaeus wanted to get married. But his future father-in-law wouldn't allow him to marry until he obtained his medical degree. So he went to the Netherlands, to the University of Harderwijk, where he got his medical degree in 2 weeks. But people in Sweden expected him to be gone for several years, so he didn't know what to do. He decided to bum around. He was invited by George Clifford (lived 1685-1760) at Hartecamp, the Netherlands, to take care of him, as a doctor. Clifford was a very wealthy man and somewhat of a hypochondriac. Linnaeus was invited to look at Clifford's garden at Hartecamp, and there he first saw a soybean growing. Clifford was a director of the Dutch East India Company; any of the company's ships could have brought soybean seeds to Clifford from the East Indies. In 1737 Linnaeus, in *Hortus Cliffortianus,* described the soybeans growing in Clifford's garden. Note: This was the earliest document seen (Jan. 2005) concerning the cultivation of soybeans in Europe. After leaving Clifford, Linnaeus went to Paris and met de Jussieu. He traveled around Europe, then returned to Sweden and got married.

In 1753 Linnaeus published the first edition of *Species Plantarum,* in which he confused the soybean and the mung bean. He repeated his extraordinary blunder in the second edition 1763. Then at some time between 1763 and 1767 he obtained some soybean seeds from someone (perhaps one of the many students he sent out around the world) and grew them at his garden in Uppsala. In 1767 he first recorded the existence of a soybean plant in his collection at Uppsala (which he noted with a "U"). Then he realized he had made a mistake.

In about 1739-40, some soybeans were sent by French missionaries to Buffon in Paris. Sometime between 1763 and 1767 Linnaeus grew soybeans at his garden in Uppsala. In 1812 William T. Aiton, in *Hortus Kewensis,* wrote that the soybean was introduced to England in 1790 by Walter Ewer, Esq. The British East India Company could have brought back these soybeans; the Linnaean Society in Britain might know how they got there. Address: Prof. of Plant Genetics, Univ. of Illinois, Urbana, Illinois 61801. Phone: 217-333-9454.

2565. Hymowitz, Ted. 1990. Could the soybean have come from Manila to Acapulco as dunnage? The Seville manifest of all items traded between Mexico and Manila (Interview). *SoyaScan Notes.* Oct. 1. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Ted reasoned that when the Chinese were taken to Acapulco from Manila as impressed seamen on Manila

galleons, the soybean was probably taken by them as part of their dunnage. Both the East India Company [of England] and the Dutch East India Company [of Holland] allowed each captain, officer, and sailor a certain amount of dunnage to trade on their own account.

The King of Spain asked the Spanish in Mexico, and also his advisors, to compile a list of all items that were traded either way from Mexico to Manila. It was a complete manifest of all items traded. This is the key document. Written in old Spanish and about 290 pages long, it was published in the 1700s. Ted obtained a microfilm copy from Seville, and found an expert from Spain to read it; the soybean is not mentioned. Ted went to Seville for 1 day almost 20 years ago to pursue this line of research. He has never been to Mexico. In addition, the University of Illinois has a huge collection of material on the Manila-Acapulco trade.

Update. 1996. May 30. Dunnage is the key word, not ballast. Ted does not recall seeing the word "ballast" ever used in connection with soybeans coming to America in ships. Ted came across the word "dunnage" in documents in which the East India Company (and perhaps the Swedish India Company) listed the amount, by weight, that each officer was allowed to trade on their own account. This came about because there was space between the angular cargo chests (loaded with items such as tea or silk) and the curved hold (interior) of the ship. The dunnage, usually kept in cloth bags, could be padded into these irregular spaces. Ted is still looking for a document stating that soybeans were brought to North America as dunnage, but to date he has found not such record. Instead he has found records of all sorts of other rubbish being used as dunnage–bird feathers and the like.

Update. 2000. May 28. All of the original documents relating to the Manila galleons are located in either Seville, Spain, or Mexico City; they are not in Acapulco. Address: Prof. of Plant Genetics, Univ. of Illinois, Urbana, Illinois 61801. Phone: 217-333-9454.

2566. Ford, Ashley. 1990. Milking the soybean: Asian firm opens drink plant. *Province (The) (or The Vancouver Sun) (Canada).* Oct. 3.

• ***Summary:*** "Yeo Hiap Seng Ltd. of Singapore has been turning Ontario's soybeans into high-protein drinks for over two decades... This week, the company will open a $13-million soybean-juice plant adjoining its juice-concentrate plant in Chilliwack... Chalk the investment up to a victory for the U.S.-Canadian free-trade agreement. Yeo says the agreement, plus the availability of high-quality soybeans, persuaded it to put in a plant at Chilliwack...

"In 1988, the company purchased the adjoining Pacific Fruit & Concentrates Ltd. from the East Chilliwack Co-operative for about $3 million. It is now known as YHS Pacific Fruit Concentrates Ltd. Last year, it also purchased Chun King, the oriental food division of RJR Nabisco, based in Windsor [Ontario, Canada]. The new plant will produce 300 cans a minute of a variety of soybean drinks for the Canadian and U.S. markets. The state-of-the art-factory will create 32 new jobs...

"At the beginning of the century [in 1900], family patriarch Yeo Keng Lian began fermenting and selling soya sauce in Fujian province... Initially, soya sauce provided Yeo's business success. In 1955, the company started producing soybean drinks, and has since gone on to produce other foods."

A photo shows Bill Chia showing off the canning line at Yeo's new soymilk plant. Note: This factory is a major Canadian consumer of soybeans for food/beverage use, but about 90% of the finished soymilk is exported to Asia–especially Singapore. Address: Business Reporter, Canada.

2567. Lo, K.S. 1990. New developments at Vitasoy (Interview). *SoyaScan Notes.* Oct. 4. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** The Vitasoy factory opened in Hong Kong on 9 March 1990. The 50th anniversary was celebrated on about 22-23 March 1990 because the Trade Development Exhibition Hall in Hong Kong was booked up so far in advance. Concerning the 50th anniversary history of Vitasoy, the woman author, Choi Po-King, has a PhD from Oxford and is now teaching history in the School of Education at the Chinese University of Hong Kong. She originally approached K.S. Lo with the proposal to do a history of his company in English. She speaks good English, but it is her second language. They decided to do the first edition in Chinese since most of the company's customers are Chinese. Now he thinks he will go back to her and ask her if she would like to do an English-language edition. He has no idea when the English edition will be available.

His company has just finished changing its name. The new name, effective 24 Sept. 1990, is Vitasoy International Holdings Ltd.; the name expresses Mr. Lo's hope that soyfoods "will at all times remain the core of our business."

Mr. Lo has attended the Natural Foods Expo at Anaheim several times. That is probably where he first met John Paino many years ago.

Vitasoy in Hong Kong is doing development work on an aseptic Tetra Pak tofu, but the product is not yet on the market. Mr. Lo has seen the Tetra Pak tofu make by Yeo Hiap Seng in Singapore, but he would not say that it is a top quality product. Yeo tried to sell it in Hong Kong but without much success. It is a hard product to sell to people with a long tradition of consuming tofu. He was not aware that the product was sold in Italy. One of the reasons Vitasoy purchased Nasoya was so that Nasoya could eventually help Vitasoy to make and market an aseptic tofu in America. Address: Chairman, The Hong Kong Soya Bean

Products Co., Ltd., 41 Heung Yip Rd., Aberdeen, Hong Kong. Phone: 5-528211.

2568. Business Trend Analysts, Inc. 1990. The market for salad dressings, sauces and condiments. 2171 Jericho Turnpike, Commack, NY 11725. 275 p. Price: $895.
• ***Summary:*** This is an update of the 1988 edition. Sauces include the following table sauces: Ketchup, meat (incl. steak, worcestershire, vegetable, and seafood sauces), barbecue, Mexican (incl. chili, taco, enchilada, etc.), prepared mustard, and soy and teriyaki. Gravies, dips, and dry sauce mixes are not included. Ketchup is the largest segment. Address: Commack, New York.

2569. YHS Pacific Fruit Concentrates. 1990. YHS Pacific Fruit Concentrates in Chilliwack descendant of 90-year-old family company headquartered in Singapore (News release). Chilliwack, BC, Canada. 2 p. Oct.
• ***Summary:*** Contains a good history of the company. The history up to 1962 is basically the same as that given by Shurtleff & Aoyagi in Feb. 1984. Then it continues: "Throughout the next two decades, Yeo's continued to expand and innovate: this was the first company in the world to pack soya bean drinks in paper tetra-paks using the ultra high temperature process. In addition, the company acquired the franchises for international brands such as Pepsi and 7-Up, Mirinda and Schweppes.

"In 1989, Yeo's purchased Chun King, the oriental division of RJR Nabisco based in Windsor, Ontario, and bought Pacific Fruit & Concentrates Limited located in Chilliwack, B.C.

"Today with associated companies, plants and 4,000 staff members around the globe, and with its products exported to 35 countries, Yeo Hiap Seng Ltd. is still guided by the Yeo family and still adheres to the original formula for success: provide quality products and unite to succeed."

Note: The company's offices and headquarters are in Richmond, B.C. The soymilk plant is located in Chilliwack (population 9,000) about 55 miles to the east, on the south bank of the Fraser River, only about 10 miles north of the U.S.-Canada Border. Address: Chilliwack, BC, Canada. Phone: 604-277-7707.

2570. YHS Pacific Fruit Concentrates. 1990. Fact sheet: YHS Pacific Fruit Concentrates Ltd.: New soya bean drink plant opens (News release). Chilliwack, BC, Canada. 1 p. Plus 2 pages of flow charts. Oct.
• ***Summary:*** "The plant: 80,000 square foot plant on 4.5 acres. Construction and equipment cost: $13 million... Production capacity: 300 cans of soya bean drinks per minute. Employees: 32 full-time. Market: output will go to Canada and the U.S.A. At present, the parent company in Singapore exports the soya bean drink to its North American markets...

"The company: YHS Pacific Fruit Concentrates Ltd. bought from the East Chilliwack Cooperative in 1988 by Yeo Hiap Seng Ltd. of Singapore.

"Yeo Hiap Seng Ltd.: YHS began in 1900 in China manufacturing soya sauce. Canned food production added in the 50s, and in the 70s YHS acquired franchises from Pepsi-Cola International to pack and distribute products. Company now also into prawn farming and Budweiser beer distribution." Address: Chilliwack, BC, Canada. Phone: 604-277-7707.

2571. Yu, Angie Elinon Yu. 1990. Re: Cherry Food Industry, APY Food Processing, and promoting tofu in the Philippines. Letter to William and Akiko Shurtleff at Soyfoods Center, Nov. 14. 2 p.
• ***Summary:*** "Sometime in the late 70's, you visited my parents-in-laws Tofu factory, then known as Cherry Food Industry here in the Philippines. I am married to their second, Jerry Joseph.

"The tofu business of my parents-in-law is still active but now registered under a new name, APY Food Processing, but located in the same address (74 Speaker Perez St., Santa Mesa Heights, Metro Manila). The plastic container of the Nippon Tofu (silken tofu), however, still carries the old name."

She and her husband operate a computer services firm. One of their business clients is Shoemart, a big chain of supermarkets, which is selling Nippon Tofu and other tofu products made by APT Food Processing. Shoemart has asked Angie and her husband to operate a portion of their Gourmet Shop (which presently has a salad bar and a Japanese sushi bar) located in the middle of their newest supermarket. They have agreed to do this

"I personally feel that the level of market awareness of what tofu really is, is relatively low. I have always suggested to my in-laws to invest in educating the market about it since five years ago. However not much has been done. By presenting our products in this Gourmet Shop we have found a vehicle to do exactly this."

She asks Shurtleff for ideas on promoting the use of tofu, and for updated materials. And she invites him to visit them any time.

"Our store will start operating on November 28 of this year. All information materials that I release to the public will be based on your Book of Tofu (1979). I bought a copy of it when I was in your country (New York) in 1988. I learned from my husband that you gave his parents an autographed original copy of the same book." Address: Elinon Yu EDP Services, International Corporation, 61 West Capitol Drive Bo, Kapitolyo, Pasig, Metro Manila, Philippines. Phone: 631-9451.

2572. Wei, Lun-Shin. 1990. Re: Work with soyfoods in India and visit to Vietnam. Letter to William Shurtleff at

Soyfoods Center, Dec. 9. 2 p. Typed, with signature.
• ***Summary:*** In January, Dr. Wei went to Bhopal, India, for more than 2 months, working as a consultant for Winrock International on a soy utilization project. After the hard work, he visited his family in Taiwan and friends in Japan.

In April and May Dr. Wei, and his wife Tam, visited Vietnam, Tam's native country, which she has not seen for 44 years. Dr. Wei helped to make the trip possible by accepting an offer to teach at Can Tho University in the Food Science Department. Tam spent her time with family and friends. They stopped over in Thailand on the return trip to the USA. Address: Dep. of Food Science, Univ. of Illinois, Urbana, IL 61801. Phone: 217-367-4933 HM.

2573. Bureau of the Census, U.S. Department of Commerce. 1990. The Asian population of the United States in 1990 (Overview). *SoyaScan Notes.* Compiled by William Shurtleff of Soyfoods Center. [1 ref]
• ***Summary:*** According to the 1990 census, the population of the United States was 248.7 million, up 9.8% from 1980. The Asian population is as follows: Total Asian and Pacific Islander 7.273 million (2.9% of the total, up 107.8% from 1980). Total Asian from traditional soy-consuming nations 5.524 million (2.2% of total, up about 100% from 1980!). Chinese 1.645 million (0.7%, up 104.1%). Filipino 1.407 million (0.6%, up 81.6%). Japanese 847,562 (0.3%, up 20.9%). Korean 798,849 (0.3%, up 125.3%). Vietnamese 614,547 (0.2%, up 134.8%). Hawaiian 211,014 (0.1%, up 26.5%).

2574. Carambas, N.M. 1990. The underrated soybean industry. Center for Research and Communications, Philippines. CRC Agribusiness Papers. *

2575. Karta, Susani K. 1990. Critical and variable factors in tofu processing. American Soybean Assoc., 541 Orchard Rd., #11-03 Liat Towers, Singapore 0923, Republic of Singapore. Technical Bulletin Vol. HN10. *
• ***Summary:*** Discusses the critical factors affecting product quality and quantity. The various types of tofu are categorized according to protein content. There is need for more research on increasing the shelf life of tofu. Address: American Soybean Assoc., 541 Orchard Rd., #11-03 Liat Towers, Singapore 0923, Republic of Singapore.

2576. **Product Name:** Tofu, Soymilk, Fried Tofu, Soft Tofu, and Tofu Pudding.
**Manufacturer's Name:** Tan Tan Tofu.
**Manufacturer's Address:** 15084 Weststate St., Westminster, CA 92683. Phone: 714-895-3565.
**Date of Introduction:** 1990.
**New Product–Documentation:** Talk with Dana Jacobi of New York City. 1998. April 14. Tan Tan Tofu in southern California makes various types of tofu, including a delicious silken tofu, which she bought at Ranch 99, a Chinese supermarket chain in the Los Angeles area. The tofu pudding came curded in a one-quart plastic container (it filled the container like yogurt) with a caramel-colored ginger-flavored syrup on top in a little ½-pint Styrofoam cup with a plastic lid. To serve: Spoon the silken tofu into a bowl, pour the syrup over the top, and enjoy.

Talk with Kim Lai, manager of Tan Tan Tofu. 1998. April 15. This tofu company, run by Vietnamese-Americans, started making tofu in 1984 in San Diego, California. In 1990 they moved to their present location in Westminster, California. In Vietnamese soft tofu is called *Dau-hu wien* and tofu pudding is called *Dau-hu duong.*

2577. Viviani, Tj.; Arsyad, Herman. 1990. Penuntum pengolahan kedelai [Manual for soybean processing]. Indonesia: pd Mahkota. [Ind]*
Address: 1. Ir.; 3. Ir.

2578. Asian Vegetable Research and Development Center. 1990. International cooperation. *Progress Report* p. 110-114. For the year 1988. *
Address: Shanhua, Taiwan.

2579. *CGPRT Working Paper.* 1990. CGPRT crops in Indonesia: 1960-1990. A statistical profile. No. 4. xv + 63 p. 25 cm.
• ***Summary:*** Contains a wealth of statistical data indicating progress of maize, soybean, groundnut, mungbean, cassava, sweet potato, and rice is presented. It draws upon a newly established statistical database and provides unique data sets such as district level development in production over 20 years in selected provinces in Indonesia. Moreover, it presents wholesale and farmgate prices movements based on monthly averages of major crops. The report presents a fraction of the data available in the database of the Centre. Supplementary data can be made available on request.

Table 5 shows that soybean production in Indonesia has increased from 339,000 tonnes in calendar year 1957 to 1,151,000 tonnes in 1987. During this time, the yield has grown from 646 kg/ha to 1,056 kg/ha.

Table 15 shows that Indonesia's top soybean producing provinces in 1987 were East Java (413,394 tonnes), Central Java (135,907), Lampung (117,698), and Aceh (102,402). Within East Java in 1987, the top soybean producing districts were Jember (71,675), Banuwangi (44,675), Pasuruan (35,686), and Lumajang (30,909).

Tables 36 and 37 shows the retail prices of tofu and tempeh each month in Rp/kg from 1981 to 1988 in Surabaya. The prices have more than doubled during this period. Retail prices for these foods in Bandar Lampung are shown in tables 40 and 41.

Table 43 shows Indonesian imports and exports of soybeans and soybean cake from 1963 to 1988. Soybean

exports, which reached a peak of 36,000 tonnes in 1973, have been at or near zero since 1978. Soybean imports have climbed dramatically since 1971, reaching a record 465,839 tonnes in 1988. Thus imports that year were equal to about 40% of domestic production. Exports of soybean cake have always been negligible but imports have risen steadily since 1975, reaching a peak of 306,716 tonnes in 1986, then dropping to 72,323 tonnes in 1988.

Table 50 shows the total supply and domestic utilization of soybeans in Indonesia from 1968 to 1987. In 1987, of the 1,411,000 tonnes available, 3% was used for seed and the rest was used for food. None was used for feed or use in non-food industrial products. Per capita availability of soybeans increased from 3.28 kg/year in 1968 to 7.76 kg/year in 1987. In the peak year, 1986, it was 8.80 kg/year.

Table 56 shows consumption per capita of GCPRT crops in Indonesia from 1981 to 1987. Tofu consumption has increased from 74 gm/week in 1981 to 82 gm/week in 1987, while tempeh consumption has decreased from 95 gm/week in 1981 to 86 gm/week in 1987. Address: CGPRT Centre, Jl. Merdeka 145, Bogor 16111, Indonesia.

2580. Darmosuwito, Suhadi. 1990. Hasil penelitian keragaman dalam proses fermentasi tempe [Results of research on the diverse tempeh fermentation processes]. Yogyakarta, Indonesia: Laboratorium Mikrobiologi, Fakultas Pertanian, Universitas Gadjah Mada. iv + 31 leaves. 28 cm. [Ind]*
• ***Summary:*** This national government publication includes bibliographic references (leaves 17-18). Address: Yogyakarta, Indonesia.

2581. Facciola, Stephen. 1990. Cornucopia: A source book of edible plants. Vista, California: Kampong Publications. ix + 678 p. Indexes (six!). 28 cm. [522* ref]
• ***Summary:*** "In your hands is one of the most remarkable efforts to come out of the struggle to preserve the genetic diversity of our planet... Steve Facciola has put together an easy-to-understand, easy-to-use compendium of the diversity of food plants available to consumer, gardener and scientist" (from the Preface). The largest and most comprehensive work of its kind, this book gives details on 3,000 edible plant species and 7,000 varieties.

Contents: Preface, by Noel Vietmeyer. Introduction. Acknowledgements. Botanical listings: Alphabetical listings of plant families *(Glycine max* and *Glycine tabacina* are listed in the family Fabaceae, pronounced fuh-BAY-see), fungi families, algae families, bacteria families. Cultivar listings (by common name for the most important and popular crops, e.g., shiitake, soybean, spinach, sprouting seeds). Sources (names, addresses and phone numbers of firms that sell seeds, plants, etc.: Domestic commercial, domestic non-commercial, overseas commercial, overseas non-commercial). Bibliography. Indices and appendixes: Index of principal vernacular names. Index of vernacular and other names occurring elsewhere in the text. Index of usage and edible parts. Index of species native to or naturalized in North America. Index of species not listed in Kunkel [Gunther Kunkel. 1984. Plants for human consumption. Koeltz Scientific Books, Germany]. Index of families and genera. Appendix A: Abbreviations used–For type of product offered, for annotated bibliographical citations, in descriptions for sources. Appendix B: Endnotes used in the cultivar listings.

As of Aug. 1994 an electronic version of this book is now available. It runs on Microsoft Windows and uses more than 25,000 hypertext links to cross reference information.

The main information on soybeans is found on pages 91 (Botanical listings for *Glycine max* and *Glycine tabacina),* p. 219 *(Aspergillus oryzae* culture), p. 221 *(Actinomucor elegans* culture for fermented tofu or sufu, and *Rhizopus* cultures for tempeh), p. 224 *(Bacillus subtilis* culture for natto), p. 482-83 (for "field soybeans," lists 5 black-skinned cultivars, and 7 yellow-skinned cultivars; plus 11 "vegetable soybeans"–Agate, Butterbeans, Envy, Extra Early, Fiskeby V, Hahto, Hakucho Early, Kanrich, Okuhara Early Green, Prize, and White Lion), p. 485-87 (sprouting seeds including soybean sprouts with directions for sprouting), and p. 500 (Soyfood cultures).

Additional information on food uses of soybeans is found throughout the book. Tofu: p. 9 (In Indonesia, a salt derived from the fruit of *Rhus javanica (Nurude, Mu-yen)* is used to coagulate tofu), p. 61 (In Japan the seeds of *Cannabis sativa,* called *asanomi,* are used in deep-fried tofu burgers *(ganmodoki)),* p. 76 (A vegetable curd similar to soybean tofu can be made from the seeds of the bottle gourd or calabash *(Lagenaria siceraria)),* p. 92 (The seeds of the Bonavista bean or hyacinth bean *(Lablab purpureus)* can be prepared as tofu), p. 127 (The seeds of okra, gumbo, or lady's finger *(Abelmoschus esculentus)* can be made into tofu or tempeh). Kecap (Indonesian soy sauce): p. 9 (In Indonesia, the plant tuberose *(Polianthes tuberosa)* is added to the substrate in making kecap), p. 191 (In Indonesia, fresh leaves of kaffir lime, also called ichang lime, makrut, or djeruk purut *(Citrus hystrx)* are used to flavor kecap). Miso: The following can be used as a substrate for miso–p. 88 (Peanuts), p. 94 (seeds of the velvet bean, also called cowitch, cowhage, benguk *(Mucuna pruriens)),* p. 155 (barley *(Hordeum vulgare)),* p. 156 (proso millet *(Panicum miliaceum)).* Address: 1870 Sunrise Dr., Vista, California 92084. Phone: (619) 726-0990.

2582. Hammer, K.; Esquivel, M. 1990. East Asian influences in Cuban agriculture. *Plant Genetic Resources Newsletter (FAO/IBPGR)* No. 77. p. 9-16. [15 ref. Eng]
• ***Summary:*** "Virtually the entire aboriginal population of Cuba was wiped out in the first years of the Conquest. The

introduction of African slaves supplied the alternative labour needed to develop agriculture in Cuba. Thus by 1861 nearly 60% of the Cuban population was either black or mulatto. By then, slave revolts had become increasingly common, jeopardizing the economic stability of Cuban agriculture. From its founding in 1794, the Junta Real de Fomento, Agricultura y Comercio (Royal Board of Development, Agriculture, and Trade) tried to boost the numbers of non-Africans in Cuba, which led to the traffic in Asiatics in 1847 and Yucatecan Indians in 1849.

"After 1842, large numbers of Chinese were sent to the English colonies of Barbados, Jamaica and Trinidad. The Real Junta de Fomento, noting this, sent a representative to China in 1844 to negotiate the introduction of Chinese settlers into Cuba. A contracting agency for coolies destined for Cuba was set up, operating in Macao, Among, Swataw [Swatow], Hong Kong, and Wompoa. The coolies travelled through Manila in the Philippines. On 1 January 1847, the first lot of 1,073 Chinese immigrants docked in the port of Havana. They consisted, *inter alia*, of farmers, artisans and tradespeople. By 1861, there were already over 60,000 Chinese from Shanghai and Canton, and it is estimated that between 1853 and 1873 alone, 132,435 Chinese entered Cuba. Basically, these people worked in the agricultural sector. Many tradespeople and artisans remained in Havana, creating a little Chinatown in the Zanja Street neighbourhood, while on the outskirts of Havana, a place known as Cienaga in the Cerro district was settled by farmers who came to grow almost all the vegetables for the capital. A major settlement of Asian vegetable farmers also developed south of Havana, in Batabanó province.

"The Japanese were only a small minority among the Asiatic immigrants to Cuba, concentrated in a few places such as the Isla de la Juventud (formerly Isla de Pinos), where they have played a major role in the development of local fruit and vegetable cultivation. We have no detailed information on their arrival in Cuba, but their presence on the Isla de la Juventud goes back at least three generations, according to our information."

According to Roig (1975), the soybean was introduced to Cuba in 1904 by the EEA *(Estación Experimental Agronómica de Santiago de Las Vegas,* currently INIFAT, the Experimental Agronomical Station) from the USA, but it was possibly already found in the Isla de la Juventud, used by the Japanese to prepare a kind of cheese called 'tofu.' (dau phu in Vietnamese).

Note: This journal is published by the Food and Agricultural Organization of the United Nations / International Board for Plant Genetic Resources. Address: 1. Zentralinstitut fuer Genetik und Kulturpflanzenforschung der Akademie der Wissenschaften der DDR, DDR-4325, GDR; 2. Instituto de Investigaciones Fundamentales en Agricultura Tropical 'Alejandro de Humboldt', INIFAT, Santiago de las Vegas, Havana, Cuba.

2583. Maesen, L.J.G. van der; Somaatmadja, Sadikin. eds. 1990. Plant resources of South-East Asia 1: Pulses. ESCAP CGPRT Centre, Jalan Merdeka 99, Bogor, Indonesia. 105 p. Originally published at Wageningen, the Netherlands, 1989. Index of scientific plant names. Index of vernacular plant names. 25 cm. [57* ref]

• ***Summary:*** This publication deals with pulses currently being used and those whose role could be expanded in South-East Asia. Pulses are defined here as the dry edible seeds of legumes, which are members of the family Leguminosae.

Contents: Editors and contributors. Prosea project personnel. Foreword. Introduction. Definition of pulses. Role. Botany: Taxonomy and wild relatives, morphology, growth and development. Ecology: Climates, soils. Agronomy: Place of pulses in cropping systems, sowing practices, management. Breeding and genetic resources. Prospects. Alphabetical [by scientific name] treatment of species: groundnut, pigeon pea, chickpea, soya bean, lablab *(Lablab purpureus)*, grass pea, lentil, horse gram, tepary bean, runner bean, lima bean, common bean, pea, faba bean, moth bean, adzuki bean *(Vigna angularis)*, a re *(Vigna dalzelliana)*, black gram *(Vigna mungo)*, mungbean *(Vigna radiata)*, bambara groundnut *[Voandzeia subterranea* (L.) Thouras var. *subterranea]*, rice bean and cowpea. Information on minor pulses. Legumes only occasionally used as a pulse. Literature [bibliography]. Glossary [extensive explanation of the terms used]. Acronyms of organizations. Acknowledgements. Sources of illustrations. The Prosea project.

The section on soya bean (p. 43-47) was written by S. Shanmugasundaram & Sumarno, under the following headings: Synonyms. Vernacular names. Origin and geographic distribution. Uses. Production and international trade. Properties. Description. Growth and development. Other botanical information. Ecology. Propagation. Husbandry. Diseases and pests. Harvesting. Yield. Handling after harvest. Genetic resources. Breeding (including wild soybeans and perennial Glycine species). Prospects. Literature.

"Prosea, short for 'Plant Resources of South-East Asia,' is an international project focused on South-East Asia. Its purpose is to make available the wealth of dispersed knowledge of plant resources for eduction, extension, research and industry through an illustrated multivolume handbook."

Note: As of 1995 the spelling of Bambara/Bambarra has apparently not been standardized. The AGRICOLA database shows the following number of records containing various spellings: Bambara groundnut 40, Bambarra groundnut 23, Bambara groundnuts 5, Bambarra groundnuts 2. The plant's scientific name is now *Vigna subterranea.* Address: 1. Netherlands; 2. Coordinator for Legume Crops,

Central Research Inst. for Food Crops (CRIFC), Bogor, Indonesiaesia.

2584. Nene, Y.L.; Hall, Susan D.; Sheila, V.K. eds. 1990. The pigeonpea. Oxon, England: CAB International for; Patancheru, AP, India: International Crops Research Institute for the Semi-Arid Tropics (ICRISAT). x + 490 p. Illust. Index. 25 x 20 cm. [500+* ref]

• ***Summary:*** Contents (18 chapters, including): Foreword. Contributors. Acknowledgements. 1. Geography and importance. 2. Origin, history, evolution and taxonomy. 16. Nutrition and products. 17. Markets and outlook.

Pigeonpea *(Cajanus cajan* (L.) Millspaugh), a major grain legume, is widely grown as a backyard subsistence crop by small farmers in the semi-arid tropics. Worldwide, it ranks sixth in area and production compared with other grain legumes, All evidence indicates that the pigeonpea originated in Peninsular India. Today India produces more pigeonpeas than all other countries combined. The word "pigeonpea" probably originated in the Americas, where it arrived in the 15th century, because pigeons were fond of the seeds.

Chapter 16, "Pigeonpea: Nutrition and products," by D.G. Faris and U. Singh (both of ICRISAT; 126 refs = many tables and photos) includes the following contents: Introduction. Nutrition. Supplementation value of pigeonpea in cereal-based diets. Nutritional quality of vegetable pigeonpea. Cooking quality. Human food: Whole dry seed (the tough seed coat results in a long cooking time "but is free from the lipoxidase that causes off-flavours in soybean..."), dhal, other products from dry seed (freshly sprouted seed {sprouts}, tempeh {made with a combination of pigeonpea and soybean; see photo}, pigeonpea sauce (ketchup) is a replacement for soysauce in Indonesia, canned whole dried seed, pigeonpea flour, extruded food, clear noodles). Vegetable (green seed {used as a green vegetable, often in place of green garden peas}, green pods). Animal feed. Medicinal uses ("There is a considerable folk medicine and ayurvedic listing of the curative effects of various parts of the pigeonpea plant"). Future. Address: 1. Deputy Director General, ICRIAT, Hyderbad, India.

2585. Tahu tempe: Pembuatan, pengawetan dan pemanfaatan limbah [Tofu and tempeh: Production, preservation and waste usage]. 1990. Bogor, Indonesia: Pusat Penelitian dan Pengembangan Teknologi Pangan, IPB. 33 p. Illust. 23 cm. [Ind]*
Address: Bogor, Indonesia.

2586. Titsingh, Isaac. 1990. The private correspondence of Isaac Titsingh, Vol. 1 (1785-1811). Introduced and edited by Frank Lequin. Amsterdam, Netherlands: J.C. Giebon. Index. 24 cm. Series: Japonica Neerlandica vol. 4. [3 soy ref. Dut]

• ***Summary:*** Text chiefly in Dutch, with some correspondence in English. Isaac Titsingh was born on 10 Jan. 1745 in Amsterdam, and died on 2 Feb. 1812 in Paris. He was buried in Père-Lachaise cemetery. The inscription on his gravestone, written in French, states: Here lies Isaac Titsingh, formerly a councillor of the Dutch East India Company, Ambassador to China and to Japan. Died at Paris the 2nd of February 1812, aged 68 years.

This book, dedicated warmly to Prof. C.R. Boxer, begins with a 17-page "General introduction," by the author, in English. It discusses: Titsingh's life and work, the nature and content of his correspondence, the manuscripts, and notes on the text. This introduction show Titsingh as a truly remarkable man, 50-100 years ahead of his time, and a pioneer at the dawn of understanding between Japan and Europe. Titsingh loved Japan, and that love opened doors to him that were closed to mere merchants.

Brief biography (p. xv-xxii): Titsingh was born in 1745 into an affluent, "well-educated patrician family in Amsterdam which counted a number of well-known surgeons among its members. Isaac Titsingh first qualified as a surgeon in Amsterdam, then obtained a doctorate in law at Leiden. In 1765, at age 20, he set sail for Asia as an *Onderkoopman* (Junior Merchant) with the Dutch East India Company *(Verenigde Oostindische Compagnie,* VOC). In Asia, he first worked as an administrator in Batavia (today's Jakarta, head of VOC's Asian operations), then he spent a total of 3½ years in Japan, divided over three separate stays from Aug. 1779 to Nov. 1784, as *Opperhoofd* or *Kapitan,* Director of the VOC trade there. At this time, Holland was the only Western nation allowed to enter or trade with Japan; the VOC was confined to the tiny man-made island of Deshima in the Bay of Nagasaki on the southern Japanese island of Kyushu–where they could be constantly watched and their actions tightly controlled by Japanese authorities. While in Japan, Titsingh paid two official visits to the Shogun's Court at far-away Edo (today's Tokyo). He also visited the Emperor's Court at Kyoto. From 1775 to 1792 he was Director of VOC's trade in Bengal; he resided at Chinsurah, near Calcutta. "In that period he [learned to speak English] and made many good English friends, who later proved a great asset to him." From 1792 to 1793 he returned to Batavia, this time as *Raad-Extraordinaris* (Councillor Extraordinary) of the Indies. From 1794 to 1795 he served as ambassador to the Imperial Court at Peking; he attended the 60th anniversary of the reign of the Qianlong Emperor. In 1796, Titsingh finally returned to Europe after a brilliant stay of 31½ years in Asia. After a brief stay in London, he spent the last years of his life as a largely unknown recluse in Paris.

"Titsingh had a brilliant career, but he was not a typical careerist. He was one of the top VOC officials in the Orient, but he was not a typical VOC employee. He was deeply interested European-Japanese academic and cultural

relations. "Titsingh's position was unique." The Enlightenment (ca. 1650-1750) was now well established in Europe and he helped to foster the interests of a number of Japanese pioneers who were interested in learning more about Holland *(Rangakusha)* and about European culture, and in opening up Japan to the outside world. Titsingh took an equally deep interest in learning more about Japan–but in a systematic and objective way, trying to eliminate the many Western prejudices about Japan. "Titsingh taught a number of Japanese to read and write Dutch, and he himself learned Japanese"–he was a prodigy at learning languages. He helped supply Dutch books in the fields of medicine, science, the arts, etc. to the *Rangagusha* and with some of them he became lifelong friends and correspondents. He developed a large collection of Japanese objects; he was granted the rare permission to take these (and a map of Japan) back to Europe. Charles Boxer described Titsingh as "the most learned of all the Hollanders who visited that country [Japan] during the two centuries and a half in which" the VOC was active there. George Sansom, the great Japanologist, described Titsingh as "a man of all-around accomplishment." For much more about Titsingh, read this General Introduction.

Volume I of book contains 215 letters relating to the period 1785-1811. Of these, three mention soy [sauce]. but only in passing. (1) Letter no. 5 of 24 Nov. 1785 (p. 9) *("...een provisie van sacky, soya en andere Japansche producted toetezended,...).*

(2) Letter no. 16 of 21 June 1786 (p. 27) *("295 kruyken Zooija. 100 kruyken Zackij...").*

(3) Letter no. 55 of 19 June 1789 (p. 124) *("...en kon gen balij zakij or zooija na boord krijgen").*

Note: Engelbert Kaempfer (1651-1716) traveled and worked in Japan for two years from Sept. 1690 to Nov. 1692 as chief surgeon to the Dutch East India Co. (VOC). While in Japan, he twice visited Edo and the Shogun Tokugawa Tsunayoshi there. His tact, diplomacy and medical skill overcame the cultural reserve of the Japanese, and enabled him to elicit much valuable information.

2587. **Product Name:** Ceresoy.
**Manufacturer's Name:** Filipro, Inc.
**Manufacturer's Address:** Philippines.
**Date of Introduction:** 1990?
**New Product–Documentation:** Michael Loh. 1990. "An overview of export opportunities in the new markets." Filipro, Inc., which is the Philippines' licensee for Nestle S.A., reported increasing market acceptance of its re-launched powdered soya milk product Vita (chocolate flavor), and a soy-based baby cereal named Ceresoy.

2588. Agranoff, Jonathan. 1991. Tempe–The unique soyfood of Indonesia. *Garuda Indonesia* 11(1):31-32, 34, 36. [1 ref]

• ***Summary:*** This article is in the in-flight magazine of Indonesia's national airline. The author "has been researching indigenous fermented foods in Indonesia and London University since 1985. A graduate of Food Science, he has worked for the Green Indonesia Foundation in West Java, subsequent to beginning research on tempe at the Nutrition Research and Development Centre in Bogor." Contents: Introduction, High quality protein source. What is tempe? A well travelled food (history of tempeh). Village "biotechnology." Red onchom and other varieties. Contains 6 photos related to tempeh. Address: Overseas Development Natural Resources Inst., England.

2589. Golbitz, Peter. 1991. Soyfoods consumption in the United States and worldwide: A statistical analysis. Bar Harbor, Maine: Soyatech, Inc. 26 p. *

• ***Summary:*** The National Cancer Institute, through Prospect Associates (a subcontractor), asked Mr. Golbitz to compile this report, largely from published sources. It contains 12 numbered pages of information and text summary and 14 unnumbered pages of tables. It contains retail soyfoods information for the past 10 years, FAO published data (Soybeans and Products Food Balance Sheets; published every 3 years), tons of soybeans used to make tofu in major Asian nations, number of U.S. manufacturers of soyfoods products 1984 and 1989, where the various soyfoods are sold in America (health/natural food stores, Asian-American food stores, supermarkets, institutional foodservice). It is not clear whether or not the report is in the public domain.

The estimated annual per capita consumption of soybeans, directly and indirectly as soyfoods, is as follows: Taiwan 13 kg, Japan 10.8 kg, Korea 9.0 kg, Indonesia 6.3 kg, and China 3.4 kg. Address: P.O. Box 84, Bar Harbor, Maine 04609.

2590. Tetra Pak Inc. 1991. Use of UHT/Aseptic white dairy milk in Europe and other countries, 1989. 889 Bridgeport Ave., Shelton, CT 06489. 2 p. Feb. 5. Unpublished manuscript.

• ***Summary:*** The following statistics are from Tetra Pak Statistics in Lausanne, Switzerland. In western Europe, 27,896 million liters of milk are consumed in total. Of this, 24,108 million liters are consumed in the eleven EEC countries. Countries not in the EEC are Austria, Cyprus, Finland, Iceland, Norway, Sweden, Switzerland, and Turkey. The four countries with the largest total milk consumption are the UK (6,687 million liters), France (3,735), Spain (3,624), and Germany (3,470). Of the all the milk consumed in Europe, 9,660 million liters (35% of the total) is packaged in UHT/Aseptic cartons. Of the all the milk consumed in the EEC, 9,376 million liters (39% of the EEC total) is packaged in UHT/Aseptic cartons. The four countries in which UHT/Aseptic packaging is most widely

used are France (3,000 million liters; 80% of all milk in France), Spain (2,125; 59%), Germany (1,578; 45%), and Italy (1,497; 52%).

Outside of Europe, the world's biggest dairy milk consumers are: USA (24,429 million liters; 0.2% UHT/ Aseptic), India (5,001; 0.4%), Japan (4,803; 4%), Mexico (2,895; 8%), and Canada (2,504; 0%). Countries with the highest percentage of UHT packaging are Yemen (39 million liters of milk consumed; 95% in UHT), Pakistan (97; 92%), Saudi Arabia (158; 82%), Thailand (34; 70%), Singapore (28; 64%), and Chile (151; 61%). Address: Shelton, Connecticut.

2591. Hymowitz, Ted. 1991. The earliest records on soybeans in Indonesia (Interview). *SoyaScan Notes.* Feb. 12. Conducted by William Shurtleff of Soyfoods Center. [1 ref]

• ***Summary:*** Ted just returned from a trip to Indonesia. The earliest document seen (Dec. 2007) concerning soybeans in Indonesia is *Herbarium Amboinense [The Flora of Amboina]*, by Rumphius (1747, Vol. 5), in which he discusses the soybean under Cadelium. There can be no doubt that the soybean was brought to Indonesia by the Chinese. Ted's colleagues in Indonesia feel that if a researcher wants to find records of the soybean before Rumphius, they will have to dig through the early Chinese literature. Address: Prof. of Plant Genetics, Univ. of Illinois, Urbana, Illinois 61801. Phone: 217-333-9454.

2592. Kerntke, Ulrich. 1991. Soya: Not just for eccentrics. *Dragoco Report* No. 3. p. 83-97. [5 ref. Eng]

• ***Summary:*** An interesting overview of soybean production worldwide and the markets for tofu and soymilk in Europe. Figure 1 is a bar chart ranking countries that produce more than 1 million tonnes of soybeans by their yields in tonnes per hectare. The country with the highest yield by far is Italy (approx. 3.1 tonnes/ha), followed by Canada (2.3), USA (2.2), Argentina (2.1), Paraguay (1.8), Brazil (1.7), China (1.3), Indonesia (1.1), and India (0.8 tonnes/ha). Figure 2 is a graph of soybean production in 4 major countries and others from 1935 to 1990. Figure 3 shows world market share of soybean production among 4 major countries and others from 1935 to 1990. The U.S. market share grew steadily until about 1965, but has fallen ever since. Brazil's market share showed significant growth after 1965, and Argentina's after 1975. Figure 4 shows the number of countries producing more than 100,000 tonnes of soybeans from 1935 to 1990. This number stayed steady at about 6-7 from 1935 to 1965, then rapidly increased to 15 in 1975 and 27 in 1990. Figures 6 and 7 are bar charts showing consumption of tofu in 1986, with projections to 1992 in France, Great Britain, Germany, Netherlands, and the rest of the EC (especially Switzerland). In 1992 for tofu, Germany is expected to be the leader followed by Great Britain and France. For soymilk, Great Britain is expected to be by far the leader, followed by Germany and France. The source of the tofu and soymilk information is Institut für Agrarpolitik, Stuttgart. Address: Product Manager, Flavor Div., Dragoco, Gerberding & Co. GmbH, D-3450 Holzminden, Germany. Phone: (05531) 704 327.

2593. Fehlberg, Eric C. 1991. The sale of Granose Foods to the Haldane Foods Group and British Arkady Ltd. (Interview). *SoyaScan Notes.* April 30. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** The sale of Granose took effect from 1 Jan. 1991. At the time of the sale, Granose was doing very well financially. The only year that they didn't break even or make a profit was 1990. At the beginning of 1990 they moved from their old building into the new one; the expenses connected with the move took upmost of their profits. In all other recent years they have been making good money, and a portion of that money has been contributed to the church. Mr. Fehlberg cannot understand why the church would sell such a thriving company.

But the board of the directors of the British Union of the Seventh-day Adventist church got an offer (which was a little bit of back-door work) that was too good to refuse, so they looked at it in their committee meeting and decided to accept it. They have a good understanding of all aspects of the company. This is the second long-established Seventh-day Adventist food company that has been sold by the church during the last 2 years. Loma Linda Foods was sold to Worthington Foods in Jan. 1990. Most of the employees of Granose have stayed with the company after the sale. Peter Archer, the former general manager, has stayed but is no longer the general manager. He is now marketing manager. The church no longer has any involvement with Granose at all.

We cannot say that these two sales are the start of a trend, but he is quite sure that the four Scandinavian Adventist food companies (Nutana in Denmark, Sweden, Norway, and Finland) will be the next to be sold. Nutana-Sweden is in considerably better financial shape than the other three, and Nutana-Finland is in pretty good shape. Nutana in Denmark and Norway are losing money and are very much in trouble. But he thinks that can easily be corrected if they get their costing straight and price their products based on their real costs. The man who has gone in to make these changes, Jan Paulsen, has as good a chance of succeeding as anyone, but he works out of London, England and does not have a much time for the health food work. He feels that the church should not be in the business of selling healthy foods. He influenced the board of the British Union in their decision to sell of Granose.

After the Scandinavian Nutana companies, the Egypt Food Factory, run by Mokhtar Nashed in Helipolois, Cairo, Egypt may well be the next to go, probably within the next

few months. They used to make soymilk but he thinks they no longer are making it. Their products are "sub-standard" but still good. Superbom in Brazil is also having a hard time because of the adverse exchange rate and the desire to borrow money from the church. Superbom Chile is also having some problems.

But many of the Adventist food companies definitely will not be sold by the church in the foreseeable future. In fact, in the Far Eastern Division, a new food company in Hong Kong, run by Mr. Menzies, is scheduled to start selling products in early June of 1991. A new company is also starting in Thailand. Sahm Yook in Korea is also very successful, as is DE-VAU-GE in Germany and Sanitarium Foods in Australia. The food companies in Central America (Mexico, Costa Rica) and the Caribbean (Trinidad) are all doing well.

There are various administrative "Unions" within the Seventh-day Adventist Church. There are 4-5 unions in North America, 4 in Australia, many in South America, etc. The South American ones report to one central office in Brasilia, Brazil. The Central American food companies report to Miami, Florida. Sometimes a company manager and the head of the Union (a church official to whom he reports) have different ideas of what needs to be done at the company. These two men live in two different worlds, yet both have input in running the company. This can be a cause of business problems. The Mormon church owns some food companies and has the same type of problems. Address: Director, International Health Food Assoc., Seventh-day Adventist General Conference, 12501 Old Columbia Pike, Silver Spring, Maryland 20904. Phone: 301-680-6674.

2594. Paine, Heather. 1991. Soya and SIAL '90: Editorial. *SoyaFoods (ASA, Europe)* 2(1):1. Spring.
• ***Summary:*** "Last year's SIAL (Salon International de L'Alimentaire) was certainly impressive and all the more so because soyafoods and products containing soya had a remarkably good presence... French soyafoods companies were well represented with many new products... In the 'new products' section a soya-oil based margarine from Denmark (Margarines AMA-Dragsbaek Margarine Fabrik S A) won a SIAL D'Or award and a soyamilk from Argentina (AdeS) was highly commended." Address: editor, SoyaFoods, 27a Santos Rd., London SW18 1NT, UK. Phone: 081-874-5059.

2595. Lee, H.P.; Gourley, L.; Duffy, S.W.; Esteve, J.; Lee, J.; Day, N.E. 1991. Dietary effects on breast-cancer risk in Singapore: Epidemiology. *Lancet* 337(8751):1197-1200. May 18. [20 ref]
• ***Summary:*** This case-control study of diet and breast cancer in Singapore showed a decreased risk to be associated with high intake of soy products. "It is suspected that diet influences the risk of getting breast cancer. A study of diet and breast cancer was done among 200 Singapore Chinese women with histologically confirmed disease [breast cancer] and 420 matched controls... In premenopausal women, high intakes of animal proteins and red meat were associated with increased risk. Decreased risk was associated with high intakes of polyunsaturated fatty acids (PUFA), beta-carotene, soya proteins, total soya products, a high PUFA to saturated fatty acid ratio, and a high proportion of soya to total protein." Thus, soy products protected younger women (but not postmenopausal women) against breast cancer.

Note: The traditional low-fat Japanese diet is rich in soyfoods, and the rate of breast cancer and prostate cancer among the Japanese is one fourth that of Americans. But several studies of Japanese women have failed to link their lower breast cancer risk to consumption of soyfoods. Address: 1&5. Dep. of Community, Occupational and Family Medicine, National Univ. of Singapore, Lower Kent Ridge Road, Singapore 0511; 2. Gleneagles Hospital, Singapore; 3&6. Cambridge, UK.

2596. **Product Name:** Soft Tofu Cake, Fried Tofu.
**Manufacturer's Name:** Binh Minh Tofu Manufacturing.
**Manufacturer's Address:** 1180 Tully Rd., Unit B., San Jose, CA 95122. Phone: 408-279-3655.
**Date of Introduction:** 1991. May.
**How Stored:** Refrigerated.
**New Product–Documentation:** Talk with Helen Raymundo. 1996. May 28. She is a registered nurse who was born and raised in the Philippines, now who lives in Fremont, and saw a television program about this tofu company recently.

Talk with Binh Tran, owner and founder. 1996. May 28. He is a Vietnamese-American. Tran is his family name. He started this company in May 1991. His is now the largest tofu maker in San Jose. When the company started, they made only soft tofu and fried tofu. These are all Vietnamese soy products and the labels are entirely in Vietnamese, with no English.

2597. INTSOY. 1991. Highlights of International Conference on Soybean Processing and Utilization. Plus closing statements and recommendations, and a directory of participants. Urbana, Illinois. 3 p. Unpublished manuscript. 28 cm.
• ***Summary:*** Organizers: Jilin Academy of Agricultural Sciences (JAAS), China–host; Chinese Academy of Agricultural Sciences (CAAS), China–co-host; International Soybean Program (INTSOY) at the University of Illinois; Ministry of Agriculture, Forestry, and Fisheries (MAFF), Japan; International Institute of Tropical Agriculture (IITA), Nigeria; Scientific Research Institute of Foods and Fermentation Industries (SRIFFI), China"

Participants: 100 foreign participants from 25 different countries and 150 participants from throughout China. 58 people from developing countries and 40 people from developed countries. Regional distribution of foreign participants: Southeast Asia–25 people from 4 countries. East Asia–23 from 3 countries. North America–17 from 1 country. Africa–13 from 5 countries. South Asia–12 from 5 countries. Europe–5 from 3 countries. Central America–2 from 1 country. Middle East–1 from 1 country.

Program: 80 research/development/policy papers presented. Topics: Research (processing/products): Breeding/germplasm 10, extrusion 9, tofu 8, fermented products 4, nutrition 4, soymilk & ice cream 3, edamame (vegetable) 2, soy protein isolates and concentrates 2, lecithin 2, other 3. Development: Country reports 21 project reports 6. Policy/economic 3.

Demonstrations and exhibitions by 37 companies from throughout China (including soy milk and ice cream).

Local visits: Modern tofu plant. Modern solvent extraction plant. Farms. Local markets/stores. Soybean research institute of Jilin Academy of Agricultural Sciences. Headquarters of the Gene Bank of Chinese Academy of Agricultural Sciences. Labs and pilot plant of Scientific Research Institute of Foods and Fermentation Industries. Address: INTSOY, 113 Mumford Hall, Urbana, Illinois 61801. Phone: 217-333-6422.

2598. Leneman, Leah. 1991. Travelling in the land of tempeh. *Vegan Views (Bournemouth, England).* Spring. p. 7. [1 ref]

• ***Summary:*** The author, a vegan, found Indonesia a fascinating place to visit but also found it difficult to obtain vegan dishes at Indonesian restaurants. "It was disappointing to find that the country that created tempeh is such a difficult place for a vegan to travel in." Address: 19 Leamington Terrace, Edinburgh EH10 4JP, Scotland.

2599. Takahashi, Nobuo. 1991. Vegetable soybean varietal improvement in Japan–Past, present and future. In: S. Shanmugasundaram, ed. 1991. Vegetable Soybean: Research Needs for Production and Quality Improvement. Taipei, Taiwan: Asian Vegetable Research and Development Center (AVRDC). 151 p. See p. 26-29. Proceedings of a workshop held at Kenting, Taiwan 29 April–2 May 1991.

• ***Summary:*** Contents: Abstract. Introduction. Breeding system. Breeding objectives. Genetic resources. Future prospects.

Vegetable soybeans grown in Japan are consumed late in the summer, mainly in July and August, and therefore very early or early varieties are used. They are ready to harvest about 90 days after the seeds are planted. Those consumed in the winter are imported from Taiwan, Thailand, or New Zealand. The breeding goal is a high yield of 9-10 tonnes/ha. In olden times vegetable soybeans were used as an offering at festivals during O-bon (August 16) and Tsukimi (Sept. 9).

Table 1 titled "Main vegetable soybean varieties" (p. 27) contains the following columns: Variety, breeding system (local variety, pedigree, cross, mutation–radiation), maturity (early to late), pod size, pubescence color, seed coat color, notes (incl. place or name of developer, incl. private seed co.). The following varieties are listed: Datcha, Krosai-chamame, Hiradoko, Tanbaguro, Okuhara 1 gou, Wase Midori, Tokyo Wase, Saporo Midori, Yukimusume, Mosono Green, Kita no Siki [Shiki], Green-75, Echigo Musume, Hatu [Hatsu] Musume, Iwa-mame-kei 1, Experiment Station, Iwa-mame-kei 4. Address: Nagano Chushin Agric. Exp. Station, Nagano, Japan.

2600. Rondot, P. 1991. Priorities for increasing soybean production in Indonesia and Thailand. *Palawija News (Bogor, Indonesia)* 8(2):13. June.

• ***Summary:*** Research needs to be strengthened in the following 5 areas: 1. Improvement of soil moisture management. 2. Breeding programme to increase drought resistance and waterlogging tolerance. 3. Extension of the project's research and development approach. 4. The role of the private sector in developing soybean production. 5. Conditions for adoption of new technology. Address: SYGAP regional coordinator, ESCAP CGPRT Centre–CIRAD/DSA, Bogor, Indonesia.

2601. Shama, Gilbert; Hall, George M. 1991. Tempeh foods. *European Food and Drink Review (UK).* Summer. p. 27-28, 31. [12 ref]

• ***Summary:*** The authors propose the following definition to cover all the different kinds of tempeh: "Tempeh results from the overgrowth by moulds, predominantly those belonging to the genus *Rhizopus,* of hydrated and partially cooked plant materials which have first undergone a primary bacterial fermentation." The plant materials are generally legumes, especially soybeans, however other plant sources, such as coconut press cake, also yield acceptable results. olds of the genus *Mucor* may play a secondary role in the tempeh fermentation. Other legumes traditionally used to make tempeh in Indonesia are the winged bean, velvet bean, jack bean, pigeon pea, and lamtoro seed.

The authors describe the process for making tempeh, its biochemical aspects, and its future potential. They are evaluating 11 different legumes for their suitability in making tempeh. Address: Lecturers in Biotechnology and Food Engineering, Dep. of Chemical Engineering, Univ. of Loughborough, UK.

2602. Anwarhan, Hans; Rondot, Pierre. 1991. Technology adoption in Indonesia: Promoting farmer participation in research. The case of soybean. *Palawija News (Bogor, Indonesia)* 8(3):8-11. Sept. Paper presented at a regional

workshop: Increasing Soybean Production in Asia, Phitsaoluk, Thailand. Held 21-24 Aug. 1990. Address: 1. Agronomist and National Co-ordinator of SYGAP (Soybean Yield Gap Analysis Project) in Indonesia; 2. Agricultural Economist, SYGAP Project. Both: ESCAP CGPRT Centre, Bogor, Indonesia.

2603. Yeong, Boon Yee (Mrs.). 1991. An update on nutritional and health aspects of soybean protein. *ASA Technical Bulletin (Singapore)* HN15 1991. p. 1-10. Paper presented at the 6th Asian Congress of Nutrition, held in Sept. 1991 at Kuala Lumpur, Malaysia. [47 ref]
• ***Summary:*** Contents: Introduction. Soy protein–nutritional quality. Soy protein and lipid metabolism. Soy protein–possible role in cancer prevention. Conclusion. Table 1 shows per capita soybean consumption for food in Southeast Asia based on American Soybean Assoc. estimates in kg per person per year, from 1983 to 1990: Indonesia (6.0 in 1983–9.0 in 1990). Singapore (5.6–8.9). Malaysia (2.1–3.8). Thailand (0.8–2.5). Philippines (0.2–0.4). It is not clear whether or not these figures include use of soy oil as food. Address: Technical Director–Human Nutrition, American Soybean Assoc., 541 Orchard Rd., #11-03 Liat Towers, Singapore 0923. Phone: (65) 737-6233.

2604. Univ. of Illinois, Dept. of Agronomy. 1991. You are cordially invited to attend a preview of the first fertile intersubgeneric hybrid between the soybean and a wild perennial relative from Australia. Turner Hall, Urbana, IL 61801. 4 p. Oct. Unpublished manuscript.
• ***Summary:*** Page 1 announces that the preview will take place on Wednesday, October 9, 1991, at 3:00 P.M. at Room 117, Turner Hall. Pages 2-4 are titled "The potential use of the wild perennial relatives of the soybean." "The overall goal of this project is to determine the potential usefulness of the wild perennial species in the genus *Glycine* for broadening the germplasm base of the soybean.

"Utilization of wild species for improvement of their cultivated counterparts is steadily increasing in various crops... Because of genetic remoteness and unique selection pressures on these wild perennial species in comparison with the soybean, there is a good possibility that they possess variation in economically valuable characteristics that may be missing in the soybean germplasm collections.

"Thus far, investigations have shown that wild perennial *Glycine* species carry resistance to soybean rust, yellow mosaic virus, powdery mildew and to brown spot. Accessions have been identified that are salt tolerant, tolerant to certain herbicides and can be regenerated from protoplast, leaf, cotyledonary, petiole and hypocotyl tissue.

"Hybrids between the soybean and its wild perennial relatives show pod abortion and are totally sterile. The main focus of this research program is to overcome the sterility barrier by the use of tissue culture techniques and chromosome manipulation."

A table shows the species in the genus *Glycine* Willd., somatic chromosome number, genome symbols, and distribution. The 15 species listed in the subgenus *Glycine* are: *G. albicans* Tind. and Craven. *G. arenaria* Tind. *G. argyrea* Tind. *G. canescens* F.J. Herm. *G. clandestina* Wendl. *G. curvata* Tind. *G. cyrtoloba* Tind. *G. falcata* Benth. *G. hirticaulis* Tind. and Craven. *G. lactovirens* Tind. and Craven. *G. latifolia* (Benth.) Newell and Hymowitz. *G. latrobeana* (Meissn.) Benth. *G. microphylla* (Benth.) Tind. *G. tabacina* (Labill.) Benth. *G. tomentella* Hayata.

All these species come from Australia. All but the last two have a chromosome number of 2n = 40, except *G. hirticaulis* which has 2n = 80. *G. tabacina* also comes from West Central and South Pacific Islands and has a chromosome number of 2n = 40 or 80. *G. tomentella* also comes from Papua New Guinea, Philippines, and Taiwan, and has a chromosome number of 2n = 38, 40, 78, or 80.

Page 4 is titled "Intersubgeneric hybrids between soybean and *Glycine tomentella* Hayata–progress and prospective." Address: Urbana, Illinois.

2605. Takai Seisaku-sho. 1991. [Takai corporate guide]. 1-1 Inari, Nonoichi-machi, Ishikawa-ken 921, Japan. 8 panels. Nov. 1. 30 cm. [Jap; eng]
• ***Summary:*** This color brochure, containing 5 color photos, is written in both Japanese and English. It notes that (as of 1 Nov. 1991) Takai has exported its tofu and soymilk equipment to 140 cities of 30 countries, including Bhutan, Bolivia, Brunei, Burkina Faso, Egypt, Finland, India, North Korea, Mexico, Nepal, Philippines, Spain, Sri Lanka, Sweden, Switzerland, and Thailand.

A chronology of the company states that in July 1917 Kamejiro Takai, a former president, founded Takai & Brothers Co. It was renamed Takai Sesakusho in Jan. 1946. Address: Kanazawa, Ishikawa-ken, Japan. Phone: 0762-48-1355.

2606. Food and Agriculture Organization of the United Nations (FAO), Statistics Div., Basic Data Unit. 1991. FAO food balance sheets, bilans alimentaires, hojas de balance de alimentos, 1984-1986 average. 00100 Rome, Italy. xx + 384 p. No index. 30 cm. [Eng; Fre; Spa]
• ***Summary:*** This book is written in 3 languages: English, French, and Spanish. Prepared by the Statistics Div. of the Economic and Social Policy Dept. of FAO in Rome, it gives food balance sheets for 3-year periods (e.g. 1961-63, 1964-66, 1986-88, etc.) for 145 countries (including mainland China but not Taiwan). The introduction discusses: Food balance sheets–what they are and how to use them. Accuracy of food balance sheets. Concepts and definitions: Commodity coverage, supply and utilization elements (production, imports, stock changes, exports, processed

trade, domestic supply, feed, seed, food manufacture, other uses, waste, food, per caput supply), Population coverage. Units and symbols. Country coverage: Statistics are given for the world, developed countries as a group, developing countries as a group, 34 individual developed countries, and 111 individual developing countries.

Soybeans are included under the heading "oilcrops" *(oléagineux, semillas oleaginosas),* along with 8 other individual oilcrops plus "others." Soybean oil is included under the heading "vegetable oils" along with 11 other individual vegetable oils plus "others."

For each country, two tables are given. In the first table, per capita food supply, foods are divided into the following commodity groups: grand total, vegetable products, animal products, cereals (excluding beer), starchy roots, sweeteners, pulses, nuts and oilseeds, vegetables, fruit (excluding wine), meat and offal, eggs, fish and seafood, milk (excluding butter), oils and fats (subdivided into vegetable oils, and animal fats), spices, stimulants, alcoholic beverages, miscellaneous. For each 3-year period the following statistics are given for each commodity group: kilograms/year, calories/day, protein (grams/day), and fats (grams/day). Thus, for the Japan (for example), we can see that grams of protein per day from "nuts and oilseeds" increased from 9.8 in 1961-63 to 10.3 in 1986-88. This is the closest we can get to a figure for soyfoods consumption from this table.

The second table gives average annual domestic supply for the period 1984-86 (broken down into production, imports, stock changes, exports, processed trade, total), domestic utilization (broken down into feed, seed, food manufacture, other uses, waste, food), and per caput supply (broken down into kg/year, grams/day, calories/day, protein [gm/day], and fat [gm/day]), for specific foods within each of the major commodity groups. Thus, for Japan, we see that for soybeans during 1984-86, production was 237,000 tonnes (metric tons), imports 4,747,000 tonnes, stock changes 35,000 tonnes, exports 0, processed trade 2,000 tonnes, total domestic supply 4,947,000 tonnes. For domestic utilization, 67,000 tones were used for feed, 8,000 tonnes for seed, 3,636,000 tonnes for food manufacture, 0 for other uses, 89,000 tonnes for waste, and 1,158,000 tonnes for food. The per capita supply was 9.6 kg/year or 26.3 gm/day. Each day this provided 98 calories, 8.9 gm of protein, and 3.7 gm of fat.

For many countries (including the USA and Brazil) no statistics are given for food use of soybeans or for any parts of per caput supply.

A ranking of the countries (not including Taiwan) with the highest per caput supply of soybeans (kg/year) and soybean protein (gm/day) is as follows: Japan 9.6, 8.9. North Korea 9.0, 8.5. Indonesia 7.2, 6.8. South Korea 6.4, 6.1, Hong Kong 3.9, 3.6. China (Mainland) 3.1, 2.0. Singapore 0.2, 0.1. Address: Rome, Italy.

2607. Levy, Phil. 1991. Hanoi harvest: The food of Thailand and Vietnam. *Observer (London).* Dec. 22. p. 78.
• ***Summary:*** The subtitle continues: "Week 4–Hué, Da Nang, Hoi An, Hanoi. In the final part of this series, Phil Levy visits four of Vietnam's major cities, where the food varies from a happy blend of Franco-Vietnamese to Chinese-influenced dishes and Buddhist vegetarian cuisine.

Hué, a Buddhist, is famous for its local vegetarian cuisine.

Ly Thung Kiet Villas is a French-built tourist villa where the writer and his party were served: Braised bean curd skin with tree-ear mushrooms, eaten with rice. Bean curd skin curry with potato and mushrooms, eaten with a baguette. Minced beef (probably with bean curd) with crunchy peanuts, wrapped in green leaves and fried. Thick soup of potato, mushroom and bean curd (see the Recipe for Buddhist monk's soup).

2608. Rondot, Pierre; Sudaryanto, T.; Djauhari, A.; Anwarhan, H. 1991. Soybean utilization, processing, and production policy in Indonesia. *Palawija News (Bogor, Indonesia)* 8(4):1-6. Dec.
• ***Summary:*** "More than 80% of the households in Java consume soybean. The next highest consumption rate is in North Sumatra where 55% of the households eat soybean regularly. In Java, annual soybean consumption per capita varies from 11 to 16 kilograms compared with one to six kilograms in other areas of Indonesia. Java, which produces 47% of Indonesia's soybean, is also its greatest consumer.

"Average soybean consumption for the whole of Indonesia increased from 3.42 kg/cap/year in 1969 to 5.78 kg/cap/year in 1985. Consumption per capita of processed soybean is higher in urban areas than in rural areas."

"The Indonesian 'poultry revolution' has given rise to the modern animal feed-mill industry,... As Indonesia did not have a crushing industry until 1988, the meal had to be imported to regulate the national demand and to sustain the development of the 'poultry revolution'".

In 1987, according to SYGAP survey data, Indonesians consumed 749,600 tonnes of tempeh (86 gm/week), 714,700 tonnes of tofu (82 gm/week), and 48,200,000 liters of kecap (ketjap; Indonesian soy sauce). Per capita consumption of onchom was 4 gm/week. Address: 1. Agricultural Economist, ESCAP/CGPRT Centre, SYGAP Project, Bogor, Indonesia.

2609. Krusong, Warawut; Yongsmith, Busaba; Sanchez, P.C. 1991. Increased vitamin B-12 level in a modified tempeh process. *Philippine Agriculturist (The)* 74:89-94. * Address: Thailand.

2610. Nanseki, Teruaki; Morooka, Y.; Zakaria, A.K.; Kosugi, S. 1991. Comparative advantage of soybean in an

upland area of West Java: Mathematical programming approach. *CGPRT Working Paper.* No. 13. 45 p.
• ***Summary:*** The paper presents a mathematical programming model to identify the comparative advantage of a specified crop in a given farming system. The model was then applied to soybean production in West Java and the implications of this approach were evaluated. The model is stochastic in nature which makes it rather more versatile than commonly used approaches. Address: 1&4. National Agricultural Research Centre, Tsukuba, Japan; 2. Tropical Agricultural Research Centre, Tsukuba, Japan (currently posted in Malaysia); 3. Bogor Inst. of Food Crops (BORIF).

2611. Sudigbia, I. 1991. The use of tempe in the management of pediatrics diarrhoeal cases. Child Health Department of Medical Faculty of Diponegoro University. Unpublished manuscript. *
Address: Child Health Dep., Medical Faculty, Diponegoro Univ., Semarang Univ., Indonesia.

2612. *CGPRT Working Paper.*1991. CGPRT crops in Thailand: A statistical profile, 1960–1990. No. 9. xv + 99 p. 25 cm.
• ***Summary:*** Contents: List of tables. List of graphs. Foreword. Acknowledgements. Tables: General indicators, crop production–national, crop production by region, crop production by province, production cost, commodity prices, trade, consumption. Graphs. General notes on tables.

Table 2.5 shows that soybean production in Thailand has grown from 54,300 tonnes in 1971 to 517,000 tonnes in 1988, while yield has increased from 943.8 kg/ha to 1,318.8 kg/ha during the same period. 1 hectare = 6.25 rai/rais.

Table 3.5 shows that in 1988 soybean production was by far the largest in the northern region (383,436 tonnes), followed by north-eastern region (80,520 tonnes), and the central plain region (52,855 tonnes). No soybeans were reported in the southern region. Tables 4.13 and 4.14 shows that Thailand's top 4 soybean producing provinces in 1988 were Sukhothai (103,131 tonnes), Chiang Mai (58,450), Kamphaeng Phet (39,043), Loei (37,829), and Phetchabun (33,713). All but Loei were located in the northern region.

Table 8.1 shows that domestic consumption of soybean in Thailand has grown from 49,000 tonnes in 1972 to 618,000 tonnes in 1987. Soybean exports have decreased from a peak of 24,000 tonnes in 1975 to only 7 tonnes in 1989. Two crops of soybeans are produced each year. The first is during July-November, while the second crop is during December-April of the next year. Address: CGPRT Centre, Bogor, Indonesia.

2613. Duong, Binh; Kiesel, Marcia. 1991. The simple art of Vietnamese cooking. New York, NY: Prentice Hall Press. xvii + 326 p. Foreword by Jacques Pépin. Illust. (color photos by Becky Luigar-Stayner). Index. 24 cm.
• ***Summary:*** About the authors: Binh Duong was born in Vietnam in Nha Trang, on a beautiful bay on the country's south central coast. He was raised in Da-Lat in the mountains; his father was an engineer. In 1975, near the end of the Vietnam war, he fled to the USA, where he became a well-known chef. He and Marcia Kiesel met in 1998 in the test kitchens of *Food & Wine* magazine.

"There is a certain finesse, a certain quality to Vietnamese cooking that sets it apart from other types of oriental food: Clean, clear sauces; a minimum of fat; an abundance of vegetables; and very distinctive flavors" (p. xi, from the Foreword, by Jacques Pépin).

The best place to eat for most people in Vietnam, especially if one does not have much extra money, is at "the food stalls in the open-air market. The atmosphere is convivial; the food as pure and fresh as it can be made."

"There are only a few basic ingredients in Vietnamese cooking, but they are vital ones: *nuoc mam,* or fish sauce, lemongrass, a handful of unusual herbs, rice paper, and rice flour" (p. xvi-vii).

The chapter on "Key ingredients" (p. 10-29) includes: (1) Bean curd, dried (tau hu ky [yuba]); it comes in thin sheets or rolled "bean sticks." Sold in plastic packets or colorful paper packages. Can be fried until crisp or softened in water then simmered or sauteed. (2) Bean curd, fresh (dau khuon): Japanese name: Tofu. (3) Bean curd, fried (dau khoun chien): Cubes of fried tofu, especially delicious filled then simmered in a flavorful stew. Sold 10 cubes in a 2-oz pack. (4) Bean curd, red (chao): "A spicy wine-fermented tofu that imparts a reddish-brown luster and rich flavor to marinades." Better quality products are sold in glass jars or small crocks. (5) Hoisin sauce (Tuong ngot): From China, hoisin is made from soybeans, garlic, sugar, and spices. (6) Vietnamese bean sauce (Tuong cu da). Made from soybeans, cooked rice, and water. (7) Soy sauce (xi dau): Used quite a bit in Vietnam, especially by Vegetarian Buddhists who do not eat fish sauce. "Japanese soy sauces are light, pleasant and well suited to Vietnamese cooking."

Dipping sauces and condiments: Soy vinaigrette (Nuox xi dau giam, with "3 tablespoons soy sauce," p. 51). Rich bean sauce (Nuoc tuong ngot, with "1 heaping tablespoon pure Vietnamese bean sauce or Chinese bean paste," p. 54).

Soy related recipes: Garlic chive and tofu soup (Canh dau knuon, with three 3-ounce tofu cakes, cut into 2-inch pieces, p. 91. "Tofu, highly prized even by nonvegetarians because it is so nutritious, picks up the flavors it is cooked with and takes on a smooth and unusual texture that is quite pleasant"). Fried tofu stuffed with pork and mushrooms (Dau khuon don thit, with two "2-ounce packages fried bean curd, p. 242-43).

"Vegetarian cooking of the Vietnamese Buddhists" (p. 269-96). Begins with a page about how Buddhism came to Vietnam and its place in modern Vietnamese life and food. Vegetarian tofu soup (Canh chua chay). Vegetarian summer

rolls (Goi cuon chay, with tofu). Vegetarian spring rolls (Cha gio chay, with firm tofu cakes and Soy dipping sauce). Fried tofu salad (Goi dau khuon). Carrot, jicama, and tofu salad (Goi chay, incl. three 3-ounce tofu cakes and "1 large sheet dried bean curd [yuba], broken in half crosswise"). Fried tofu with green beans (Dau khuon xao dau). Grilled tofu and vegetables (Dau khuon va la ghiem nuong vi). Curried tofu sauté (Dau khuon xao la lan, with firm tofu cakes). Lemongrass-scented vegetable sauté (with tofu). Fried vegetables with noodles (with tofu and 1 large sheet of yuba). Squash and sweet potato stew with coconut and peanuts (Kiem, with yuba and tofu). Fried tofu with tomato and vegetables (Dau khuon xao thap cam). Hoisin dipping sauce (Nuoc cham tuon). Soy dipping sauce (Xi dau cham, with soy sauce). Address: 1. Chef and owner of the Truc Orient Express, Hartford, Connecticut; 2. Assoc. director of the test kitchen and a food writer at *Food & Wine* magazine.

2614. Hymowitz, T.; Bernard, R.L. 1991. Origin of the soybean and germplasm introduction and development in North America. In: H.L. Shands and L. Wiesner, eds. 1991-1992. Use of Plant Introductions in Cultivar Development: Proceedings of a symposium sponsored by Division C-1 of the Crop Science Society of America in Las Vegas, Nevada, 19 Oct. 1989. 2 vols. Part 1. CSSA Special Publication Number 17. Madison, Wisconsin: Crop Science Society of America (CSSA). 164 p. See p. 147-64. Chap. 9. Crop Science Society of America Special Publication No. 17. [34 ref]

• ***Summary:*** Contents: Introduction. Origin of the genus *glycine*. Origin of the soybean. Introduction of the soybean to North America (by Samuel Bowen in 1765). Experiment stations and technology. Introduced soybean germplasm. Cultivar development. *Glycine soja*. Wild perennial *glycine* species.

"The genus *Glycine* Willd is divided into two subgenera, *Glycine* and *Soja* (Moench) F.J. Herm. The subgenus *Glycine* contains 15 wild perennial species (Singh et al., 1988; Tindale and Craven, 1988). Thirteen of the species *[G. albicans* Tind. and Craven, *G. arenaria* Tind., *G. curvata* Tind., *G. canescens* F.J. Herm., *G. clandestina* Wendl., *G. curvata* Tind., *G. cyrtoloba* Tind., *G. falcata* Benth., *G. hirticaulis* Tind. and Craven, *G. lactovirens* Tind. and Craven, *G. latifolia* (Benth.) Newell and Hymowitz, *G. latrobeana* (Meissn.) Benth. and *G. microphylla* (Benth.) Tind.] are indigenous to Australia. All carry $2n = 40$ chromosomes (diploid) except for *G. hirticaulis* which is tetraploid, $2n = 80$.

"*Glycine tabacina* (Labill.) Benth. with $2n = 40$ or 80 chromosomes, has been found in Australia, Taiwan, south Pacific Islands (New Caledonia, Fiji, Tonga, Vanuatu, Niue) and west central Pacific Islands (Mariana, Ryukyu). All accessions of *G. tabacina* collected outside of Australia are tetraploid ($2n = 80$) and even within Australia, tetraploids predominate over diploid forms. *Glycine tomentella* Hayata has been found in Australia ($2n = 38$, 40, 78, or 80), Papua New Guinea ($2n = 40$, 78 or 80), Indonesia ($2n = 80$), Philippines ($2n = 80$), and Taiwan ($2n = 80$). Singh et al. (1987, 1989) demonstrated that the complexes of *G. tabacina* and *G. tomentella* evolved through allopolyploidization in Australia."

"The soybean was first introduced to North America in 1765 by Samuel Bowen, a seaman employed by the East India Company. Bowen brought soybean from China via London to Greenwich, his residence in the province of Georgia. Situated a few kilometers east of Savannah, the 180 ha of Greenwich (now a cemetery) became the center of his farming and manufacturing enterprises.

"By the late 1850s, soybean was evaluated for forage potential by many farmers throughout the USA (Hymowitz, 1987). However, the scientific approach for evaluating the crop had to wait until the emergence of the agricultural experiment stations at land grant institutions during the latter part of the nineteenth century."

Table 9-1 (p. 154-57) shows "Ancestral cultivars and their occurrence in pedigrees of U.S.- Canadian publicly developed grain-type soybean cultivars (excluding backcross-developed isolines covered in Table 3). Part A of this table is a summary by maturity group and part B is a summary by decade of release. Each part is divided into number of descendant cultivars, northern ancestors, southern ancestors, ancestors chosen for pest resistance, other, and number of ancestral cultivars. The ten most important northern ancestors (in descending order of importance with the number of occurrences in pedigrees in parentheses) are: Mandarin (143), Manchu (121), Richland (119), A.K. (108), Dunfield (83), Mukden (73), No. 171 (30), Pakota (27), L37-1355 (25), and Manitoba Brown (14). The 13 most important southern ancestors are: CNS (118), Tokyo (109), PI54610 (108), S-100 (82), Roanoke (42), Haberlandt (40), Arksoy (40), Palmetto (34), Biloxi (9), PI 60406 (7), Otootan (7), Laredo (4), Mammoth Yellow (5).

Table 9-2 (p. 158-59) shows the "Origins of major ancestral cultivars of the 221 cultivars developed at public institutions in the USA and Canada." For each cultivar is given: Descendant cultivars, maturity group, year of introduction, country and locality of origin, and original cultivar name.

Table 9-3 (p. 161) shows "Sources of genes backcrossed into domestic public soybean cultivars." The named varieties are Kanro, Mukden, Arksoy, Higan, Kingwa, and CNS. All 8 of the most important northern cultivars originated in China. Of the 12 most important southern cultivars, 9 originated in China, 2 in Korea, and 2 or 3 in Japan. Address: Univ. of Illinois, Urbana, Illinois.

2615. Landwehr, John; Krogt, P.C.J. van der. 1991. VOC: A bibliography of publications relating to the Dutch East India Company, 1602-1800. Utrecht, Netherlands: HES Publishers. xlii + 840 p. + xvi p. of plates. Illust. Facsims. 28 cm. *

• ***Summary:*** In Dutch, VOC is an abbreviation of Vereenigde Ost-Indische Compagnie.

2616. Passmore, Jacki. 1991. The encyclopedia of East Asian food and cooking. New York, NY: William Morrow. 320 p. Illust. by Jan Smith. Index. 24 cm. [44 ref]

• ***Summary:*** The most complete book of its type seen to date (May 2010), with many helpful cross references (sometimes flawed). Soyfoods are mentioned throughout. Unfortunately, for Chinese foods, the author does not distinguish between Mandarin and Cantonese, or between pinyin (newer) and Wade-Giles (older) styles of romanization. For some of the "Also known as" it is not clear to which of several previous entries this refers (see "Soybean").

Ame (ah meh, Japan): A sweet jelly made from millet.

Azuki bean *(Phaseolus angularis).* Native to China; used in China since the Han Dynasty (206 BC–AD 220): An [or anko] (Japan): A sweetened paste of ground azuki beans available in smooth (koshi-an) and crunchy [chunky] (tsubu-an or tsubushi-an). Sarashi-an: A flour of ground azuki beans. Also known as hong dow (China), dried red beans, red beans [adzuki beans, aduki beans]. See also: Red bean paste, sweet.

Bean curd: Also known as dou-fu, dow foo (China); tahu (Indonesia), momen tofu, tofu (Japan); ta hu, ta hua (Malaysia); tahure (Philippines); tauhu kau (Thailand); dau hu, dau hu chung (Vietnam); bean custard, soybean cake. Illust of: Fried bean curd, pressed bean curd. Almond bean curd (non-soy). Bean curd "brains": Also known as doufu nao (China); taho (Philippines). "Cotton" bean curd: Also known as momen tofu (Japan). Freeze-dried bean curd: Also known as char doufu, doufu pok (China); agedofu, atsu-age, nama-age (Japan); tauhu tod (Thailand), dau hu chien (Vietnam). Fried bean curd pouches: Also known as aburage, usuage (Japan). Gan modoki. Grilled bean curd: Also known as doufu kan [sic], gone (China); yakidofu (Japan). Instant bean curd. Okara. Pressed bean curd: Also known as doufu kan (China), taukwa, tauhu kuning (pressed yellow bean curd) (Indonesia, Malaysia); tokwa (Philippines); tauhu leong (Thailand); dau hu ki (Vietnam). Silk bean curd: Also know as kinugoshi tofu (Japan), shui doufu (China), taho (Philippines). Contains a recipe for homemade "Bean Curd" plus 3 recipes.

Bean curd by-products: Bean curd skin [yuba], bean curd sticks: Also known as fu jook pin, gee jook (China), yuba (Japan), forng ta ohu [tauhu] (Thailand); rolled bean curd, second bamboo.

Fermented bean curd: Also known as foo yu, fu-ru, narm yu (China), tahoe, tahu (Indonesia, Malaysia), tausi (Philippines), bean curd cheese, Chinese cheese, pickled bean curd, red bean curd, soybean cheese.

Moldy bean curd. Bean curd cheese: See bean curd by-products (fermented).

Bean pastes and sauces: Shih and jiang from China: (1) Bean sauce (jiang) also known as taucheo or tau sa (Malaysia, Nonya and Singapore cooking), mien see [mian shi] (China), taoco [Pron. = tao-cho] (Indonesia), tuong ot (Vietnam), bean paste, brown bean sauce, yellow bean sauce. (2) Black bean sauce (a recent addition to the family of Chinese sauces. A major ingredient is puréed fermented black beans with a hint of garlic and star anise. It tastes best when freshly made). (3) Chili bean paste (in addition to chopped dried chilies, it sometimes contains fermented black beans): Also known as lat chu jeung, as lat chu jeung yau (Garlic) (China); kochujang (Korea); bean paste with chili; hot bean paste; Sichuan hot bean paste. (4) Dhwen-Jang (Korea). See also miso. (5) Hoisin sauce (China): A sweet, thick, reddish brown sauce. One ingredient is fermented soybean paste. Not to be confused with the Chinese barbecue sauce called sha cha jang. Also known as hoi sin cheung (China); barbecue sauce. (5) Soybean paste. Also known as mean see jiang (China). (6) Sweet bean paste. In this context it is not the sweet bean paste made from azuki beans, but rather a sweet, thick, dark brown sauce made of ground fermented soybeans and sugar. Its salty-sweet flavor is used in marinades and roast meats. Also known as tim mean jiang (China).

Bean sprout: Mung bean sprouts, silver sprouts (mung bean sprouts with the roots and seed pods removed), soybean sprouts. Also known as: Daai dau nga choy (soybean sprout), ngunn nga choy (silver sprouts), nga choy, sai dau nga choy (mung bean sprout) (China); tauge (Indonesia); moyashi (Japan); kacang ijo, kacang djong, kacang padi (Malaysia); togue (Philippines); taun gawk (Thailand); gia (Vietnam); bean shoots.

Beijing duck sauce (recipe with ½ cup sweet bean paste). Vietnamese-style Beijing duck sauce (with ½ cup sweet soy sauce–kecap manis).

Black bean: See Fermented black bean. Black bean sauce: See Bean pastes and sauces. Fermented black bean sauce. Black soybean: See soybean.

Broad bean paste. Broad bean sauce: "The best is made in Pixian, a city in Sichuan province, where it is used instead of soybean-based seasoning sauces."

Brown bean sauce: See Bean pastes and sauces.

Che hau sauce (Che how, China): See Bean pastes and sauces (Hoisin). Chick-pea.

China: Has the "oldest and most well-documented cuisine in the world." Chinese cheese: See Bean curd by-products (fermented). Chinese hot bean paste: See Bean pastes and sauces.

Dau hu (Dow hoo, Vietnam): See bean curd. Dau hu chien (Dow hoo chee-ian, Vietnam): See Bean curd, fried. Dau hu chung (Dow hoo chee-ung, Vietnam): See Bean curd. Dau hu ki (Dow hoo kee, Vietnam): See Bean curd, pressed.

Dengaku (plus recipe).

Dhwen-jang (Dwen-jang, Korea). Similar to Chinese soybean paste or Japanese akadashi miso. Also known as Korean bean paste. Doufou Kan [doufu gan], China: Bean curd (grilled, pressed). Dou-fu (Dau-fu, China). See Bean curd. Doufu nao (Daufu-nou, China): See Bean curd "brains." Doufu pok (daufu pork, China). See bean curd, fried. Dow foo (dau fu, China): See Bean curd.

Edamame (e dah ma meh, Japan): See soy bean.

Fermented bean curd: See Bean curd by-products. Fermented bean curd cake. See Bean curd by-products; tempe.

Fermented black beans (Shih, China). With recipe for "Fermented black bean sauce" (p. 106). Also known as dau see (China), black beans, dried black beans, preserved back beans.

Fermented red rice. Flours and thickeners: Kuzu (Japan). Mung bean flour. Soy flour (incl. kinako). Foo yu (Fu you, China). See Bean curd by-products (fermented). Forng Tao Hu (Fong tao huu, Thailand). See Bean curd by-products, bean curd sticks. Fu jook pin (Fu juk pin, China): See bean-curd by-products, bean curd skin. Fu-ru (Fu yue). Gee Jook (Ji Juk, China): Bean curd sticks.

Gluten: Kau fu, kohana fu, matsutake fu, mein jin pau, nama fu, su tang, yaki fu. Also known as: Kau fu, mianjin, mein jin pau, su tang (China), kohana fu, yaki fu (Japan).

Gochujang (Korea). See also: Chili paste, chili sauce. Korean barbecue sauce.

Grilled bean curd: See Bean curd, grilled.

Hatcho miso: See miso, Hatcho. Hot bean paste. Hot black bean sauce. Inaka miso: See miso.

Japan: "Japanese cooks revel in the artistry of their craft. The Japanese love of nature is a challenge to present each ingredient as reminder of its origins: to bring nature to the table...," Regional cuisines are not of great importance in Japan; cooking methods (incl. Dengaku), salting (incl. Teriyaki), cutting and slicing techniques.

Kecap asin (Ket-chup a-seen, Indonesia): See Soy sauce, sweet and salty. Kecap cair (cha-ear, Malaysia): See soy sauce, light. Kecap hitam (Indonesia): See soy sauce, sweet and salty. Kecap ikan (Indonesia): See Fish sauce. Kecap manis (mah-niece, Indonesia): See Soy sauce, sweet and salty. Kecap petis (pet-is, Indonesia): See fish sauce. Kinugoshi tofu (Japan): See Bean curd, silk.

Kochujang (go-choo jang, Korea): See Bean pastes and sauces; chili pastes.

Koikuchi shoyu (Japan): See soy sauce. Continued. Address: Author of several books on Asian cuisine.

2617. Passmore, Jacki. 1991. The encyclopedia of East Asian food and cooking (Document part II). New York, NY: William Morrow. 320 p. Illust. Index. 24 cm. [44 ref]

• ***Summary:*** Continued from p. 153: Korean bean paste: See Dhwen jang. Koshi-an (Japan): See Azuki beans (an). Koya tofu (Japan): See Bean curd, freeze-dried [sic].

Kuzu (Japan): See Flours and thickeners. Lentil *(Lens esculenta):* Red lentil, Red mung beans.

Light soy sauce: See Soy sauce.

Lu soy (lo shui, China): See soy sauce.

Maltose: Made by fermenting germinated grains of barley. When used to glaze foods, may have soy sauce and red food coloring added. Also known as: Malt sugar, [barley malt syrup].

"Ma-po" dofu [Mabo-dofu]: See beef.

Mean see jiang [mian shi jiang] (min see jiang, China): See Bean pastes and sauces.

Mein jin pau [mien jin pau] (China): See Gluten.

Mianjin (China): Gluten.

Mien see (mien-si [mian shi], China): See Bean pastes and sauces.

Miso (Japan): (1) Hatcho-miso. (2) Inaka miso or Sendai miso. Also known as Red miso. (3) Shinshu miso. (4) Shiro miso.

Mochi. Monosodium glutamate. Also known as: Mei jing (China); aji-no-moto (Japan); servuk perasa (Malaysia); ve tsin (Vietnam), M.S.G., taste essence, taste powder.

Moyashi (Japan): See Bean sprout.

Mung bean. Also known as moong ke dal (India); kacang djong, kacang eedjo [hijau, katjang idjo] (Indonesia); kacang hiau (Malaysia); tau ngok (Thailand); dau xanh (Vietnam); green gram.

Nama-age (nah-mah ah-geh, Japan): See Bean curd, deep fried.

Nama fu (Japan): Raw / uncooked wheat gluten.

Natto (Japan). See soybean.

Noodles: (1) Bean curd noodles (China). Also known as Soy noodles, soy vermicelli.

Oils and fats: Soybean oil. (2) Bean curd skin noodles (China) [yuba noodles].

Peanut (with many foreign names and recipes).

Preserved black beans: See Fermented black beans. Pressed bean curd: See Bean curd (pressed).

Red bean paste, sweet: "An important ingredient in Chinese and Japanese cooking, sweet red bean paste is made by boiling the red azuki bean and mashing it to a paste with lard or oil, then cooking it until it is fairly dry or thick. In Japan, red bean paste is made in two textures: the smooth purée is koshi-an and the chunky version, with the beans only partly crushed, is tsubushi-an. It is a filling for cakes and sweet buns, and is used in several desserts." Also known as hong dow sar (China), an (Japan). Contains a recipe for Sweet red bean paste.

Red rice: See Fermented red rice.

Rice: Many type of glutinous and non-glutinous.

Rolled bean curd: See Bean curd sticks [dried yuba].

Seaweed: Many different types. Seaweed gelatin or Seaweed jelly: See agar agar.

Sendai miso (Japan): See miso.

Sesame seed: Black sesame seed, sesame oil, sesame paste, white sesame seed.

Shinshu miso (Japan). Shui doufu (China): See bean curd (silk). Silk bean curd: See Bean curd (silk).

Soybean *(Glycine max):* (1) Black soybeans. (2) Fresh soybeans [edamame]. (3) Yellow soybeans. Soybean cheese: See Bean curd, fermented [fermented tofu]. Soybean condiment: See Bean pastes and sauces. Soybean milk. Also known as tau cheing, tau ni (China). With homemade soymilk recipe. Soybean noodle: See Noodles, bean curd. Soybean oil: See fats and oils. Soybean paste: See Bean pastes and sauces. Soybean sprout: See bean sprout. Soy flour: See Flours and thickeners.

Soy sauce: "An ancient seasoning, first used in China more than 3,000 years ago. Known in its original form as *shih,* it was a thin salty liquid in which floated fragments of fermented soybeans." "Soy sauce is to Chinese and Japanese cooking what the pungent, salty fish sauce known as nam pla or nuoc mam is to Thailand and Vietnam respectively." (1) Dark soy sauce. Also known as jang yau, see yau (China); koikuchi shoyu, tamari (Japan), kecap pekat (Malaysia); mushroom soy. (2) Light soy sauce: Thinner, saltier, and lighter in color and flavor. It is used in cooking where its light color will not spoil the color of the ingredients. Also known as sang chau, see yau (China), shoyu, usukuchi shoyu (Japan), kecap cair (Malaysia), toyo (Philippines), nam siew (Thailand), xi dau (Vietnam), thin soy sauce. (3) "Lu soy (China) is a 'master sauce' based on soy sauce with sugar, ginger, and five-spice, It is used for simmering poultry and other meats to give a rich flavor and to color the food a deep brown. Also known as lu shui (China)."

Soy sauce, sweet and salty: (I) "Kecap asin (Indonesia) is a thick, salty, dark soy-based sauce used to impart a strong color and flavor. Its sweet counterpart is *kecap manis.* It is similar to, but thicker than, several dark soy sauces used in Chinese cooking." (2) Kecap hitam (Malaysia) is a sweet dark soy sauce. Slightly less spicy than kecap manis. (3) Kecap manis (Indonesia) is a sweet, dark, thick, aromatic soy sauce, especially widely used with satay. "It is similar to, though finer in flavor than, Chinese sweet soy sauce" [tian mian jiang]. Also known as kecap bentang manis (Indonesia); sweet soy sauce. (4) "Sweet soy sauce (China) is a dark, sweet sauce combining soy sauce, sugar, and malt sugar. Its distinctive malt-like taste goes well as a dip for fried snacks, poultry, and seafood." It appears frequently on the table in homes and restaurants in Fukien province, opposite Taiwan on the coast of southeastern China. For a recipe, see Sweet soy sauce pork (p. 230). Note: This is not generally a commercial product. (5) Tim cheong (Malaysia) is a thick, sweet, black soy sauce, similar to that used in China. In Malaysia it is served with poh pia. Its flavor is closer to that of kecap hitam than to kecap manis.

Sprouts, soybean. See Bean sprout, soybean. Sushi (describes many types, with recipes). Sweet bean paste or Sweet bean sauce: See Bean pastes and sauces.

Taho (Philippine bean curd brains). Tahoe (Indonesia or Malaysia, fermented bean curd). Tahu (Malaysia bean curd). Ta hua (Malaysia bean curd). Tahure (Philippine bean curd).

Tamari (Japan): See soy sauce. Taucheo (Malaysia or Singapore, bean pastes and sauces). Tauge (Indonesia bean sprout). Tauhu kao (Thailand bean curd). Tauhu kuning (Indonesia and Malaysia bean curd pressed). Tauhu leong (Thailand bean curd, pressed). Tauhu tod (Thailand bean curd, fried). Taukwa (Indonesia and Malaysia bean curd pressed). Tau sa (Malaysia bean paste and sauces). Tausi (Philippines, bean curd products, fermented).

Tempe (Indonesia, Malaysia): Fermented soybean cake [tempeh]. Oncom [Ontjom]. Tokwa (Philippine bean curd pressed).

Tosa soy sauce (Japan): The classic sashimi accompaniment. Recipe given.

Tsukemono: Takuan, umeboshi.

Usu-age (Japan): See Bean curd (fried) purses.

Winged bean. Yuba (Japan).

Brief biography: "For more than twenty years she has been professionally involved with Asian food as a writer, teacher, publicist, researcher, consultant, and, of course, cook. She has traveled extensively in Asia and lived in Hong Kong for more than ten years, working as a food writer on a number of newspapers and magazines, which led to a career as a food consultant. Her most recent book, *Asia the Beautiful Cookbook* was listed by *Publishers Weekly* as one of the best books of 1987." Address: Author of several books on Asian cuisine.

2618. Simoons, Frederick J. 1991. Food in China: A cultural and historical inquiry. Boca Raton, Florida: CRC Press Inc. xxv + 559 + x p. Illust. Index. 27 cm. Maps by Mary Beth Cunha. [1543 ref]

• ***Summary:*** An excellent, scholarly work. Soybeans and soyfoods are discussed throughout the book. The Preface begins: "This book is a study of Chinese food from a cultural and historical perspective. Its focus is on traditional China of the nineteenth and early twentieth centuries, before establishment of the People's Republic."

Also discusses: Vegetarianism and vegetarian dishes (p. 27, 31-37, 41, 45, 71, 86, 89, 161, 182, 189, 268, 274, 301, 303-04, 310, 312, 363, 409, 446).

The section titled "Fish cultivation in ponds" (p. 343-46) has a detailed history of fish farming in ponds in China. As early as "the 5th century B.C. there is clear mention of

the practice, and some have suggested that it was known long before that date." It was especially prominent in southern China, where today the deltas of the Pearl and Yangtze rivers have made China "one of the world's great centers of fish farming." Most widely cultivated in China are members of the carp family (cyprinids). Fish have also long been cultivated in Japan and Hong Kong (gray mullet), Taiwan and Java (milkfish). Since 1949 in Taiwan, tilapia and eels (both Japanese and American eels) have been cultivated and sold locally or exported to Japan. Contains a good bibliography.

In the section titled "Other edible nuts and seeds consumed by the Chinese" (p. 282+) are two brief references to the sunflower *(Helianthus annuus, hsiang-jih-k'uei* or *chao-jih-k'uei,* p. 285-86). A plant of New World origin, it bears edible seeds which, consumed raw or roasted, are very popular in China. Production of sunflower seeds in China has recently grown rapidly, from 33,000 metric tons in 1949 to 1.7 million metric tons in 1985–an increase of more than 50-fold in 36 years! This has made sunflower a major oilseed in China, and earned for the nation the rank of 4th largest sunflower producer worldwide, behind only the Soviet Union, Argentina, and the USA. Because the sunflower plant is able to tolerate cold and grow well in poor soils, production is concentrated in northern China, especially Manchuria. Address: Dep. of Geography, Univ. of California, Davis, CA 95616.

2619. Sutardji, -. comp. 1991. Bibliografi khusus tanaman kedelai Indonesia 1978-1991 [Bibliography of soybeans (especially plants) in Indonesia, 1978-1991]. Malang, Indonesia: Badan Penelitian dan Pengembangan Pertanian, Pusat Penelitian dan Pengembangan Tanaman Pangan, Balai Penelitian Tanaman Pangan Malang. 103 p. Author index. 28 cm. [641 ref. Ind]

• ***Summary:*** Within each of the following 11 subject areas, the documents are listed alphabetically by author: General. Agronomy: Cultivation, cropping systems, weeds. Plant protection: Pests, diseases. Pre- and postharvest: Seed technology, postharvest, processing. Socio-economics. At least 90% of the references are entirely in Indonesian; the rest are in English. Address: Malang, Indonesia.

2620. Yeong, Boon Yee (Mrs.). 1991. Nutrition and application aspects of soybean oil. *ASA Technical Bulletin (Singapore)* HN14 1991. p. 1-15. [20 ref]

• ***Summary:*** Contents: Introduction. Structure and production. Essential fatty acids. Plasma cholesterol. Omega-3 fatty acids and prostaglandins. Hydrogenation. Polyunsaturates and cancer. Other therapeutic factors. Conclusion. Address: Consultant–Human Nutrition, American Soybean Assoc., 541 Orchard Rd., #11-03 Liat Towers, Singapore 0923. Phone: (65) 737-6233.

2621. Yokotsuka, Tamotsu. 1991. Proteinaceous fermented foods and condiments prepared with koji molds. In: Dilip K. Arora; K.G. Mukerji; E.H. Marth, eds. 1991. Handbook of Applied Mycology. Vol. 3: Foods and Feeds. New York, NY: Marcel Dekker, Inc. x + 621 p. See p. 329-73. Chap. 11. [118 ref]

• ***Summary:*** Contains a great deal of very interesting information. Contents: 1. Introduction. 2. Fermented soybean foods in East and Southeast Asia: A. Douchi (China), Hama-natto (Japan), and in-yu (Taiwan). B. Shuidouchi (Shandong province, China), thua-nao (Thailand), kinema (Nepal), and natto (itohiki natto) (Japan). C. Tempe [Tempeh] and Oncom [Onchom] (Indonesia) (Making soybean tempe, volatile flavor of tempe, chemical composition and nutritional value of tempe, tempe bonkrek). D. Fermented tou-fu (soybean curd) products: Sufu (China and Taiwan), Tofu-yo (Okinawa, Japan).

3. Fermented salty condiments in a slurry or paste made from soybeans and cereals: A. Doujiang (touchiang) (China) and Tauco [taucho] (Southeast Asia). B. Doubanjiang (Toupanchiang). C. Tianmianjiang (Tienmienchiang). D. Gochujiang and Doenjang (Korea). E. Hishio (Japan). F. Miso (Japan) (Production and consumption of miso, making rice miso and barley miso).

4. Fermented salty liquid condiments made from soybeans and cereals: A. Japanese shoyu (Manufacture of koikuchi and usukuchi shoyu, manufacture of tamari shoyu). B. Soy sauce produced in east and southeast Asian countries other than Japan (Korea, Taiwan, Hong Kong, Singapore, Malaysia, Indonesia, Thailand, People's Republic of China {the process, acid hydrolysis illegal until recently}, chijhi or whole soybean soy sauce still made in the basins of the Zhujiang {Pearl} River and the Huanghe {Yellow} River).

5. Biochemistry involved in shoyu and miso manufacture: A. Selection of raw materials. B. Contribution of improved cooking methods of raw materials to increase the enzymatic protein digestibility. C. Selection and improvement of koji molds. D. Improvement in koji making. E. Microbial and chemical control of salty mash fermentation. F. Flavor evaluation of koikuchi shoyu. G. Stability of color of pasteurized shoyu. H. Nutritional concern about shoyu and miso (salt content). Safety of koji molds and shoyu (aflatoxins).

6. Conclusion.

Tables show: (1) Chemical composition of kinema, thua-nao, and douchi. (2) Changes in nitrogenous compounds during Natto Fermentation. (3) Changes of nitrogen compounds in sufu making. (4) Constituents of some types of miso. (5) Chemical composition of various kinds of genuine fermented shoyu in Japan. (6) Effect of cooking conditions of thoroughly moistened defatted soybean grits on the enzymatic digestibility of protein. (7)

Differences between *A. oryzae* and *A. sojae* used for shoyu fermentation. (8) Proteinases produced by *Aspergillus sojae*. (9) Enzyme composition of koji as influenced by the difference of material. (10) Various metabolic patterns by lactobacilli in shoyu mash. (11) Digestiblilities of protein in shoyu, miso, natto, and tempe fermentations. (12) Results of quantitative analysis of flavor constituents in koikuchi shoyu.

Figures show: (1) Flow sheet of tempe making. (2) Flow diagram of sufu making. (3) Diagram of rice-miso fermentation. (4) Diagram of koikuchi shoyu fermentation. (5) Tamari-shoyu fermentation. (6) Microflora changes in shoyu mash fermentation. (7) Classification of Aspergilli. (8) Fermented foods and condiments made from soybeans mixed with or without cereal grains or flour. Address: Research Div., Kikkoman Corp., Noda City, Chiba prefecture, Japan.

2622. Dinh, Daniel. 1992. Present status of soyfoods in Vietnam (Interview). *SoyaScan Notes.* Jan. 24. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Tofu and soymilk are the only two soyfoods that are widely known and used in Vietnam. Daniel's relatives made fish sauce *(nuoc-mam)* in Vietnam. Before 1975 there was a trade association of fish sauce manufacturers in Vietnam and their company was one of only 12 major manufacturers in the association Then in 1975 when the Communists took over, he had to flee the country, and his family decided to destroy their fish sauce factory, lest they face death or prison as capitalists. Now the situation is ripe for his return to Vietnam, and he is interested in learning to make miso and soy sauce, and perhaps starting production in Vietnam. Address: 22821 Sherman Way, West Hills, California 91307. Phone: 818-704-6432.

2623. Kushi, Michio. 1992. Introduction to *Culinary Treasures of Japan,* by John and Jan Belleme. 16 p. Jan. Unpublished manuscript.

• ***Summary:*** This manuscript, which was published in a condensed form in the actual book, tells the story of Mitoku and their work to export traditional Japanese natural foods to the Western world. Michio Kushi was instrumental in getting Mr. Akiyoshi Kazama involved in this work. Mr. Kushi, who became a World Federalist after World War II, came to the U.S. in Nov. 1949 to study at Columbia University. He continuously sought ways of establishing world peace, and increasingly came to believe that a proper diet is the basis for health, happiness, and peace.

In April 1966 the author's wife, Aveline, opened a small store named Erewhon in Boston. Michio began to search for a Japanese source for foods that Erewhon would sell. He was introduced to Mr. Kazama (who lived in Tokyo) through a Japanese friend, Mr. Obayashi, who resided at that time in New York City. Michio felt that Mr. Kazama understood his desire for foods of high quality. So Mr. Kazama "began his search for food producers and manufacturers who were sincere and willing to supply the kind of quality we requested. I know that for him, at that time, it was a great gamble. It was also a painstaking and slow step-by-step process."

Mr. Kazama was born on 1 Feb. 1930 in Yamanashi prefecture. He graduated from Waseda University in Tokyo, then was selected to study business in the United States. After arriving in Chicago, Illinois, he was drafted by the U.S. government to serve in the American Army in Korea and in Japan from 1956 to 1958. Upon his return to Japan, he settled in Tokyo where he became an import agent for a German company dealing in optics and electronics. After the Kushis contacted him, he became involved in the emerging natural food business. [He founded a company named Mitoku. Mi = Michio. To = Tomoko (Aveline's given name in Japanese). Ku = Kushi].

In 1968 Mr. Kazama made his first shipment of Japanese natural foods to Erewhon; the order was worth $3,000. The Kushis first met Mr. Kazama in Boston in 1970. Over the years, the volume of Mitoku's exports steadily grew, and expanded to Europe, Australia, and the Middle East. Today Mitoku ships its products to about 35 countries. Approximately 40% of Mitoku's exports go to America, 40% to Europe, and 20% to Australia and other regions. Annual sales are about $10 million. Among the major suppliers are Sendai Miso Shoyu Co. Ltd., Hatcho Miso Co. Ltd., Hagoromo Miso, Ltd., Hanamaruki Miso Co. Ltd, San Iku Foods Co. Ltd.

Distributors of Mitoku's products include the following: In the USA: Westbrae Natural Foods Inc., Great Eastern Sun Inc., U.S. Mills Inc., Tree of Life Inc., and Shojin Natural Foods (Hawaii). In Canada: Koyo Foods Inc., Flora Distributors Ltd., and Timbuktu. In Costa Rica: Distribuidora de Productos Macrobioticos S.A. In England: Sunwheel Foods Ltd, Clearspring Natural Grocer, Meridian Foods Ltd. In France: Celnat, Tama. In Belgium: Lima N.V. In the United Arab Emirates: Emirates Trading & Marketing Est. In South Africa: Key Health. In Austria: Naturkostladen, Lebenszeichen. In Switzerland: S'lotusbluemli, Terrasana, Futonhaus. In Sweden: Kung Markatta. In Norway: Alternative Import. In Finland: Makro Bios. In Portugal: Armazens Da Matinha. In Spain: Kunga. In Italy: La Finestra Sul Cielo, Probios S.R.L., Dalla Terra al Cielo, Solo Natura. In Israel: Tivoli Ltd. In Australia: Pureharvest. In New Zealand: Enso. In Singapore: Nature's Best. In Yugoslavia: General Export. In Japan: Seibu Department Stores Ltd., Tokyu Department Stores Ltd. Among the countries reached indirectly through trans-shipment are Hungary, reached through Austria, various South American countries reached through the United

States, and other countries such as Poland, Czechoslovakia, Iceland, Andorra, Ireland and the Caribbean Islands."

As Mitoku developed its international operations, Mr. Kazama hired many students from Western countries, including Blake Rankin (USA), Ferro Ledvinka (Italy), Christopher Geoffrey Dawson (New Zealand, starting 1979), Robbie Swinnerton (England), Terrie Adams (USA), and Michelle Harbroun (France).

"For the past 10 years, Mitoku has echoed and supported the macrobiotic perspective with its motto 'Isshoku-Dogen.' These words, though they have been forgotten in the last few centuries by the very people in the health care field who should remember them well, mean literally 'medicine and food have the same source,' and can be translated as 'food *is* medicine.' This saying has been used and known as part of the ancestral heritage of wisdom transmitted from generation to generation for several thousand years in Oriental countries such as China, Korea and Japan.

"In an attempt to preserve Japanese traditions, Japan has instituted a 'Living Treasures' program granting official recognition and support to [living masters in] various cultural areas such as theater, music, dance, sculpture, carpentry, weaving... and arts and crafts. Ironically, though, Japan has not granted the same official recognition to its traditional methods of food processing and production in spite of the fact that increasingly large numbers of people throughout the world are now appreciating traditionally processed Japanese food products and have become aware of their important health benefits. The Japanese traditional arts of producing miso, soysauce, tofu, natto, amazake, rice vinegar, sake, mirin, condiments and pickles as well as cooking methods and preparation are unique among the culinary practices of the world... These foods are also works of art... It is my hope and recommendation that official recognition and support be granted by the 'Living Treasures of Japan' to those who have dedicated their life to the traditional art of food production and processing in spite of the hardships and commercial disadvantages they are compelled to face in business competition and present-day economical conditions." Address: 62 Buckminster Rd., Brookline, Massachusetts 02146.

2624. *SoyaFoods (ASA, Europe).*1992. Nestlé invests in Asia. 3(1):2. Winter.
• ***Summary:*** "Nestlé, the world's biggest food group, is investing $100 million in new factories in five countries belonging to the South-East Asian Nations (ASEAN). The Swiss-based company will own 60% of the companies and will manage them."

Two of the 5 factories will be making soya products. "The Indonesian factory will be soya-based and soya sauce powder will be produced in Singapore."

2625. Whiteman-Jones, Michael. 1992. Soyfoods poised for growth: New mass-market interest, product development and consumer interest are driving sales higher than ever. *Natural Foods Merchandiser.* Feb. p. 18-19.
• ***Summary:*** Last year soyfoods were introduced to mass-market consumers by two of America's corporate giants. (1) Archer Daniels Midland Co. (ADM of Decatur, Illinois) introduced the vegeburger to show that a delicious food product could be made from soy. ADM marketing specialist Lee Lensch says the soy burger is doing very well in test markets in Indiana, Illinois, and Minnesota. Versions of the product are being advertised nationally in corporate TV spots and on local TV in test markets. Buyers who gave the products shelf space at chains such as Kroger, SuperValue and Cub Foods now report brisk sales. (2) Protein Technologies International in St. Louis, Missouri, a subsidiary of Ralston Purina, is test marketing a soy-based beverage named First Alternative in Phoenix, Arizona.

Peter Golbitz, president of Soyatech Inc., a consulting company in Bar Harbor, Maine, notes that since the 1980s, Japanese companies (such as Nichii Co.) have invested at least $50 million in soyfoods manufacturing plants in the U.S.

"Retail sales of soyfoods are growing in America by about 5 to 7 percent a year, increasing to about $657 million in 1990, Golbitz says. The most rapid expansion is for soy milk, which is growing at a rate of about 20% a year, and second-generation soyfoods which are growing at a rate of about 15%... Soy milk consumption in Australia, where it is sold in grocery stores like milk, is about 10 times what it is in this country."

Worldwide, consumption of soyfoods now averages about 1.7 kg/person/year, and is expected to rise to 2 kg or more by the year 2000. Taiwan is the world leader with 15.5 kg/capita/year of soy, followed by Japan at 11.1 kg. A world map and table (largely compiled from FAO Food Balance Sheets) shows "Soyfood consumption: Yearly average per capita (Amount of change from 1979 to 1988)." The following countries are listed in descending order of consumption in kg/capita: Korea 17.1 kg (2.4%). Taiwan 13.0 (37.0%). Japan 10.8 (6.7%). Indonesia 6.3 (57.4%). Hong Kong 3.8 (-22.0%). Saudi Arabia 3.6 (342.9%). China 3.4 (-5.6%). Paraguay 2.8 (50.0%). Malaysia 2.3 (102.2%). Thailand 1.6 (162.5%). Zimbabwe 1.6 (22.2%). United States 1.4 (33.3%).

2626. Wijeratne, Wilmot B. 1992. Update on developments at INTSOY (Interview). *SoyaScan Notes.* March 12. Conducted by William Shurtleff of Soyfoods Center. [1 ref]
• ***Summary:*** When INTSOY employees travel abroad to study soya, they prepare a trip report after each trip, but these reports are strictly for in-house use, and cannot be ordered; summaries can be ordered for a fee. Dr. Karl Weingartner has taken a number of trips to Africa and has

many contacts there. INTSOY's work is much more focused on food uses of soybeans than on feed.

Dr. Kauffman is on a 2-year leave of absence in Delhi, India setting up a Winrock-sponsored general Plant Genetics Resource Bank; it is not limited to soybeans. Wilmot Wijeratne is Associate Director and Dr. John Nicholaides III (director of the Office of Intl. Agriculture) is Acting Director of INTSOY. Due to funding constraints, INTSOY is now operating in more of a business mode.

The Proceedings of the China conference on soybean utilization have been submitted and edited, but the funds to publish the proceedings have never been obtained. INTSOY is now looking for funds, but unless such funds are found, the proceedings may never be published. However the Japanese have published all the papers presented by Japanese participants under the title *Proceedings of the International Conference on Soybean Processing and Utilization.* Each of the papers is in Japanese with an English abstract. It was edited by Okubo and printed by Sendai Kyodo Printing Co., 126 pages. No publisher is listed.

Recently Wilmot attended a conference in Bangkok, Thailand, concerning a network of Asian countries that are interested in soybean production. Address: Assoc. Director, INTSOY, Champaign-Urbana, Illinois.

2627. *Centerpoint (AVRDC, Shanhua, Taiwan).*1992. World Soybean Research Conference V. 10(1):10. March.
• ***Summary:*** "The World Soybean Research Conference V will be held in Chiang Mai, Thailand from 21 to 27 February 1994... For further information, write to: Conferences Secretariat, World Soybean Research Conference V, Department of Agricultural Extension, 2143/1 Phaholyotin Road, Jattujak, Bangkok 10900, Thailand."

2628. *Centerpoint (AVRDC, Shanhua, Taiwan).*1992. Global soybean network planning workshop. 10(1):10. March.
• ***Summary:*** RAPA stands for "Regional Office for Asia and the Pacific."

"The FAO Regional Office for Asia and the Pacific (RAPA) and the Thai Department of Agriculture, in collaboration with AVRDC, will sponsor the Planning Workshop for the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans to be held 2-7 March in Chiang Mai, Thailand.

"Scientists and specialists with experience in international agricultural development will meet in working groups to discuss priorities for an Asian Regional Soybean Network based on constraints and opportunities related to production, utilization, extension and policy. The Asian Network will be a component of the Global Tropical and Subtropical Soybean Network to be based in Rome [Italy]. Regional networks for Africa and Latin America have already been set up."

2629. Yamawaki, Teijirô. 1992. Edo jidai shôyu no kaigai yushutsu [Exports of shoyu from Japan during the Edo Period]. In: Noda Shishi Kenkyu (Studies of Noda History), Vol. 3. Noda, Japan: Shishi Hensan (Noda City History Editorial Committee). See p. 63-93. March. 30 cm. [50 ref. Jap]
• ***Summary:*** This is one of the best sources known on the subject, which includes much information on the export of shoyu from Japan to other parts of Asia and to the Netherlands by the Dutch East India Company (VOC).

Chronology and basic concepts: Almost all shoyu (soy sauce) exported from Japan during the 1600s and 1700s (and all soy sauce exported officially or legally) was exported from a tiny man-made island named Dejima in Nagasaki Harbor. Most of it was exported by the Dutch East India Company (VOC), which was the only European company allowed to trade with Japan during this period of isolation from 1600 to 1854. The Japanese government classified all soy sauce exported from Deshima into two basic types: (1) Official trade freight *(motokata nimotsu,* also called *compania nimotsu),* and (2) Private trade freight *(waki nimotsu,* also called *yakusha / sojya* {staff / sailor} *nimotsu).* Official trade freight was the kind engaged in by the Dutch East India Co.; this freight was recorded in the Nagasaki Trading Firm Journal. Private trade freight referred to the goods traded privately by Dutch sailors and by the chief and staff working at the Nagasaki Trading Firm.

Note: In about 1600 the Chinese obtained an official trade permit and settled in Nagasaki. At the peak of Chinese activity there, about a century later, as many as 190 Chinese ships a year were visiting Nagasaki, and one-sixth of the town's population hailed from the East Asian mainland.

1609-1641–The Dutch East India Co. (VOC) maintains a trading post at Hirado, a small island off the northwest coast of Kyushu.

1634–Dejima (literally "protruding island," also spelled Deshima), a small artificial island in Nagasaki Harbor is constructed as ordered by shogun Iemitsu; it originally accommodated Portuguese merchants.

1638-1639–The Portuguese (and other Catholic nations) are expelled from Japan for suspected complicity in the Shimabara Revolt of 1637.

1641 May–The Dutch East India Co. is moved from to Hirado to Dejima, where they were kept almost like prisoners on the tiny island. For 200 years, Dutch merchants were generally not allowed to cross the little bridge from Dejima to Nagasaki, and Japanese were likewise banned from entering Dejima. From 1641 to 1853 the Dutch are the only Western nation allowed to trade with or to enter Japan, but solely on Dejima. Chinese and Korean traders are still welcome, but their movements are restricted.

Dutch ship arrivals: From 1641 to 1671 an average of 7 ships per year. From 1671 to 1715 about 5 per year. From 1715, only 2 ships were permitted each year; this was reduced to 1 ship in 1790 and again increased to 2 ships in 1799.

1647–Exporting of shoyu (soy sauce) to Asia from Japan (as official trade freight) began. The first shipment was 10 kegs *(taru / balien)* sent to Amping, on today's Taiwan, by the VOC's Taiwan Trading Firm. From 1647 to 1720, this shoyu was exported from the Nagasaki Trading Firm to each regional trading firm in Asia, including today's Hanoi, Vietnam (1652); Ayuthaya, Thailand (1657), Jakarta, Indonesia (1659), Malaca, Malaysia (about 1660), 250 km northwest of Phnom Penh, Cambodia (1665), Paliacatta, 40 km north of Madras, India (1666), Bengal region. India (1666), Colombo, Sri Lanka (1670), Surat, northwest coast of India (1672), Amboina, Banda, and Ternate, in the Moluccas, Indonesia (1693), Sulawesi Island (Celebes), Indonesia (1693).

Note: This document contains the earliest date seen (May 2010) for soybean products (shoyu) in Cambodia (1665); soybeans as such had not yet been reported by that date.

1685–The Shogunate at Edo limits the amount of "private trade freight" to 400 *kan* (1 kan = about 3.75 kg), or about 1,500 kg or 3,300 lb.

1669 March 31–20 kegs of shoyu are shipped from Japan to Batavia on a Chinese ship (Source: Diary of Casteel Batavia). This is the earliest document seen showing a Chinese ship exporting shoyu from Japan.

1687–20 kegs of shoyu made in Kyoto (1 keg = about 29.104 liters) is shipped to the Ceylon (today's Sri Lanka) trading headquarters. It is believed to have been made by a sake brewer in Kyoto. At that time, Sakai city, a southern suburb of Osaka city, was located on the edge of Osaka Bay at the mouth of the Yamato River. It is one of the largest and most important seaports in Japan during the Medieval era, and is also famous in the Kyoto/Osaka (along with Kyoto) for its soy sauce production. During the period 1764-1780 shoyu was made in Sakai by 4 manufacturers, including Shobei Hosoya. Soy sauce made in Sakai was transported by ships along the Inland Sea (north of Shikoku), through the narrow straight between northern Kyushu and Shimonoseki, around the north and west sides of Kyushu, to Nagasaki. These ships from Sakai were called the "Sakai Raw Silk Carrier Boat" or *Sakai Bune.* They had been authorized to ship imported silk from Nagasaki since the Keichô period (1596-1611) of Edo era. The ship was empty going back from Sakai to Nagasaki and the space was used for soy sauce exports. Much of the shoyu exported from Japan to the Netherlands is thought to have been made in the Kyoto / Osaka area. It was probably made mainly in Sakai, while that made in Kyoto was exported in small amounts for special occasions. Extremely low priced shoyu is thought to have been made in Kyushu, and exported to China. None of the shoyu exported during the Edo / Tokugawa period (1600-1867) was made in the Edo / Tokyo *(Kanto)* area.

1711–In the Chinese and Western Freight Log it is recorded that 61 kegs of shoyu (56 large kegs and small kegs) as well as 40 kegs of miso were exported as "official trade freight," whereas 867 kegs were exported as "private trade freight." Thus, the private freight (in this rare year where records exist) was about 8 times as much as the official freight.

1712–Some 999 kegs of shoyu and miso are exported as "private trade freight," Unfortunately we are not told how many of these contained shoyu and how many contained miso.

1721-1792–The VOC exports Japanese shoyu only to its trading headquarters at Batavia (today's Jakarta, Indonesia); from there it is transferred to each regional trading firm.

1737–The VOC first exports Japanese shoyu to the Netherlands, from its Batavia headquarters. Thus, Japanese soy sauce first arrived in the Netherlands (and in Europe) in 1737. All this shoyu was exported as "official trade freight." This export route was used until 1760. During the 24 years from 1737 to 1760, approximately 46,000 liters of soy sauce were exported from Dejima to the Batavia headquarters, and 15,600 liters (about 1/3 of the total) were then shipped from Batavia to the Netherlands. In 1742 and 1743, no shoyu was transshipped from Batavia to the Netherlands. Thus, during the 22 years that shoyu was transshipped from Batavia to the Netherlands as "official trade freight" was about 707 liters/year. The amount exported was calculated based on the capacity of the "large keg" (29.104 liters); the small keg held exactly half this capacity (14.552 liters). In addition, a substantial amount of shoyu was presumably exported from Batavia to the Netherlands as "private trade freight."

Also in 1737 the limit of 400 *kan* on "private trade freight" is abolished, so that any amount can be exported in this way.

1790–Shoyu is first exported from Japan in comprador bottles; these bottles, made of grey / white porcelain, were recorded as "sterilized soy sauce" and 550 of them were used this year to export shoyu.

1795–The book titled *Travels in Europe, Africa, and Asia, Made between the Years 1770 and 1779...*, by Charles Peter Thunberg (a Swede) is published in English. An entry from about the year 1776 (Vol. 4, p. 107), in the chapter on Commerce, reads: The traffic in *Soy* [sauce]... is more considerable [than that of tea. Japanese] soy is much better than that which is brewed in China. For this reason, soy is not only exported to Batavia [Jakarta], in the wooden kegs in which it is made, but likewise sold from thence to Europe and to every part of the East Indies. In some places in Japan too the soy is reckoned still better than in others; but, in

order to preserve the very best sort, and prevent its undergoing a fermentation, in consequence of the heat of the climate, and thus being totally spoiled, the Dutch at the Factory [at Desima / Dezima / Dejima] boil it up in iron kettles, and afterwards draw it off into bottles, which are then well corked and sealed [by applying bitumen / coal tar to the stopper]. This mode of treatment renders it stronger and preserves it better, and makes it serviceable for all kinds of sauce.

Note: This early discovery of pasteurization and sealing in porcelain bottles explains how the Dutch were able to keep this soy sauce from spoiling becoming overfermented while it was being shipped from tropical Japan, to Batavia [Jakarta], across the Equator, around the Cape of Good Hope (south of Africa), then all the way to the Netherlands.

1799–The Dutch East India Co. (VOC) is dissolved.

1804-1829–A total of 2,672 kegs of shoyu is exported in Chinese ships during most of these 26 years from Japan. About 153 kegs/year are exported (range: 12 to 322 kegs, but with no exports in 1805, 1816-18, 1824-28).

1854–Japan's policy of self-imposed national isolation is abolished / ended. Shoyu can be exported freely, without limits.

Some 670 liters a year went to Holland. The soy sauce to be sent to Holland was put in a special container with special outside packaging. The shoyu that was exported was made mostly in Kyoto and In 1765 the famous French-language *Encyclopedia*, by Denis Diderot had a section on soy sauce.

Brief biography of Teijirô Yamawaki: 1914–Born in Japan. 1950–Graduated from Tokyo University, Dep. of Literature, Faculty of Japanese History. 1954–Awarded his doctorate (PhD) in history from Tokyo Univ. Between 1960 and 2002 he was the author of at least 8 books in Japanese including: (1) *Smuggling (Nukeni)* (1965, Nikkei Shinsho). (2) *Trading with Chinese Merchants in Nagasaki* (1964, Yoshikawa-kobunkan). (3) *Nagasaki Trading Firm of Dutch Merchants* (1980, Chiokoron). (4) *Encyclopedia of Silk and Cotton during the Edo Period (Jiten Kinu to Momen no Edo Jidai)* (2002, Yoshikawa-kobunkan, Tokyo, 230 p.).

Note: See also the excellent 16-page English-language summary of this report prepared and published by Kikkoman Institute for International Food Culture (KIIFC) in Noda, Japan. Address: Japan.

2630. Yamawaki, Teijirô. 1992. Soy sauce export in the Edo Period–according to the Nagasaki Trading Firm Journal. A translation of *Edo jidai shôyu no kaigai yushutsu*. Noda, Japan: Kikkoman Institute for International Food Culture (KIIFC). 16 panels. 15 x 10.5 cm each. Front and back. Available at http:// kiifc.kikkoman.co.jp/ english/exhibit/ index.html [18 ref. Eng]

• ***Summary:*** This is the best known English-language source on the subject. It is volume 3 of the 14-volume set. Contents: 1. Introduction. 2. Soy sauce export in the Edo Period–according to the Nagasaki Trading Firm Journal. Note: This Firm in Nagasaki was part of the Dutch East India Co, or VOC. 2. Profile of Dr. Teijiro Yamawaki. 3. Official trade freight and private trade freight. Routes of soy sauce exports. 5. Soy sauce export to Asian countries. 6. Soy sauce export to Batavia headquarters. 7. Soy sauce export to the Netherlands. 8. Comprador soy sauce bottle (1). 9 Comprador soy sauce bottle (2). 10. Soy sauce exported as *waki nimotsu* (private trade freight). 11. Soy sauce exported by Chinese ships. 12. Production sites of exported soy sauce. 13. Transportation of Comprador soy sauce bottles. 14. Comprador merchant guild (1) *[Konpura / Kompura Nakama]*. 15. Comprador merchant guild (2). 16. References.

A careful analysis of the records shows that there were two sizes of wooden (cedar) kegs used for exporting soy sauce from Japan. The "large taru" had a capacity of 29.1 liters, whereas the "small taru" had about half that capacity. Note: However during the 20th century, the typical wooden taru used for packaging soy sauce, had a capacity of either 9 *shô* (16.2 liters) or (later) 10 *shô* (18 liters = 4.75 gallons U.S.). Each cedar keg had a wooden lid, was held together with braided bamboo hoops, and tied with packing rope. Address: Lecturer, Tokyo Metropolitan Daisan High School of Business Studies; Dep. of Literature and Graduate School of Hosei Univ., Tokyo, Japan.

2631. Yamawaki, Teijirô. 1992. The Comprador soy sauce bottle (1-2). In: Yamawaki, Teijirô. 1992. "Soy Sauce Export in the Edo Period–According to the Nagasaki Trading Firm Journal." A Translation of *Edo jidai shôyu no kaigai yushutsu.* Noda, Japan: Kikkoman Institute for International Food Culture (KIIFC). 16 panels. See panels 8, 9, and 13. [Eng]

• ***Summary:*** The amount of soy sauce exported from Japan was recorded by the barrel in the Nagasaki Trading Firm Journal. But not all of this soy sauce was actually exported in barrels; some of it was exported in sterilized glass bottles (called "kerder bottles"), which were soon replaced by sterilized grayish white pottery bottles (called "comprador bottles").

The records show that two sizes of barrels were used to export soy sauce. The capacity of the small barrel was about 14.5 liters (3.8 gallons), roughly half of that of the large barrel (approximately 29.104 litres, or 7.78 gallons).

The pottery bottles [many of which are still exist and are even sold or displayed on the Web] were made in Imari or Hasami near Nagasaki to cover the shortage of glass kerder bottles. They were then replaced with the pottery bottle similar to the baked bottle currently used as sake bottles *(tokkuri).* [Note: Both types of bottles were ordered, examined, paid for, and supplied by the Comprador Merchant Guild].

The full name of the comprador bottle shaped like a sake bottle is "comprador soy sauce bottle," in order to distinguish it from the comprador sake bottle.

According to Mr. Yamawaki, a comprador bottle contained about 552 millilitres [a little more than 1 pint or half a quart] and 550 of them were used for the first time in 1790 for soy sauce export. These bottles of soy sauce are recorded in the Journal as "sterilized soy sauce." Soy sauce exported as official trade freight *(motokata nimotsu)* was discontinued in 1793. Eventually in 1799, the Dutch East India Company was dissolved. The Nagasaki Trading Firm subsequently came under the supervision of the East Indian Governor-General in Batavia, and soy sauce exports were resumed. At this time, the bottles were modeled after the ones used in 1790.

It was suggested by the late local historian, Mr. Masao Ichikawa, also a former notary in Amakusa, Nagasaki, that the comprador bottles came in two different styles.

They have the letters (all caps) "JAPANSCHZOYA" or "JAPANSCHSOYA" written on the shoulder. The early comprador bottles have handwritten letters on them and are grey/white porcelain. Two of the three bottles exhibited are the early comprador bottles. One of them, which is of yellowish earth-color, is considered to have been used even earlier than the white porcelain bottle.

Late comprador bottles have "JAPANSCHZOYA" and "CPD" stamped. "CPD" is the monogram that came from "comprador". On the opposite side of the bottle, a circular or oval stamp in Western characters or in Chinese characters, referring to the Nagasaki Comprador Trading Company or the Nagasaki Comprador Store, is seen. According to Mr. Yamawaki, the term, "trading company" came to be used during the Meiji period. This means that the late comprador bottle with the Chinese character stamp was also used during the Meiji period.

The capacity of comprador bottles differs from bottle to bottle. The capacity of one bottle exhibited in the Noda City Local Museum is 575 millilitres while that of another bottle is 460 millilitres (See: *Comprador soy sauce and soy sauce produced in Tokatsu region,* by Norio Tanaka). Based on the amount of soy sauce and the number of the bottles exported, Mr. Yamawaki assumes that a bottle contained approximately 522 millilitres.

As mentioned in Panel 8, "JAPANSCHZAKY" is seen on the shoulder of the bottles of the same shape used for sake export.

Transportation of Comprador soy sauce bottles: It must have been very difficult for the Dutch to maintain the quality of the soy sauce they shipped all the way to the Netherlands by way of Batavia, right on the equator and around the Cape of Good Hope. How did Dutch merchants prevent the products from spoiling without any of the refrigeration or vacuum packaging technology we have today?

The following is an excerpt from the 1795 book *Travels in Europe, Asia, and Africa, Made between the Years 1770 and 1779,* by C.P. Thunberg, a Swedish doctor and botanist who worked for the Nagasaki Trading Firm as a medical doctor.

"Japanese people produce extremely high-quality soy sauce, much better than the Chinese equivalent. A large amount of soy sauce is shipped to Batavia, India and Europe. The Dutch discovered a reliable method for preventing soy sauce from being degraded or fermented at a high temperature. They boil soy sauce in an iron pot and pack it into bottles applying bitumen (coal tar) to the stopper." (Translated by Tamaki Yamada; Thunberg's 1795 book is in English).

Note: All this took place long before Appert's invention of canning in 1809 and Pasteur's invention of pasteurization in 1862. In fact pasteurization had been practiced in Japan for 200 to 300 years before this time.

In 1790, 550 comprador bottles were used for the first time to export "sterilized soy sauce". This seems to refer to the soy sauce that was boiled and packed into bottles with coal tar-applied stopper, as described by Thunberg.

A photo shows a page that mentions soy sauce from the trading records of the Dutch East India Company (National Central Archive, Hague, the Netherlands). Address: Lecturer, Tokyo Metropolitan Daisan High School of Business Studies; Dep. of Literature and Graduate School of Hosei Univ., Tokyo, Japan.

2632. Yap, Bwee Hwa Flora. 1992. Tempeh activities. Promotion of tempeh. St. Ingebert, Germany. 3 p. April 5. Unpublished manuscript.

• ***Summary:*** These are two chronologies of her work to help introduce tempeh to Germany. The following is a sampler of activities, in chronological order: 1989 Feb. 18–Start experiments for tempeh starter production. 1989 March 31–First tempeh made. 1989 May 12–Make and serve Tempeh Croutons for about 150 people at the "Bali Evening" in the Saarbruecken high school *(Volkshochschule).* 1989 June 23–Sample of tempeh starter sent to Bernd Steyer of Byodo in Munich. 1989 Dec. 7–Fried tempeh made and served to about 80 people at the "Open door" Maya's tourist office.

1990 Jan. 28–First tempeh delivered for commercial sale to "Mutter Erde" (Mother Earth) natural food shop in the Saarbruecken. Each 200 gm cake sells for DM 3.20. 7 cakes a week are sold, later increasing to 10. 1990 Sept. 18–Report to the Gewerbe Amt of St. Ingebert. Her tempeh kitchen is inspected by 2 persons from the hygiene control *(Gesundheitspolizei)* division. Eventually she gets official

permission to make tempeh in her home kitchen. 1990 Nov. 2–Resume deliveries to "Mutter Erde" with package and label. 1990 Nov. 12–First cooking of tempeh for the cooking club of the Kneipp Verein of St. Ingebert.

1991 Jan. 30–Start whole-foods cooking course at the Kneipp Verein of St. Ingebert. They hold a "Tempeh Evening" and 15 people attend. 1991 Sept.–Promoting "Das Tempeh Buch." A recipe is now attached to each piece of tempeh.

A note about the Kneipp-Bund (a German national organization) and its state-level Kneipp-Vereins. The Kneipp Bund was founded in 1891 by father Sebastian Kneipp, a catholic priest who lived 1821-1897. The organization is devoted to the promotion of the health of the body-mind-soul through prevention by natural means, including water, fresh air, herbs, diet and lifestyle. Today there are about 150,000 members nationwide. The headquarters and publishing offices are in Bad Woerishofer. Flora has actively worked with this organization to introduce tempeh to its members and leaders. Address: Am Muehlenwaeldchen 1a, W-6670 St. Ingebert, Germany. Phone: 06894 / 53609.

2633. **Product Name:** Tofu [Firm, or Regular], Tofu Pudding, Soymilk [Plain, or Sweetened], and Fried Tofu.
**Manufacturer's Name:** Happy Tofu.
**Manufacturer's Address:** 5231 S.E. Powell Blvd., Portland, OR 97206. Phone: 503-771-2802.
**Date of Introduction:** 1992. April.
**How Stored:** Refrigerated.
**New Product–Documentation:** Talk with (call from) Ann Uong of Happy Tofu in Portland, Oregon. 1994. Feb. She hopes to start making tofu in April 1992. John Rumler. 1994. This Week (Portland, Oregon). Aug. 17, "Tofu Fo' You." Ann Uong started this tofu company and now has four employees. In 1980 she escaped from Vietnam in a crowded riverboat and was almost killed twice by pirates. Then she and her 6-year-old sister had to spend 18 months in a refugee camp in Thailand; there she met Hoang, an engineer from Saigon, and now her husband. Uong came to the USA in 1982, and Hoang followed a year later. In 1985 they were married. In 1991 they considered buying a chicken farm. But the unnatural factory-farming methods, with chicken kept in cages so cramped they were unable to walk, being force-fed chemicals to make them grow faster, made the couple so sad they decided to give up the idea–and to become vegetarians. Instead they decided to open a business in southeast Portland (at Southeast 53rd Ave. and Powell Blvd.) making and selling tofu and other soybean staples. At first their products were sold only to Asians, but gradually they found customers of all kinds. Now the company is distributing soybean products across Portland, and as far north as Seattle, and selling to such major accounts as Safeway and Food-4-Less.

Talk with Tom Nguyen. 1994. Nov. 17. Tom is Ann Uong's partner and brother-in-law, married to her sister. He is also Vietnamese. In April 1992 Happy Tofu started making firm and regular tofu, tofu pudding, and soymilk in plain and sweetened flavors. In Oct. 1992 they introduced Fried Tofu (in cubes).

2634. Bergh, Barbara. 1992. The Canadian oilseed processing sector: A profile. In: Statistics Canada. 1992. Grain Trade of Canada 1990-91. Ottawa, ONT, Canada: Statistics Canada. See p. 23-32. [Eng; Fre]
• ***Summary:*** Contents: Oilseed situation. Crushing industry. Vegetable oils. Vegetable oilmeals. Economic value of the industry. Policy issues and recommendations by the Canola Marketing Task Force. "The main oilseed crops produced in Canada are [in descending order of the amount produced], canola, soybeans, flaxseed and sunflower seed. There has been an almost continuous increase in the production of oilseeds since 1950, with the largest increase being in canola production which will reach a record 4.3 million tonnes in 1988/89. There was a record 1.3 million tonnes of soybeans produced in 1990/91. A bar chart shows the amount of Canada's four major oilseeds produced every 5 years from 1950 to 1990. "Only small amounts of oilseeds are imported into Canada, but significant amounts are exported. In 1990/91, 99% of canola exports went to Japan, while soybean exports were destined mainly for the U.S., Netherlands, Portugal, Hong Kong, Japan and Singapore."

One of Canada's three soybean crushing plants closed in 1991 causing a drop in soybean crush capacity from 3,700 to 2,500 tonnes per day. Of this, CanAmera Foods in Hamilton, Ontario, has 1,270 tonnes, and ADM Agri-Industries Ltd. [in Windsor, Ontario] has 1,250.

"The two major oilseeds processed in Canada are canola and soybeans, with small amounts of sunflower seed and flaxseed also being crushed. Canola is crushed mainly for its oil as its seed yields about 40% oil and 60% meal. Soybeans are crushed more for the meal since they yield about 78% meal and only 17.5% oil. Sunflower seed yields 42% oil and 35.5% meal, while flaxseed yields 34% oil and 63% meal...

"In 1990/91, 44% of the domestic canola crop was crushed, compared with 72% for soybeans, 70% for sunflower seed and 1% for flaxseed."

"In 1990/91, 0.8 million tons of crude vegetable oils were produced in Canada... Canola oil accounted for 74% of total vegetable oil production in Canada, followed by soybean oil at 21%, sunflower oil at 4% and linseed oil at 1%. In addition, approximately 25.0 thousand tonnes of corn oil are produced annually."

"Soybean meal is the major vegetable oilmeal used in Canada, accounting for 76% of the total oilmeal consumption in 1990/91. Canola meal is next, accounting for 22% of total domestic use, followed by sunflower and

linseed meals which accounted for 1% or less." Soybean meal contains 48% protein, whereas canola meal contains only 36-37% protein; it contains more fiber than soybean meal and has less digestible energy.

As of 1 Jan. 1992, Canadian soybeans, crude soybean oil, soybean meal, canola seed, crude and refined canola oil and meal all have tariff-free access to the USA. Refined soybean oil will be duty free as of 1 Jan. 1995. Address: Market Analyst, Canadian Oilseed Processors Assoc., 1010-360 Main St., Winnipeg, Manitoba R3C 3Z3, Canada. Phone: 204-942-3408.

2635. Lee, H.P.; Gourley, L.; Duffy, S.W.; Esteve, J.; Lee, J.; Day, N.E. 1992. Risk factors for breast-cancer by age and menopausal status: a case-control study in Singapore. *Cancer Causes and Control* 3(4):313-22. July. * Address: 1&5. Dep. of Community, Occupational and Family Medicine, National Univ. of Singapore, Lower Kent Ridge Road, Singapore 0511; 2. Gleneagles Hospital, Singapore; 3&6. Cambridge, UK.

2636. Schrodt, Anita. 1992. Tastes of Thailand survive with Royal Orchid Restaurant... *Wichita Eagle (The) (Kansas).* Sept. 7. p. 4D. Prosper section.

• ***Summary:*** The section titled "Other Donations" states: "Midwest Biofuels of Leawood [Kansas] for biodiesel production that will turn tallow and yellow grease feedstocks into fuel.

Note: This is the earliest document seen (May 2007) that mentions "Midwest Biofuels."

2637. Shannon, Dennis A. 1992. Work with soybeans in Nigeria (Interview). *SoyaScan Notes.* Oct. 9. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Dennis worked as a soybean breeder with IITA in Nigeria, where the center of soybean production is currently Benue state in south central Nigeria. Benue state has been growing soybeans since the end of the 1930s, when the variety Malayan was introduced. Soybeans were seen as an export crop until the Biafran war; at that time exports ceased but curiously production continued. When he was a graduate student in 1980-81 doing his research in Nigeria, he found soybeans being grown in Benue state. Yet farmers don't eat the soybeans. Some farmers told him: "They used to tell us that soybeans are good to eat but they would also tell us that they are poison." So the farmers sold the soybeans to Hausa traders who would ship them to Kafanchan, in Kaduna state, where they were made into dawa-dawa *(dadawa, iru).* Kafanchan is the center of soybean dadawa production. Hendrick C. Knipscheer had a Nigerian graduate student who did a survey on dawa-dawa; he found that some of it was even making its way into Niger and Chad. A Peace Corps Volunteer named Woodworth worked with Ken Dashiell at IITA in 1988-89 doing surveys on soybeans. He found that quite a few people are eating soybeans now in Benue state, either as dawa-dawa or as a partial substitute for cowpea in *moimoi* (steamed cowpea flour) or *akara* (dumplings). The soybeans were less expensive and more nutritious than cowpeas. When he arrived in Nigeria in the mid-1980s, there was almost no soybean production in western Nigeria. Increasingly, soybeans in Nigeria are being used as food.

In Nigeria IITA developed a cropping system named "alley cropping" as a way of maintaining the productivity of the soil, improving soil conservation, and reducing erosion. You plant hedgerows of fast-growing trees (typically leucena) about 12 feet apart, then before planting crops between the rows you prune the trees and spread the leaves on the ground to provide nitrogen and organic matter. Between the rows you can plant maize, cassava, soybeans, etc. You must prune the trees at least once while the ground crop is growing to reduce shading and add more nitrogen. Address: Asst. Prof., Dep. of Agronomy and Soils, 202 Funchess Hall, Auburn Univ., Auburn, Alabama 36849-5412. Phone: 205-844-4100.

2638. Griffis, Gil; Wiedermann, Lars. 1992. Marketing food-quality soybeans in Japan: A manual on how to profit from the niche market in Japan for value-added soybeans. 5th ed. St. Louis, Missouri: United Soybean Board. 25 p. Nov. 28 cm.

• ***Summary:*** Contents: Introduction. Japan: Desired soybean characteristics, tofu (procedure for making tofu, desired soybean characteristics, color of hilum, seed size {the larger the better, preferably more than 20 grams/100 beans}, color of cotyledons, hull, composition, special notes, American interpretation), miso (same categories of information as tofu), natto (ditto; seed size: The smaller the better, with a maximum of 5.5 mm diameter. Round shape is preferred to oval in order to limit swelling during the soaking and boiling processes), food quality soybean varieties (name, maturity zone, release year, used to make what soyfoods), distribution channels, marketing channels, protocol, pricing, organically-grown soybeans.

Taiwan: Introduction, list of major buyers, users, and trade associations. Korea. Southeast Asia. United States.

Appendix I. Distribution systems for soybeans used for food in Japan: Tofu, natto, miso. Appendix II. Food soybean imports by country of origin, 1984-1991. USA is the largest supplier (845,000 tonnes in 1991), followed by China (279,000), then Canada (28,000). Total imports, which have stayed about constant during this period, were 1,152,000 tonnes in 1991.

Appendix III. Distribution by usage of soybeans used for food–1991, direct use only in tonnes (metric tons). Tofu: 607,000 tonnes total, of which 562,000 come from the USA and Canada, 25,000 from China, and 40,000 from Japan. Up 2% from 1989.

Miso: 171,000 tonnes total, of which 38,000 come from the USA and Canada, 121,000 from China, and 12,000 from Japan. Up 0.5% from 1989.

Natto: 147,000 tonnes total, of which 87,000 come from the USA and Canada, 50,000 from China, and 10,000 from Japan. Up 9% from 1989.

Other: 39,000 tonnes total, of which 20,000 come from the USA and Canada, none from China, and 19,000 from Japan. Total food use of 964,000 tons is up 2% from 1989. Source: Japanese trade newspapers and trade associations. These figures do not include a estimated 492,000 tonnes of soybeans used indirectly (in the form of defatted soybean meal) for soy sauce, 222,000 tonnes used for soy protein, and 20,000 tonnes for other indirect uses.

Appendix IV. Directory of direct importers of food-quality soybeans. Appendix V. Traders of food-quality soybeans. Appendix VI. Soy food organizations in Japan (tofu, miso, soymilk, packaged tofu, natto). Appendix VII. Helpful contacts.

Food quality soybean varieties (with maturity group / zone, and year released; table, p. 5): Chico (00, 1983), Grande (0, 1976), Proto (0, 1989), Minnatto (0, 1989), NattoKing (I, 1988), Disoy (I, 1967), Vinton (I, 1978), Vinton 81 (I, 1981), King Natto (I, 1985), Kato (I, 1989), Magna (II, 1967), Prize (II, 1967), Marion (II, 1976), LS201 (II, 1989), Provar (II, 1969), Beeson (II, 1969), Kanrich (III, 1956), Kim (III, 1956), LS301 (III, 1989), Verde (III, 1967), IL2 (III, 1989; from Illinois), Hawk (III, ?), Emerald (IV, 1975), Vance (V, 1986), Camp (V, 1989), Hartz 936X (VI, 1981), Hartz 914 (VI, 1989), Hartz 922 (VI 1989), Merrimax (?, 1986).

Note: This report was originally published in Sept. 1989, mainly for use by the the American Soybean Association office in Tokyo. Address: 1. Division Director for Asia; 2. Country Director for Japan. Both: American Soybean Assoc.

2639. *INTSOY Newsletter (Urbana, Illinois).*1992. INTSOY-Triple F partnership unveils model soybean processing facility. No. 44. p. 4. Dec.

• ***Summary:*** "In a unique public-private partnership, INTSOY and Triple F of Des Moines, Iowa, recently unveiled a model extrusion-screw press facility that produces high-quality soybean meal and oil. This commercial plant is located in the small town of Congerville, Illinois–about 50 miles from the University of Illinois campus. The opening of the facility culminates more than a decade of research and development activities and will serve as a functioning model for developing countries interested in expanding the use of soy foods and feed. The process is ideally suited for countries where millions of dollars are not available for building soy processing plant...

"The new system centers on an INSTA PRO Model 2500 extruder...

"About 150 local farmers have been trading soybeans for meal at the facility for about a year, while INTSOY and Triple F studied the process. The current operation processes about 400 metric tonnes of locally grown soybeans a month. A single extrusion-screw press unit can process 680 kilograms of soybeans per hour, yielding about 600 kilograms of protein-rich meal and 70 kilograms of oil. The press cake or meal contains about 44 percent protein and 8 percent oil...

"In many developing countries, the system can be easily used to produce soy flour for human consumption. Extensive tests by INTSOY scientists have confirmed that 15 percent or more soy flour can be added to local staples such as baked products without affecting the flavor and texture...

"Commercial extrusion-screw press facilities are also operating in Zambia, Vietnam, Sri Lanka, and Zimbabwe. Another model demonstration plant is set for construction in Egypt."

2640. Tu-Bich-Thuy. 1992. The current status of soybean production in South Viet Nam. *Palawija News (Bogor, Indonesia)* 9(4):1-7. Dec.

• ***Summary:*** Contents: Soybean producing areas in South Viet Nam: Dong Nai Province (this area in eastern South Viet Nam supplies 25% of the nation's soybeans), Mekong River delta. Technical aspects of soybean production (in each of the two regions mentioned above): Land preparation, fertilizer use, varieties, weeds, pests and diseases, cropping patterns, mixed cropping with maize, soybean before tobacco, economic efficiency. Soybean utilization in Viet Nam: Utilization as food (80% of the crop is used to produce soybean curd, fermented soybean curd, soybean milk, soybean meal and small quantities of soybean oil), utilization for soybean glue, utilization as stock feed, utilization as fertilizer. Policies necessary for the development of soybean production in South Viet Nam: Government's role in soybean production. Production constraints. Research activities conducted to date by U.A.F. Concluding remarks. Future research activities of the U.A.F.

2641. Anwarhan, Hans; Rondot, Pierre. 1992. Technology adoption in Indonesia: Promoting farmer participation in research on soybean. In: Increasing Soybean Production in Asia: Proceedings of a Workshop. 1992. Bogor, Indonesia: CGPRT Centre. 187 p. See p. 85-97. Held 21-24 Aug. 1990 at Phitsanulok, Thailand. [5 ref]

• ***Summary:*** Contents: Introduction. Research extension linkage. The SYGAP methodology: The diagnosis stage, on-farm experiments, socio-economic monitoring and field days, farmer's trial of the proposed technology. Discussion and conclusion. Address: 1. Agronomist and National Coordinator of SYGAP (Soybean Yield Gap Analysis Project) in Indonesia, ESCAP CGPRT Centre; 2.

Agricultural Economist, ESCAP/CGPRT Centre, SYGAP Project.

2642. Asian Vegetable Research and Development Center. 1992. Annotated bibliography of soybean rust *(Phakopsora pachyrizhi* Sydow). Shanhua, Taiwan: AVRDC. 160 p. Author index. Subject index. Geographical index. 26 cm. AVRDC Library Bibliography Series No. 4-1. [480 ref]
• ***Summary:*** This publication supersedes an earlier edition published by AVRDC in 1987. It includes an additional 160 citations covering the period 1985 to May 1991.

Compiled by P.L. Hwang, F.C. Chen, and C.C. Wei, this bibliography contains abstracts of documents about soybean rust which are available in the AVRDC Library. Contents: Explanatory note, general information, pathogen morphology and taxonomy, physiology and biochemistry, epidemiology, pathogenic specialization, etiology, yield loss, and disease management (incl. general, chemical control, biological control, host resistance, cultural control).

Countries or continents mentioned in the index at geographical distribution of soybean rust: Africa, Asia, Australia, Brazil, Cambodia, China, Columbia, Costa Rica, Cuba, Guatemala, India, Indonesia, Israel, Japan, Korea, Latin America, Malaysia, Nepal, Papua New Guinea, Philippines, Puerto Rico, Soviet Union, Sri Lanka, St. Thomas, Suriname, Taiwan, Thailand, Togo, United States, West Indies, Venezuela, Vietnam, Zambia. Address: P.O. Box 42, Shanhua, Tainan 74199, Taiwan.

2643. Asian Vegetable Research and Development Center. 1992. Vegetable soybean production: Proceedings of a training course, Chiang Mai, Thailand, 18-24 February 1991. Taipei, Taiwan: Asian Vegetable Research and Development Center. 69 p. AVRDC Publication No. 92-369. No index. 28 cm. [5 ref. Eng; Tha]
• ***Summary:*** This conference was sponsored by AVRDC and the Thailand Department of Agricultural Extension. These proceedings were originally published in Thai. The technical editor was M. Shanmugasundaram. Contains 14 chapters by various authors, each cited separately. Also contains: Preface, by Emil Q. Javier, Director General of AVRDC (p. 4). Opening remarks, by Chavalvut Chainuvati (p. 5). Opening address, by Petcharat Wannapee (p. 6-7). Directory of 68 participants (p. 67-68). Address: Taiwan.

2644. Astuti, Mary. 1992. Iron bioavailability of traditional Indonesian soybean tempe. PhD thesis, Tokyo University of Agriculture. [Eng]*
Address: Native of Indonesia.

2645. Burley, Terry. 1992. Thailand: Vegetable oil supply and demand set to take off. *Oils & Fats International* 9(5):26-28.
• ***Summary:*** In the twelve years from 1977/78 to 1989/90 production of soybeans and oilpalm (FFB = fresh fruit bunches) in Thailand more than doubled, from 2.15 million tons to 4.77 million tons.

Table 1 shows that of that production, soybean production went from 96,000 tons in 1977/78 to 617,000 tons in 1989/90–a 6.4-fold increase. Oilpalm production grew even faster during the same period, from 46,000 tons to 1,098,000 tons–a 23.9-fold increase.

Production of these two sources of vegetable oil has been promoted by successive governments in an attempt to reduce dependence on imports. "At the same time, several established oil extraction plants have undergone substantial expansion and modification..."

2646. Cardenas, Danilo C.; Legaspi, Benjamin M. 1992. The status of soybean production and utilization in the Philippines. In: Increasing Soybean Production in Asia: Proceedings of a Workshop. 1992. Bogor, Indonesia: CGPRT Centre. 187 p. See p. 119-35. Held 21-24 Aug. 1990 at Phitsanulok, Thailand. [8 ref]
• ***Summary:*** Contents: Introduction. Production situation: Production trends, economics of soybean production, price trends, marketing of soybean. Philippine foreign trade situation: Soybean imports, soybean exports. Soybean utilization. Government policies/programs affecting the industry: Policies, programs. Major problems besetting the local soybean industry. Conclusions.

The soybean, also know locally as "utao," has become an increasingly important economic crop in the Philippines. Yet in 1987 (the latest year for which figures are given) only 5,698 tonnes (metric tons) were harvested from 6,490 hectares, having a value of 45,169,000 pesos. This represented only 0.02% of the total Philippine quantity of agricultural production, and only 0.05% of total farm area and value. Philippine soybean production peaked at 11,466 tonnes in 1982. Most of the country's soybeans are grown in the southern Mindanao region (72.1%), followed by northern Mindanao (10.0%) and central Mindanao (9.4%). Imports of soybeans and products have steadily increased since Philippine farmers do not produce enough soybeans to meet local demands; the value (FOB US$) rising from $61,989,000 in 1980 to $127,981,000 in 1988. The main imports are soybean meal (accounting for 86.87% of total import value), refined soybean oil (5.19%), soybeans (4.18%), and crude soybean oil (223%). Before March 1986 the National Food Authority (NFA) had the sole authority to import soybeans, but with the introduction of the trade liberalization program, importation has reverted to private firms. In 1989 the country's major sources of imported soybeans were China (which supplied 42% of total imports), Brazil (34%), and the USA (15%). Exports, which are negligible, have grown from $136,000 to 1,123,000 during the same period. The main exports are soy sauce

(accounting for 91.03% of total value), salted and fermented soybeans (tausi, 3.34%), and soybeans (2.65%).

Table 7 lists and describes "Soybean-based food products popularly used in the Philippines." Fermented products include soy sauce, salted and fermented soybean *(tausi),* tempe (tempeh), soybean paste (miso), and soybean curd (fermented tofu cubes; a soft cheese-type product with a salty but mild flavor, eaten as a relish or cooked with meat and vegetables). Non-fermented products include soybean sprouts *(toge),* soybean cheese *(tokwa* [tofu]), Geerlings cheese (taho, soymilk curds; a sweet dessert or snack food for children), soybean milk, and roasted soybean (soy coffee).

"In terms of food usage, Filipinos, unlike other Asians, have not developed a taste for soya-based products... Most of the soy products available in the market are either made at home or in family-operated shops.

"It is interesting to note from the report of Co (1987) that small scale food processors engaged in manufacture of taho and tokwa preferred locally grown beans to imported ones. They claimed that local soybeans have a distinctive 'fresh' quality which imparts a finer and smoother texture to their finished products providing a longer shelf life than that produced from imported beans.

"Recently, several developments in the local economy have signaled a revival of interest in the use of soybean as food. In 1980 Nestle Philippines Incorporated began commercial production of powdered soymilk products and later a baby soya-cereal food formulation and a soya-based meat extender which is produced primarily for export to other Asian countries. Today Nestle Philippines, in co-operation with the Land Bank of the Philippines, the Regional Offices of the Department of Agriculture and PCARRD is encouraging local production of soybean and had adopted a no importation policy.

"Some years ago, the use of TVP also gained a permanent foothold in the local processing industry. It is used in the manufacture of ground meat products and as a meat extender. Almost all TVP used in the country is imported except for the locally manufactured full-fat TVP which is being produced by the Vitarich Corporation, one of the biggest feed millers in the country. The company has built a full-fat soya processing plant capable of utilizing 900 MT [metric tons] of soybean per month. Unfortunately, all its raw soybean requirements are imported from the U.S. and China.

"Soybean flour, protein concentrate and protein isolates are the newest soya-based products and are now used extensively in the country for the formulation of meat emulsion products. All raw materials are imported and there is no local manufacturing capability at present."

"Programmes: As early as the 1970s, the government tried to involve itself to some degree in boosting national soybean output, despite the low priority it accorded to soybean in general. It was an involvement borne out of an urgent need to meet the growing requirements of the local feed milling and livestock industry, rather than of a need to address the high incidence of malnutrition among Filipinos. Accordingly, the government launched a number of programmes to improve soybean production, most of which failed to achieve their goals. At present, only the PCARRD-coordinated Soybean Pilot Production Programme continues to function. This programme was initiated in late 1983." Address: 1. Supervising Science Research Specialist, Philippine Council for Agriculture, Forestry, and Natural Resources Research and Development (PCARRD); 2. Dep. of Agriculture Bureau of Plant Industry, Los Baños National Crop Research and Development Centre. Both: The Philippines.

2647. Chainuvati, Chavalvut. 1992. Soybean production and utilization in Thailand. In: Increasing Soybean Production in Asia: Proceedings of a Workshop. 1992. Bogor, Indonesia: CGPRT Centre. 187 p. See p. 1-15. Held 21-24 Aug. 1990 at Phitsanulok, Thailand. [6 ref]
• ***Summary:*** Contents: Introduction: Importance of agriculture, establishment of the Department of Agricultural Extension, DOAE's functions & responsibilities, soybean production, soybean production area, crop seasons, cultivation practices, harvesting, vegetable soybean. Soybean production and consumption campaign: Previous activities, 1990 activities, new creative work. Conclusion.

Thailand produces about 650,000 tons of soybeans each year. Of this, the first-grade seed is used for either home food industries (150,000 tons) or for next season's seed and other grain use. The remaining 500,000 tons are second grade seed, which are crushed to yield soy oil and soybean meal. The 20% of production used for food is used as follows: Fresh soybeans *(toa rae)* sold in open markets. Home industries: Soymilk, curd (tofu), soy sauce, fermented soybeans *(tao chiew),* soybean sprouts, starch or protein isolate for hot dogs or other sausages, and crisps *(Tao Nao).* Soy milk industries: Instant powdered milk mixed with dairy milk, fresh soymilk in packages, fresh soymilk in open market restaurants. "No soy grain [soybean seeds] is exported, except for a small amount of first-grade soybean to Singapore and Malaysia for making the above mentioned food."

"Vegetable soybean: Vegetable soybean is becoming more popular in agri-business, as many frozen-product companies are showing interest in this new crop. Seed is imported from Japan and Taiwan. Production yield has been impressive in several regions of the country such as Chiangmai, Chachoengsao, Petchburi, etc. Two companies which are close to the extension offices, are Chiangmai Frozen Food Co. and Okada Corporation Ltd.

"The Department of Agricultural Extension plays the role of middleman between private companies and the

farmer. Extension officers also transfer new information to the local farmers. Additionally, a national plan on vegetable soybean has been submitted to the policymakers and a future plan includes the promotion of domestic consumption."

"Previous activities: In 1972 the idea of a soybean campaign was first thought of by scientists in the Institute of Food Research and Product Development, Kasetsart University and the Department of Agricultural Extension. The major sponsor and co-creator, was the American Soybean Association. The co-institutes organized a grand dinner to open the campaign. Afterwards, the Department of Agricultural Extension encouraged Bangkok and provincial headquarters to organize exhibitions, field days and local broadcasting or publications on soybean production and processing. The home-economists from various provinces and organizations met for training and a seminar. The Food Institutes of Kasetsart University played a major role through publications, technology transfer, demonstrations and seminars."

"Since the opening of the soybean campaign, we assume that about 50 percent of the total population has received information about soybean. At least 10 percent of the population has started or increased soybean consumption, both industrial and home made products. This evaluation was carried out by the working group using stratified random sampling with a well-designed questionnaire.

"From general observation, soybean has become more popular than in the past. Urban people are now aware of soybean products and do not object to consuming soybean in their regular diet. Rural people, however, have very definite ideas about food and it is difficult to change their traditional food habits. The main target of our campaign was therefore to introduce soybean products into the daily food pattern of rural villagers." Address: Div. of Crops Promotion, Dep. of Agriculture Extension, Bangkok, Thailand.

2648. Chainuvati, Chavalvut. 1992. Vegetable soybean production in Thailand. In: AVRDC, ed. 1992. Vegetable Soybean Production: Proceedings of a Training Course, Chiang Mai, Thailand, 18-24 February 1991. Taipei, Taiwan: Asian Vegetable Research and Development Center. 69 p. See p. 8-9. AVRDC Publication No. 92-369. [Eng; Tha]

• ***Summary:*** In 1988 vegetable soybean production was established in Thailand by Japanese and Taiwanese manufacturers. Most of the soybeans are exported to Japan. Major Thai manufacturers include Chareon Pokapan C. Ltd. and Amphol Frozen Food Co. Ltd. In Thailand, soybeans are grown only during certain seasons as an intercrop. Therefore processing plants typically operate only 1-2 months per year due to shortages of vegetable soybeans.

Vegetable soybeans are presently one of the cash crops promoted by the Thai government as a supplementary crop to rice, corn, and cassava. Farmers can earn US$1000 to 1250 per ha growing this new crop. Since growing vegetable soybeans for fresh pods is labor intensive, and farmers have a limited supply of labor, each household can grow only 0.3 ha. Production is concentrated in the central and northern regions of Thailand. Varieties preferred and promoted by the manufacturers are AGS 292, Kaohsiung No. 1, Ryokkoh, and Tsurunoko.

Harvest of the pods begins at 3:00 in the morning. The pods are stored in nylon net bags that facilitate air circulation. The pods are sprayed with water and covered to maintain good quality. They must be transported to the processor within 6 hours to prevent the glucose in the beans from changing to starch. The value of vegetable soybeans depends on their degree of sweetness.

Upon arrival at the processing plant, the pods are cleaned in water. Only grade A and B pods are sorted out for blanching in water at 100ºC for 2½ minutes. The pods are then soaked in ice water, graded, and packaged in 1-kg plastic bags. Address: Rice and Field Crop Promotion Div., Dep. of Agricultural Extension, Thailand.

2649. Chotiyarnwong, Pimporn. 1992. Varieties and varietal development of vegetable soybean. In: AVRDC, ed. 1992. Vegetable Soybean Production: Proceedings of a Training Course, Chiang Mai, Thailand, 18-24 February 1991. Taipei, Taiwan: Asian Vegetable Research and Development Center. 69 p. See p. 13-18. AVRDC Publication No. 92-369. [5 ref. Eng]

• ***Summary:*** Vegetable soybean is called *turag* in Thai. The breeding program at the Chiang Mai Field Crop Research Center in Thailand is working to develop improved vegetable soybean cultivars for local consumption and export. For local consumption, the large-seeded Nakhon Sawan 1 is recommended. For export: About 30 years ago, private companies began breeding vegetable soybeans for export to Japan. They have released more than fifty varieties, among which the following are now widely used: Tzurunoko [Tsurunoko], Ryokkoh, Kegon, Hatsutaka, Taishoshiroge, Nakate Kaori, Suzumo, Enrei, Fukuda, Raityo, Shirobata, Tamasudare, Hakutyo [Hakucho], and Siratsuyu [Shiratsuyu].

Eight tables show varieties, the 100-seed weight, and days to maturity. Vesoy #4, BPI #4, Tzuronoko, and Ryokkoh have performed very well. Vesoy #4 has a 100 seed weight of 56.4 gm. Address: Chiang Mai Field Crop Research Center, Dep. of Agriculture, Thailand.

2650. Chotiyarnwong, Pimporn; Chotiyarnwong, Anek. 1992. Postharvest management of vegetable soybean. In: AVRDC, ed. 1992. Vegetable Soybean Production: Proceedings of a Training Course, Chiang Mai, Thailand,

18-24 February 1991. Taipei, Taiwan: Asian Vegetable Research and Development Center. 69 p. See p. 24-26. AVRDC Publication No. 92-369. [Eng]

• ***Summary:*** Contents: Introduction. Vegetable soybean grades: A, B, C, and D. Vegetable soybean quality control form. Grade A (the best) must have: At least two complete well-developed seeds per undamaged pod. Pods that are at least 4.5 cm long. Varietal purity. In a 3-seeded pod, one missing seed is acceptable as long as the other two are well developed and next to each other. It is OK for pods to have a slightly pink color. Address: Chiang Mai Field Crop Research Center, Dep. of Agriculture, Thailand.

2651. Cultivation of vegetable soybean and production of good quality seeds. 1992. In: AVRDC, ed. 1992. Vegetable Soybean Production: Proceedings of a Training Course, Chiang Mai, Thailand, 18-24 February 1991. Taipei, Taiwan: Asian Vegetable Research and Development Center. 69 p. See p. 50-53. AVRDC Publication No. 92-369. [Eng]

• ***Summary:*** Contents: Introduction. Cultivation of vegetable soybean: Periods of cultivation, climate, cultivation areas, soybean strains, land preparation, seeding method, fertilization (fertilizers), weed control, irrigation, harvesting. Seed production and quality control: Planting area selection, farmer selection, planting seasons, cultivation, harvesting, packaging, storing.

Three soybean strains grown in Thailand are suitable for export: AGS 292 (Kaoshiung #1), TVB4 or 205 (Tzurunoko [Tsurunoko]), and 305 (Ryokkoh).

Vegetable soybeans are harvested between the R-6 and R-7 stages, while the pods are still green, 65-75 days after sowing, or 28-30 days after flowering, depending on the variety. The plants are harvested by cutting or pulling them out of the ground.

2652. Effendi, Mohammad Nasrul. 1992. Agricultural extension in Indonesia with reference to soy production. In: Increasing Soybean Production in Asia: Proceedings of a Workshop. 1992. Bogor, Indonesia: CGPRT Centre. 187 p. See p. 67-83. Held 21-24 Aug. 1990 at Phitsanulok, Thailand. [8 ref]

• ***Summary:*** Contents: Introduction: Background to agricultural extension. The agricultural extension system: Concept and philosophy, organizational structure. Agricultural extension personnel. Food crop production programmes and their relation to agricultural extension, specifically soybean. Conclusion. Appendix 1: The number of farmer groups in Indonesia, per April 1989. Appendix 2: The administrative divisions of extension regions in Indonesia, per May 1990. Glossary. Address: Directorate of Food Crop Extension Development, Directorate General of Food Crop Agriculture.

2653. Food and Agricultural Organization of the United Nations. 1992. Soybeans: Area harvested, yield, and production. *FAO Yearbook–Production (Rome, Italy)* 46:115-16.

• ***Summary:*** The following nations are listed for the first time as soybean producers in the *FAO Production Yearbook.* F = FAO estimate. * = Unofficial figure. Burkina Faso: Harvested 5,000F ha in 1990, 1991, and 1992.

Panama: Harvested 1,000 ha per year in 1979-1981, 7,000 ha in 1990, 6,000 ha in 1991, and 3,000 ha in 1992.

Honduras is no longer listed, but reappeared in 1994. Achieved yields of 747 kg/ha in 1991.

Syria: Harvested 5,000* ha in 1991 and 1992.

Albania: Harvested 4,000 ha in 1979-81, 10,000 ha in 1990, 9,000F ha in 1991, and 10,000F ha in 1992. Note: This is the earliest document seen (May 2003) that contains statistics on soybean production in Albania.

Bosnia and Herzegovina: Harvested 8,000 ha in 1990, 6,000* ha in 1991, and 5,000F ha in 1992.

Croatia: Harvested 27,000 ha in 1990, 23,000 ha in 1991, and 26,000 ha in 1992.

Macedonia: Achieved yields of 1,314 kg/ha in 1990, 1,833 kg/ha in 1991, and 1,600 kg/ha in 1992.

Slovenia: Achieved yields of 1,692 kg/ha in 1990, 2,000 kg/ha in 1991, and 978 kg/ha in 1992.

Former Soviet Republics–Azerbaijan: Harvested 1,000* ha in 1990, 1,000* ha in 1991, and 1,000F ha in 1992.

Georgia: Harvested 8,000 ha in 1990, 6,000 ha in 1991, and 6,000F ha in 1992.

Kazakhstan: Harvested 23,000* ha in 1990, 18,000* ha in 1991, and 19,000F ha in 1992.

Moldova: Harvested 26,000* ha in 1990, 20,000* ha in 1991, and 20,000F ha in 1992.

Russia (Russian Federation): Harvested 741,000 ha in 1979-81, 675,000 ha in 1990, 664,000 ha in 1991, and 632,000 ha in 1992.

Ukraine: Harvested 69,000 ha in 1979-81, 87,000 ha in 1990, 100,000 ha in 1991, and 100,000F ha in 1992.

Thus in 1992 the former Soviet Union harvested 800,000F hectares of soybeans. The leading countries, in descending order of soybean production, were Russia, Ukraine, Moldova, and Kazakhstan.

2654. Increasing soybean production in Asia: Proceedings of a workshop held in Phitsanulok, Thailand, August 21-24, 1990. 1992. CGPRT Centre, Jalan Merdeka 99, Bogor, Indonesia. vii + 187 p. Illust. Author index. 25 cm.

• ***Summary:*** Contents: Foreword by Peirre Rondot, SYGAP Regional Coordinator, CIRAD/CGPRT Centre. Map of study sites in Thailand and Indonesia. Thailand (3 papers). Indonesia (4 papers). Country papers: China. Korea. Philippines (2 papers). South Viet Nam. Sri Lanka.

Appendices: Directory of Participants and observers. Authors.

"These proceedings are the results of the Soybean Yield Gap Analysis Project in Thailand and Indonesia with country papers from China, Korea, the Philippines, South Viet Nam and Sri Lanka.

"Soybean production and utilization, socio-economic constraints on the grower, and the transfer of research results and the adoption of new technology by farmers are aspects covered in both Thailand and Indonesia.

"China's problems of production, and consumption prospects, the intensive cultivation practices of Korea and the private and company production of soybean in the Philippines provide interesting contrasts. The status of soybean in South Viet Nam contrasts in turn with the Yield Gap Analysis of Soybean in Sri Lanka." Address: Indonesia.

2655. Khadkao, Sawang. 1992. Insect pests of soybean. In: AVRDC, ed. 1992. Vegetable Soybean Production: Proceedings of a Training Course, Chiang Mai, Thailand, 18-24 February 1991. Taipei, Taiwan: Asian Vegetable Research and Development Center. 69 p. See p. 27-37. AVRDC Publication No. 92-369. [Eng]
• ***Summary:*** For each insect is given: Basic information, characteristics, habit, host plant, natural enemies, prevention and eradication, cultural practices. Major insect pests: Bean stem miner. Bean leaf roller. Soybean aphid. Sweetpotato whitefly. Common cutworm. Pod borer. Bean stink bug. Green stink bug. Bean bug. Controlling principles: Eradication, plant protection, pest control, pest population density (equilibrium level, economic injury level, economic threshold). Control methods: Biological control, physical and mechanical control, cultural control, legal aspects of control, chemical control, integrated pest management (IPM). Pest control considerations: The key is surveillance. Address: Chiang Mai Field Crop Experiment Center, Dep. of Agriculture, Thailand.

2656. Manit, Srisomwong; Ratonatawin, Kalya. 1992. Vegetable soybean seed production. In: AVRDC, ed. 1992. Vegetable Soybean Production: Proceedings of a Training Course, Chiang Mai, Thailand, 18-24 February 1991. Taipei, Taiwan: Asian Vegetable Research and Development Center. 69 p. See p. 10-12. AVRDC Publication No. 92-369. [Eng]
• ***Summary:*** Contents: Eight key recommendations for farmers. Seed production problems. Causes of immature seeds. Address: Chiang Mai Field Crop Research Center, Dep. of Agriculture, Thailand.

2657. Markmoon, Chalermpol. 1992. Vegetable soybean "information for farmers." In: AVRDC, ed. 1992. Vegetable Soybean Production: Proceedings of a Training Course, Chiang Mai, Thailand, 18-24 February 1991. Taipei, Taiwan: Asian Vegetable Research and Development Center. 69 p. See p. 22-23. AVRDC Publication No. 92-369. [Eng]
• ***Summary:*** Contents: Farmers who grow vegetable soybean for the first time need information and training. Four sources of information. Two places that vegetable soybean cultivation takes place in Nakhon Pathom and Kanchanaburi. Six requirements of successful vegetable soybean cultivation. Two methods of planting. Three methods of irrigation. Two methods of applying fertilizer. Two manual harvesting approaches. Four problems experienced by farmers. Address: AVRDC Thailand Outreach and Regional Training Program, Kasetsart Univ.

2658. Nantapan, Monta. 1992. Diseases and their control. In: AVRDC, ed. 1992. Vegetable Soybean Production: Proceedings of a Training Course, Chiang Mai, Thailand, 18-24 February 1991. Taipei, Taiwan: Asian Vegetable Research and Development Center. 69 p. See p. 38-44. AVRDC Publication No. 92-369. [Eng]
• ***Summary:*** For each disease, the causal organism, symptoms, epidemiology, and control are discussed. Contents: Bacterial pustule. Anthracnose. Soybean crinkle leaf. Purple seed stain. Rust. Downy mildew. Charcoal rot. Basal and root rot. Soybean mosaic virus. Phomopsis seed decay. Address: Chiang Mai Field Crop Research Center, Dep. of Agriculture, Thailand.

2659. Pattana, Jierwiriyapant; Hermanto, -; Roche, F.; Bottema, J.W.T. 1992. Local soybean economies and government policies in Thailand and Indonesia. ESCAP CGPRT Centre, Jalan Merdeka 99, Bogor, Indonesia. x + 203 p. Illust. 25 cm. Series: CGPRT No. 27. *
• ***Summary:*** Contents: Foreword. Summary and introduction, by J.W. Taco Bottema. Part I. Soybean and competing crops in Chiang Mai province, Thailand: An application of the policy analysis matrix, by Pattana Jierwiriyapant and Prayogo U. Hadi. Part II. Local comparative advantage of soybean production: Cases from East Java, Indonesia, by Hermanto, Armen Zulham, and Sri H. Suhartini. Part III. Regional costs and comparative advantage in secondary crops, Indonesia, by Frederic Roche, Budiman Hutabarat, Abubakar, Nuryanto Daris, Toni SW, and Bambang Adinugroho.

"Pattana Jierwiriyapant clearly and thoroughly discusses the production, cultivation practices, utilization and marketing of soybean, and relevant government policies from 1971 to 1991, in Chiang Mai, Thailand. She uses the Policy Analysis Matrix (PAM) System to weigh up comparative advantage of soybean in relation to onion and garlic in Chiang Mai province. Important conclusions show the relevance of the PAM System to the formulation of future government policies on soybean."

"In this volume the trail-blazing work of Roche et al. is presented." Address: Indonesia.

2660. Postharvest practices and management [for vegetable soybean]. 1992. In: AVRDC, ed. 1992. Vegetable Soybean Production: Proceedings of a Training Course, Chiang Mai, Thailand, 18-24 February 1991. Taipei, Taiwan: Asian Vegetable Research and Development Center. 69 p. See p. 54-56. AVRDC Publication No. 92-369. [Eng]
• ***Summary:*** Contents: Introduction. Harvesting date. Harvesting method: Plant uprooting, cutting with sickle, direct pod collection (at 2-day intervals in three installments). Harvest time. Pod collection method. Packaging and transporting. Sorting and grading: Grades A, B, C, and D. Quality control by manufacturer.

2661. Rondot, Pierre; Sudaryanto, T.; Djauhari, A.; Anwarhan, H. 1992. Soybean utilization, processing and production policy in Indonesia. In: Increasing Soybean Production in Asia: Proceedings of a Workshop. 1992. Bogor, Indonesia: CGPRT Centre. 187 p. See p. 43-56. Held 21-24 Aug. 1990 at Phitsanulok, Thailand. [14 ref]
• ***Summary:*** Contents: Soybean utilization. Soybean processing industries. Production policy. Address: 1. Agricultural Economist, ESCAP/CGPRT Centre, SYGAP Project; 2. Agricultural Economist, CASER, SYGAP Project; 3. Agricultural Economist, Socio-economic Dep., BORIF; 4. Agronomist, CRIFC, SYGAP Project. All: Indonesia.

2662. Santos, D.T. 1992. Soybean cultivation in the Philippines. In: Increasing Soybean Production in Asia: Proceedings of a Workshop. 1992. Bogor, Indonesia: CGPRT Centre. 187 p. See p. 137-50. Held 21-24 Aug. 1990 at Phitsanulok, Thailand.
• ***Summary:*** Contents: Introduction. Development of the soybean industry: Nestlé Philippines' soybean operations (Nestlé soya farm, commercial soy production, soy loan and buy-back scheme, soy sourcing beyond Tupi, growth requirements and adaptability of soybean, soybean cropping systems), crop research and development, extension programme. Appendix 1: Soybeans–maize monocropping (crop rotation). Appendix 2: Maize–soybeans–crop rotation (three consecutive maize followed by soybeans). Appendix 3: Maize–soybeans intercropping (6 rows corn -4 rows soybeans). Appendix 4: Wet season 1988–soybean researchers at Nestle soya farm Tupi South Cotabato.

"Soybean, first cultivated in China during the eleventh century BC, was introduced into trading regions of the Philippines in the fifteenth century AD. Its cultivation and use spread throughout the Philippines and then the western hemisphere in the nineteenth century. Soybean... is considered by scientists and economists to be a major food source for the future. Although currently produced in small quantities, both traditional and new soybean products such as soya cheese, soybean curd, and miso, and Nestle's Twin, Vita, Soyex and Ceresoy, are popular with Filipinos.

"Development of the soybean industry: Soybean production in the Philippines has developed in response to an increasing demand. Varietal selection and development commenced in the early 1930s. In the 1970s, the Philippines Council for Agriculture and Resources Research and Development (PCARRD), in cooperation with the University of the Philippines at Los Baños and the Department of Agriculture, introduced the National Soybean Production Programme (NSPP) which promoted development of, and self sufficiency in, soybean... Under the programme, soybean planting was established throughout the country. A large soybean extraction plant with a 50 ton daily capacity was built by the Philippines Asia Food Industries Corporation in the early 1980s to produce the livestock industry's requirements of soybean oil and meal as well as soy-based food products.

"However, the combined impact of limited raw materials, the 1984 recession and some external political pressures led to the closure in 1986 of the factory and the NSPP. Individual initiatives among former participants allowed research and development activities to continue.

"PCARRD is currently engaged in a comprehensive nutrition-based programme covering soy production, post-harvesting processing, marketing, product utilization and development of improved varieties. This programme is funded by the International Research and Development Center of Canada."

"Nestlé Philippines' soybean operations: During the last ten years, Nestlé Pbilippines has developed new soy-based products with the assistance of Nestlé Switzerland. These include Vita Choco Drink, Twin, Ceresoy and Soyex.

"Nestlé Philippines, through Nestlé Soya Farm, continues to identify promising soy varieties and to generate the appropriate production and post-harvesting processing techniques to ensure its factory receives high quality raw materials.

"Nestlé soya farm: This six hectare soy researcb and demonstration farm in Tupi, South Cotabato has three main functions: production, crop research, and development and extension." Address: Nestlé Philippines, Inc., Agricultural Services Dep., 335 Gil Puyat Ave., Makati, Metro Manila, Philippines.

2663. Sarobol, Nantawan; Potan, N.; Virakul, P.; Benjasil, V.; Rondot, P. 1992. Transferring soybean research results to farmers [in Thailand]. In: Increasing Soybean Production in Asia: Proceedings of a Workshop. 1992. Bogor, Indonesia: CGPRT Centre. 187 p. See p. 31-42. Held 21-24 Aug. 1990 at Phitsanulok, Thailand.
• ***Summary:*** Contents: Linkage between research and extension: Concept. The existing farmer organizations in Thailand with emphasis on farmer organizations related to

soybean production: Choice of production inputs, development of existing farmer technology, bargaining power. The soybean users organizations, traders and processors. Address: 1-4. Ministry of Agriculture and Co-operatives, Bangkok, Thailand; 5. ESCAP CGPRT Centre, Indonesia.

2664. Sitatani, Krung. 1992. Cultivation practices for vegetable soybean. In: AVRDC, ed. 1992. Vegetable Soybean Production: Proceedings of a Training Course, Chiang Mai, Thailand, 18-24 February 1991. Taipei, Taiwan: Asian Vegetable Research and Development Center. 69 p. See p. 19-21. AVRDC Publication No. 92-369. [Eng]
• ***Summary:*** Contents: Introduction. Cultivars at TVRC. Cultivating season and location. Growing. Husbandry (management). Address: AVRDC Thailand Outreach and Regional Training Program, Kasetsart Univ.

2665. Summary of group discussions. 1992. In: AVRDC, ed. 1992. Vegetable Soybean Production: Proceedings of a Training Course, Chiang Mai, Thailand, 18-24 February 1991. Taipei, Taiwan: Asian Vegetable Research and Development Center. 69 p. See p. 63-66. AVRDC Publication No. 92-369. [Eng]
• ***Summary:*** Topic 1. Methods of vegetable soybean production for domestic consumption: Current situation, production limits and main issues, ways to develop, marketing channels.

Topic 2. Promotional methods for the production of vegetable soybean for export and coordination between growers and factories: Main issues and problems, method of development, amendment, and suggestions.

2666. Sunarlim, Novianti. 1992. Synthesis of agronomic results of SYGAP II in four locations in Indonesia. In: Increasing Soybean Production in Asia: Proceedings of a Workshop. 1992. Bogor, Indonesia: CGPRT Centre. 187 p. See p. 57-66. Held 21-24 Aug. 1990 at Phitsanulok, Thailand.
• ***Summary:*** Contents: Introduction. Research results: Varietal adaptation, cultivation, pest control, seasonal differences, package. Conclusion. Address: Agronomist and Agronomic Programme Leader of SYGAP (Soybean Yield Gap Analysis Project) in Indonesia. ESCAP CGPRT Centre.

2667. Tu, Bich-Thuy. 1992. The current status of soybean production in South Viet Nam. In: Increasing Soybean Production in Asia: Proceedings of a Workshop. 1992. Bogor, Indonesia: CGPRT Centre. 187 p. See p. 151-65. Held 21-24 Aug. 1990 at Phitsanulok, Thailand. [3 ref]
• ***Summary:*** Contents: Soybean producing areas in South Viet Nam. Technical aspects of soybean production. Soybean utilization in Viet Nam. Policies necessary for the development of soybean production in South Viet Nam. Production constraints. Research activities conducted to date by U.A.F. Concluding remarks. Future research activities of U.A.F. Suggestions for future research.

"Utilization as food: In Viet Nam 80% of the soybean crop is used to produce soybean curd, fermented soybean curd, soybean milk, soybean meal and small quantities of soybean oil. Although many factories in Ho Chi Minh City produce sesame, groundnut and coconut oils, soybean oil remains uncommon." Address: Univ. of Agricultural Forestry of South Viet Nam (UAF), Ho Chi Minh Coty, South Viet Nam.

2668. Vegetable soybean planting situations: Banhuafuay, Maunglen Subdistrict, Sansai District, Chiang Mai Province [Thailand]. 1992. In: AVRDC, ed. 1992. Vegetable Soybean Production: Proceedings of a Training Course, Chiang Mai, Thailand, 18-24 February 1991. Taipei, Taiwan: Asian Vegetable Research and Development Center. 69 p. See p. 57-62. AVRDC Publication No. 92-369. [Eng]
• ***Summary:*** Contents: General survey. Land preparation. Planting. Fertilizer application. Irrigation. Harvesting (Farmers cut the plants with sickles early in the morning. The plants are then gathered for pod collection). Cost and return. Observation tour of the Vegetable Soybean Demonstration Plot at the Chiang Mai Agronomy Research Center (Sansai District, Chiang Mai Province). Tour of Chiang Mai Frozen Foods Company Ltd. (Sansai subdistrict, Sansai district): The company was established in 1988 as a joint venture between Japan and Taiwan, objectives, operating results, scope of operation, promotion of vegetable soybean cultivation, planting technology, vegetable soybean purchasing (price for various grades), frozen vegetable soybean processing.

2669. Vegetable soybean production, consumption and marketing requirements. 1992. In: AVRDC, ed. 1992. Vegetable Soybean Production: Proceedings of a Training Course, Chiang Mai, Thailand, 18-24 February 1991. Taipei, Taiwan: Asian Vegetable Research and Development Center. 69 p. See p. 47-49. AVRDC Publication No. 92-369. [Eng]
• ***Summary:*** Soybean is an important crop in Thailand. Fresh soybean pods ("Tau Rae") are used as vegetables domestically and are also exported; their export volume has increased rapidly during the past 2 years. Thailand now exports about 5,000 tonnes (metric tons) per year, frozen, to Japan. The main growing area is in northern Thailand. Research is being conducted on variety improvement.

2670. Virakul, Prakarn; Potan, N.; Sarobol, N.; Benjasil, V.; Rondot, P. 1992. Socio-economic constraints on the soybean grower; Mae Tung, Chiang Mai [Thailand]. In: Increasing Soybean Production in Asia: Proceedings of a Workshop. 1992. Bogor, Indonesia: CGPRT Centre. 187 p.

See p. 17-29. Held 21-24 Aug. 1990 at Phitsanulok, Thailand. [1 ref]

• ***Summary:*** Contents: Introduction. Objectives. Methods of study: Method of data collection, type of data collected, farm treatments, data analysis. Sites of study. Period of study. Results: Soybean production system, marketing of soybean, family income and expenses, household debts, cost of soybean production, crop return analysis, production problems. Further research considerations. Address: 1-4. Ministry of Agriculture and Co-operatives, Bangkok, Thailand; 5. ESCAP CGPRT Centre, Indonesia.

2671. Badani, Bernard. 1993. Edible soybean mission report, Korea, Indonesia, Taiwan, February 1993. Ottawa, Ontario, Canada: Agriculture and Agri-Food Canada. iii + 14 + 17 p. 28 cm. Spiral bound.

• ***Summary:*** Contents: Foreword. Acknowledgements. Mission members: Tino Breuer, Ron MacDougall, Dr. Gary Ablett, Jim Lowe, Bernard Badani. 1. Visit to Korea: Executive summary, report, conclusions, recommended follow-up. 2. Visit to Indonesia: Executive summary, report, background, price structure, quality requirements, conclusions, recommended follow-up. 3. Visit to Taiwan: Executive summary, report, background, price structures, conclusions, recommended follow-up. Appendix A. List of contacts (photocopies of business cards of people met on the trip). List of 26 invitees for Canadian soybean seminar in Seoul (15 Feb. 1993), including academic researchers, government, soybean crushers, soysauce association, tofu association, food-related media, soybean milk manufacturers (Kwangja General Foods Co., Namyang Dairy Co., Lotte-Chilsung Beverage Co., Samyuk Foods Co., Dong-A/Otzka Co., Dr. Chung's Foods, See Joo Industry Co.). List of participants for Indonesia and business cards from Indonesia (incl. Primkopti, Sarpindo, Ikapti, Yeo's-P.T. Salim Graha). Business cards from Taiwan. Address: Oilseeds Div., Grain Marketing Bureau, Grains and Oilseeds Branch, Agriculture Canada, Ottawa.

2672. Le Quang Hanh; Le Dih Son. 1993. Field note: DT80 soybean in the north of Viet Nam. *Palawija News (Bogor, Indonesia)* 10(1):1-2. March. [2 ref]

• ***Summary:*** "In South Viet Nam the two main soybean producing areas lie in Dong Nai Province (eastern South Viet Nam) and the Mekong River Delta... Soybean farming is not mechanized. In the Mekong River Delta alone the total area under soybean is about 20,000 ha. This region produces about one third of the national crop (Tu Bich Thuy, 1990, Workshop on Priorities for Soybean Development in Asia, Bogor, in press)."

The DT80 variety soybean is being widely tested in Northern Viet Nam. "In 1983, 100,000 ha was planted to soybean in Viet Nam with an average yield of 1,070 kg/ha. After 10 years DT80 soybean has extended to 1,000 hectares in 7 provinces. The area, yield and production of DT80 soybean are given [for each province] in Table 1. The average yield is 1.96 tons dry soybean seed per hectare (average 1,899 kg/ha). In the areas given above, soybean seed has mainly been used in the daily diet after making soyacake." Address: Phu Qui Agricultural Research Centre, Pulse Crop Research Centre of Viet Nam Dep. of Agriculture and Extension, Nghe An, Thanh Hoa province, Viet Nam.

2673. Win, Sein. 1993. Short and long-term measures for agricultural development in Myanmar. *Palawija News (Bogor, Indonesia)* 10(2):1-7. March.

• ***Summary:*** In Myanmar slightly over 2 million acres of peas and beans are planted to 17 kinds of peas and beans each year. The crops fulfill the nation's consumption requirements and provide a surplus of about 80,000 tons for export. The leading legumes in terms of acreage are: Pigeonpea (304,000 acres), chickpea (272,000), black gram (259,000), mungbean (255,000), soybean (82,000), and garden bean (62,000)–total: 1,234,000. The soybean is not used as an oil crop. The major oilseeds are presently groundnut, sesame, and sunflower. Address: Myanmar Agricultural Service.

2674. *SoyaScan Notes.*1993. The world's most active countries with respect to soybeans and soyfoods, as of 1 April 1993 (Overview). April 1. Compiled by William Shurtleff of Soyfoods Center.

• ***Summary:*** A tally by country on the SoyaScan database (which currently contains 42,087 bibliographic references relating to soybeans and soyfoods) shows the following countries to have the largest number of listings relating to soya (over 200): United States of America 21,459, Japan 5,599 Germany 2,053 United Kingdom 1,986, China 1,844, France 1,601, India 1,222, Canada 1,112, Indonesia 993, Brazil 873, Netherlands 809, Manchuria 733, USSR 665, Italy 596, Australia 467, Korea 463, Taiwan 460, Belgium 400, Austria 375, Mexico 371, Switzerland 353, Sri Lanka 341, Philippines 323, Yugoslavia 321, Nigeria 312, Sweden 289, Argentina 244, Israel 240, Czechoslovakia 237, Denmark 225, Bulgaria 219, Malaysia 214, Thailand 214, South Africa 207, Spain 204, Russia 203.

2675. Hymowitz, Ted. 1993. First paper on hybridizing a soybean to a wild relative from Australia resulting in fertile plants (Interview). *SoyaScan Notes.* April 25. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Their former hybrids were all sterile. Now they have obtained fertile plants. Now the genes from the wild varieties are accessible for the first time to commercial soybean breeders. A lot of breeders are beginning to want the material. The most valuable character is disease resistance. For example, in all of Southeast Asia, the major

soybean disease is rust. This new hybrid has moderate resistance to soybean rust. No other soybean cultivars have as much resistance to rust. The germplasm is already legally protected by the University of Illinois. Address: Prof. of Plant Genetics, Dep. of Agronomy, Univ. of Illinois, Urbana, Illinois.

2676. World Soybean Research Conference V. 1993. Bangkok, Thailand: Dep. of Agricultural Extension, Kasetsart. 36 p. 29 cm.

• ***Summary:*** This booklet announces and gives details on the World Soybean Research Conference V, which will be held in Chiang Mai, Thailand from 21 to 27 February 1994. For further information, contact Department of Agricultural Extension, P.O. Box 1081, Kasetsart, Bangkok 10903, Thailand. The conference theme is "Soybean: A Universal Crop for Better Global Health." Arwoorth Na Lampang (honorary president, with photo) notes that "This will be the first World Soybean Research Conference to be held in the tropics." As part of the conference program there will be a special symposium on "Soybeans in Tropical Agriculture."

Note: Talk with James Sinclair, interim director, National Soybean Research Laboratory. 1996. Oct. 7. The proceedings of World Soybean Research Conference V have not yet been published. The reason: Personality conflicts among people in Asia. The next world conference will probably (95% sure) be held in Chicago, Illinois, in 1998, and hosted by the University of Illinois. Harold Kauffman may be put in charge, and Jim plans to help him. Address: Bangkok, Thailand.

2677. Yen, Irene. 1993. Roland A. di Centa, the man who introduced tofu to Italy (Interview). *SoyaScan Notes.* May 19. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Irene recently visited with Roland at his home in France near Cannes (Address: Residence Port Azur Apt. B110, 79 Ave. Frizes Rousians, F-06220 Golfe Juan, France). He told her that he introduced tofu to Italy using *The Book of Tofu* by Shurtleff and Aoyagi. He made tofu in his home kitchen in Italy and sold it commercially. Newspaper articles were written about his work. He was quite involved with macrobiotics and close to the Kushis. He no longer lives in Italy and is no longer involved with making soyfoods.

Roland, who is about age 50, was born in Germany to German parents, but his surname is Italian and his family originates from Italy, from a small village called Centa. He is second or third generation German. He lived in Germany until age 18, then lived in Italy for 10 years and France for 10 years. At one point he was married to a Vietnamese woman, who grew up in France. He was also a fashion photographer for the French fashion magazine *Elle*. A jack of all trades, he currently owns a business named Punshon Ltd. in Lugano, Switzerland, works as a consultant on many subjects, moves around a lot, and is quite affluent. He has a 60-foot sailing boat ported near Nice, France.

Note: Card from Roland. 1993. July 13. His address is now 3, Boulevard d'Aguillon, 06600 Antibes, France. Address: Berkeley, California.

2678. *International Agriculture Update (Univ. of Illinois).* 1993. International travel. 7(1):5.

• ***Summary:*** "From October 18 to November 26, Wilmot B. Wijeratne, Karl E. Weingartner, and Kukiat Tanteeratarm, INTSOY, discussed implementation of the new Soybean Utilization Technical Program with officials of the Food Technology Research Institute in Egypt. Wijeratne then went to Ethiopia, Kenya, India, and Sri Lanka; Weingartner went to Ethiopia, Kenya, Zambia, and back to Egypt; and Tanteeratarm went to India, Sri Lanka, Thailand, and Japan."

2679. *Ontario Export Soybeans (OSGMB).* 1993. Happenings. 6(2):-2. May.

• ***Summary:*** "March 28-30, 1993 the Ontario Soybean Growers' Marketing Board in conjunction with Agriculture Canada and the Ontario Ministry of Agriculture and Food, staged 'Soybeans in Canada: Beyond 100 Years,' a symposium marking 100 years of soybeans in Canada. Over 350 delegates and 30 exhibitors made the show a tremendous success. A strong list of internationally renowned speakers drew large crowds. Mr. Tetsu Minagawa, of Mitsubishi, Tokyo, spoke on Japan's market for soyfood products. Mr. Michael Loh, Export Development Officer of the Ontario Ministry of Agriculture and Food (OMAF), highlighted the potential for soybeans in the Asia Pacific region as we approach the year 2000.

"In conjunction with the Symposium the Board sent Centennial awards to companies in the Asia/Pacific region, in recognition of their important contributions to expanding the market potential for Canadian soybeans."

Presentations were made in three countries by Michael Loh on behalf of OSGMB. The companies recognized were: In Hong Kong: Dah Chong Hong Ltd., Vitasoy International Holdings Ltd., and Law Man Tung Trading Co. Ltd.

In Singapore: Singapore Sin Seng Lee Trading Co., Asia Corporation, and Yam Thye & Co.

In Malaysia: Yeo Hiap Seng, Chop Lee Kit Heng, Tan Ban Huat, Tung Lieng Trading Co., Thye Huat Chan, and Lun Heng. Address: Chatham, Ontario, Canada.

2680. Shurtleff, William; Aoyagi, Akiko. comps. 1993. Tempeh and tempeh products–Bibliography and sourcebook, 1815 to 1993: Detailed information on 616 published documents (extensively annotated bibliography), 423 commercial tempeh products, 216 original interviews (many full text) and overviews, 247 unpublished archival documents. Lafayette, California: Soyfoods Center. 449 p.

Subject/geographical index. Author/company index. Language index. Printed June 4. 28 cm. [2078 ref]

• ***Summary:*** This is the most comprehensive book ever published about tempeh and tempeh products. It has been compiled, one record at a time over a period of 18 years, in an attempt to document the history of this subject. Its scope includes all known information about tempeh, worldwide, from 1815 to the present, plus detailed information on each of the following four closely related subjects–the first three of which are popular Indonesian foods:

1. Onchom (125 records; also spelled ontjom or oncom; peanut presscake or okara fermented with *Neurospora). Neurospora* is the single most important mold used in genetic and biochemical research; 2. Tempeh bongkrek (49 records; made from grated coconut or coconut presscake). 3. Non-soy relatives of tempeh (54 records, such as winged bean tempeh). 4. Early studies on *Rhizopus* molds in which tempeh is not mentioned (43 records).

This book is also the single most current and useful source of information on each of these five subject, since 79% of all records contain a summary/abstract averaging 125 words in length.

This is one of more than 40 books on soybeans and soyfoods being compiled by William Shurtleff and Akiko Aoyagi, and published by the Soyfoods Center. It is based on historical principles, listing all known documents and commercial products in chronological order. It features: 35 different document types, both published and unpublished; every known publication on the subject in every language–including 175 in Japanese, 140 in Indonesian, 96 in German, 68 in Dutch, etc.; 216 original Soyfoods Center interviews and overviews never before published. Thus, it is a powerful tool for understanding the development of tempeh and related products from their earliest beginnings to the present.

The bibliographic records in this book include 616 published documents and 247 unpublished archival documents. Each contains (in addition to the typical author, date, title, volume and pages information) the author's address, number of references cited, original title of all non-English publications together with an English translation of the title, month and issue of publication, and the first author's first name (if given).

It also includes details on 423 commercial tempeh products, including the product name, date of introduction, manufacturer's name, address and phone number, and (in many cases) ingredients, weight, packaging and price, storage requirements, nutritional composition, and a description of the label. Sources of additional information on each product (such as references to and summaries of advertisements, articles, patents, etc.) are also given.

Details on how to make best use of this book, a complete subject and geographical index, an author/company index, a language index, and a bibliometric analysis of the composition of the book (by decade, document type, language, leading periodicals or patents, leading countries, states, and related subjects, plus a histogram by year) are also included. Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549. Phone: 510-283-2991.

2681. Rich, Robert. 1993. More on Rich Products Corporation's work with soy-based dairy analogs (Interview). *SoyaScan Notes.* July 13. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Rich Products does not have any documents in its archives on the various small companies (such as Delsoy Products) that were the first to make soy-based whip toppings starting in about 1944-45. However Bob remembers them well and what they did. Delsoy started with a filled cream named Devonshire Topping which they sold mostly in Detroit, Michigan. Then they came out with a soybean cream that was not frozen. The majority of their early sales were in the filled cream. Delsoy was never sold in Buffalo, New York, and thus was not a competitor to Rich's Whip Topping. Even after Whip Topping was frozen, Delsoy was never much of a competitor. Bob is not sure when Delsoy was launched, but he has the feeling that it was on the market only several months before his Whip Topping.

Concerning the article by F. Olmsted in the 16 April 1945 issue of the *Detroit News*, Bob (who worked for the War Food Administration or WFA) never heard of the WFA issuing an order placing a 19% limit on all fats used in any dairy product. This information was probably supplied to Olmsted by Herbert Marshall Taylor, who Bob remembers as "a wild man." Bob conjectures that maybe the reason Taylor switched to a soy-based topping was to allow him to ship the product across state lines. In those times a company could not sell a filled cream product (which was what he had) across state lines, and there were only 7 states in which filled milk products could be made and sold within the state. In fact the Milnot Company had a plant near Litchfield, Illinois, situated exactly on the state line between Illinois and Indiana. They had a filled milk processing room on each side of the line, i.e. in each state. They never made a soy-based product. At one time, Milnot started shipping its filled milk across a state line either to test the law or because they thought they could get away with it. The government seized their product and took the president to court. He was judged guilty and had to spend the weekend in jail until he could get a bail bond. He was sentenced to a year in jail but he never served time because president Franklin Roosevelt gave him a presidential pardon.

Rich Products was involved in about 40 lawsuits with various states involving its non-dairy products–and the company won them all. But if the lawsuits had taken place a few years earlier, Bob thinks Rich Products could have been

beaten. The climate was changing, led by more favorable attitudes toward legalization of margarine–which replaced a dairy product. The first lawsuit against Rich Products took place in California in 1949. The charge was that Whip Topping was an imitation dairy product, and hence illegal. Arguing that the product was a replacement, not an imitation, the company won the case.

Most of the subsequent cases were against Coffee Rich (a non-dairy coffee whitener) starting in 1961. Whip Topping was not much of a threat to the dairy industry. Most milk routes used to take out 6 half pints of heavy cream (38-40% fat; housewives would use it to make whipped cream) in the morning and maybe bring back 8 in the afternoon–due to souring, etc. So heavy cream was not of much interest to milk dealers. But Coffee Rich was a real threat because much more light cream (19-20% fat; for use in coffee) and medium cream (28-30% fat; for use on cereal) was than heavy cream.

Last Wednesday (July 7) Bob celebrated his 80th birthday. He is still chairman of the board of Rich Products Corp., his son Robert Jr. is president, and Herb Kusche is executive vice president. Last year his company did $940 million is sales. Next year, which will be the company's 50th anniversary, they expect to go over $1,000 million. The company has a research department in Buffalo with 75 researchers, plus 6,000 employees and 26 plants worldwide. They have 7 people in their London office, 5 in the Hong Kong office, 6 in Mexico City, 2 in Singapore, 2 in Brisbane (Australia), and 2 in Tokyo–all their own people.

The Freeze Flo process has become very successful, especially in frozen fruits and in their great-tasting product named Bettercreme–which was launched in April 1977 and which keeps fresh without bacterial growth or spoilage at room temperature without preservatives. It is sold as such to foodservice organizations and bakeries, which keep it frozen, then whip it for use on cakes and pies; the latter will go stale before the Better Cream! It is also used as the filling in Rich's Frozen Chocolate Eclair. Though the company spent a lot of money hoping to find medical applications for the Freeze Flo Process, nothing has yet been commercialized.

Rich Products does not have a good archives with documents from the early years of the company. "In those days we didn't save things, although we have nice displays in our memorabilia room here in our 250,000 square foot building which is called Rich Renaissance Niagara. Our offices and research center are in that building–but it houses no manufacturing operations."

Bob has heard that Edsel Ford died of either ungulate fever or cancer of the intestine. If it were ungulate fever, that could be one more reason why Henry Ford was so interested in promoting the use of soymilk–as at the Henry Ford Hospital. Bob thinks they also served a soy coffee cream (soymilk thickened with propylene glycol) at the hospital.

Note from Ford Bryan, researcher at the Ford Archives, in response to an inquiry from William Shurtleff. 1993. Aug. 9. "I'm fairly certain Henry Ford disliked cows as a boy–long before Edsel's illness. We do not seem to have a copy of Edsel Ford's death certificate. As far as we know, the cause of Edsel's death was cancer of the stomach, perhaps complicated by ungulate fever."

Talk with Herb Kusche, executive vice-president of Rich Products. 1993. July 14. "Bob Rich has a memory like an elephant; its superb." Address: Chairman of the Board, Rich Products Corp., P.O. Box 245 (1150 Niagara St.), Buffalo, New York. Phone: 716-878-8000.

2682. Katoh, Kiyoaki. 1993. Current status of tempeh in Japan (Interview). *SoyaScan Notes.* July 20. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** The Third Asian Symposium on Non-Salted Soybean Fermentation and the International Soybean Food Fair will be held in Akita, Japan, on 4-6 June 1994. There is a legend in Japan that natto originated in Akita, and there is also a large natto manufacturer there. Many countries in Southeast Asia will participate. He is still very involved in tempeh issues in Japan, and maintains a close contact with Indonesian tempeh researchers. The Tempeh Study Group *(Kenkyu-kai)* has its regular meeting twice a year and 60-70 people (including himself) typically attend. A very good and popular restaurant in Shibuya, Tokyo, named Jembutan Mérah (Red Bridge), features many delicious tempeh dishes. They feature ethnic foods, including Thai and Vietnamese cuisines. The chef of the restaurant used to work with Torigoe Seifun. Their tempeh is made by the village cooperative shop in Hyogo prefecture (initiated as part of a local community activation program). This tempeh shop ships their tempeh all over Japan, including to the Indonesian embassy in Tokyo, several Indonesian restaurants in Tokyo, and to individuals who order it. The only other tempeh shop, also part of a village activation program, is led by Prof. Kazuko Noguchi (a woman) of Saga. When Mr. Kanasugi died, the natto people discontinued their interest in tempeh. All the large private companies (Marusan, Torigoe Seifun) also stopped. Address: Tajimaya rice company, International Affairs, Japan.

2683. Katoh, Kiyoaki. 1993. New developments with soyfoods in Africa (Interview). *SoyaScan Notes.* July 20. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Mrs. Yasuko Torii is very involved in efforts to introduce soyfoods to southern Africa and South Africa, especially Capetown. Katoh joined FAO (the Food and Agriculture Organization of the United Nations) in 1987 and was a biotechnology officer there for 2 years and very

much committed in Africa. He was active in work with soybeans in Nigeria, Cameroon and other countries. He has written about that work. The crucial question is how to interest African people in using soyfoods. There is now increasing South-South cooperation. For example, Indonesian people are very interested in transferring tempeh technology to Africa. The German government is sponsoring such a program on tempeh and Dr. Darwin Karyadi is leading the Indonesian work; the minister of Science and Technology, Dr. Habibi, is very keen on this. The best man to contact concerning soya in Africa is Dr. Shiv R. Singh (pronounced Sin), who used to work with IITA at Ibadan, Nigeria, and is now Director of the Western Africa Department of the World Bank in Washington, DC. He is the key man with soya in Africa. Address: Tajimaya rice company, International Affairs, Japan.

2684. Karyadi, Darwin. 1993. Re: Novel substances in tempeh. Letter (fax) to William Shurtleff at Soyfoods Center, July 31. 1 p.

• ***Summary:*** It is known that tempeh (which is free of cholesterol) contains isoflavones and an anti-diarrhea compound. The latest discovery is that it contains superoxide-dismutase (SOD) enzymes which scavenge free radicals. Address: Nutrition Research Development Center, Jl. Dr. Semeru No. 63, Bogor 16112, Indonesia. Phone: (0251) 321763-326348.

2685. Executive Committee Secretariat. 1993. The Roots of Biotechnology in Monsoon Asia: The Third Asian Symposium on Non-Salted Soybean Fermentation and International Soybean Food Fair. Akita Cultural Center, Akita City, Japan: 4-6 June 1994 (Leaflet). Akita, Japan. 2 p. July.

• ***Summary:*** The executive committee for this event is: Chair: Prof. Tadao Watanabe. Vice-Chair: Prof. Fumio Yamauchi. Indonesia Advisor: Dr. Darwin Karyadi. United Nations University (UNU) Food and Nutrition Programme Advisor: Dr. Abraham Besrat.

The symposium hopes to focus on South-South cooperation for technical transfer of soybean technologies (koji, tempe, natto) to Africa in order to alleviate an impending protein crisis beyond the year 2000.

Program outline: Part I: International Soybean Food Fair–Industrial/commercial exhibition and cooking demonstration of ethnic cuisine using soybean products. Part II: Public Symposium–World soybean overview with perspectives for international technical cooperation in Africa. Part III: The Third Asian Symposium on Non-Salted Soybean Fermentation. Session 1. Koji for fermented soybean (Kikkoman, Nagano Miso Institute, China, Korea, Akita). Session 2. Natto in Asia–Microbiology, enzymology, health-medical studies. Kinema of Nepal, Tuanao [Thua-nao] of northern Nepal, Bhutan. Session 3. Tempe (Overview by Dr. Darwin Karyadi, contributions from Indonesia, Germany, USA, Japan and others–on microbiology, biochemistry, nutrition, physiology, medical studies, cooking, and industrial development). Part IV: The Role of Soybeans in Africa–The Perspective beyond 2000 (organized in cooperation with UNU Food and Nutrition Program). Sessions: Agriculture of Sub-Saharan Africa and soybean development (World Bank, IITA, JICA). Tofu technology adapted to West Africa (Dr. Nakayama, IITA). Indigenous fermented legumes in West Africa. Introduction of soy into Sub-Saharan African diet. Achievements of UNU Tempe Training Program (Indonesia/UNU; with Poster presentation of UNU funded research). Proposal on South-South cooperation.

Technical tours will be organized from three participating countries: Indonesia, USA, Germany. Address: c/o Akita International Assoc., Aidex Building 8th floor, 2-1-60 Sanno, Akita City, Japan 010. Phone: 0188-64-1181.

2686. Centa, Roland A. di. 1993. Re: Introducing tempeh and tofu to Italy. Letter to William Shurtleff at Soyfoods Center, Aug. 9–in reply to inquiry. 4 p. Typed, with signature. Followed by a letter of Sept. 10 answering questions.

• ***Summary:*** Roland was one of the first people to introduce soyfoods to Italy. He was very interested in macrobiotics and was a close friend of Michio Kushi. "My interest in food was to heal people with food and I had a lot of success using a holistic approach to help people with major diseases. For all these cures I used a lot of miso, tempeh, and tofu. Good miso was available. However tempeh and tofu had to be locally produced. I cured people from 1980 until about 1985.

"As I am a businessman I was always business minded in order to produce, make a profit, and be able to realize my ideas–which always cost. I am educated in international law and advise corporations who want to expand abroad.

"Tempeh: There was only tempeh available for Paris, made by a lady there named Anita Dupuy, who delivered and sold it to Le Bol en Bois (a macrobiotic restaurant in Paris) and to some consulates and embassies (such as the Philippines). As I was busy elsewhere I sent Giovanna Mazzieri (of Milan, Italy) to Paris [for 1 week in Feb. 1983] to study the process. She was a very busy lady and a fan of macrobiotics after I healed her husband of a very difficult disease. She was very smart and she produced in tempeh in Milan in about 1980 [actually mid-1983]. It was perfect and of very good quality. It was sold in a few health food stores. (Letter from Roland of Sept. 10 says Giovanna's tempeh was never sold commercially in stores; she produced tempeh only non-commercially from Feb. 1983 until today. Roland taught her to make tofu in June 1982; she started to make and sell it shortly thereafter).

"Actually it never took off commercially and eventually was used only for selected people, me and my patients. At that time I was very strict in eating macrobiotic. I was very sensitive to the quality of tempeh: I didn't like the acid taste. On the island of Bali I once ate some tempeh which was very acid. Therefore I used to deep freeze it in order to have it ready when we wanted tempeh with perfectly good taste. Today it is no longer produced, or only in small quantities, for the use of the family of Giovanna and some friends in Italy. As I am no longer living in Italy and I stopped curing people, unfortunately I don't use tempeh any more myself. I was interested to find out whether it worked in curing people. It did! However in order to make a profession and profit-making enterprise, I preferred to do other jobs.

"Tofu: Tofu was produced by myself. I am sure I was the only one who produced it on the basis of your teaching the first time in Italy in 1978. After seeing an ad in the *East West Journal,* I ordered your *Book of Tofu* by mail.

"Tofu already existed in Italy in Chinese restaurants in all the major cities. They called it Tau-Fu. After studying your book, I went to many kitchens in order to observe how it was produced, and with the cooks I ate the okara which was never offered to the clients of the restaurants but was seasoned very hot for themselves. The main restaurant I studied at was "La Muraglia," which means "The Wall" and which still exists.

"I then bought the Tofu Kit [made by Larry Needleman of The Learning Tree] which was advertised in the *East West Journal.* With this kit I started to make my first tofu. It was at once of very good quality.

"I started to make the equipment following the instructions in your book and twice a week produced 10 kg of tofu, which was used by my family, and sold in health food stores and later to my patients. I sold the tofu also in bakery shops where I offered the clients free samples to taste before they eventually bought it. I had a few sales. I produced the tofu in the kitchen of my apartment on Via Maffei in Milan. I got up very early and at 8 A.M. the kitchen was clean–you couldn't see anything left of the production. My wife [who was Vietnamese] didn't want to have a mess in the kitchen when she got up.

"Before I going to work as a consultant in the morning, I delivered the tofu to various shops. I didn't sell as a company because the quantity was too small to justify a commercial set-up yet. After about a year, when the whole business was working well, I transferred everything to a friend of mine who was looking for a job. He did it also in his apartment, but had problems with the neighbors who saw the kettles steaming on his balcony and they wondered what he did in his place. As nobody knew what tofu was, he said he was making some kind of cheese. The neighbors thought he might even have cows in his flat, and they managed to kick him out of his rented apartment after he had been making tofu there for about one year.

"When we heard that a company from Rimini [located 200 miles southeast of Milan and run by Gilberto Bianchini] had also started to produce tofu, we stopped production I didn't get the feedback in profit from this business; I preferred to use my time in other operations and buy the tofu made by Gilberto Bianchini at health food stores in Milan. I am sure I would have had success in Italy if I had continued. But I didn't have the support of my family, even though my wife was Vietnamese, and therefore I oriented myself to other activities. Someone who makes 10 kg of tofu in his kitchen before going to work must be a bit crazy–right?

"Nowadays in France I eat tofu about 2-3 times a week, as does my companion, Barbara, and our 4-year-old Carolina.

"Tofu-Kit: In about 1979 I produced about 100 tofu kits, which I sold for 30,000 lires to friends and other people who were interested in making their own tofu. As it was actually a copy of the American tofu-kit which I bought in the U.S., I wanted to see whether there was a real interest in this product before marketing it in Italy. Since it didn't sell very well, I didn't go ahead with it. Eventually I planned to buy the copyright from the tofu-kit people in the U.S. In 1979 I also published booklets in Italian and French titled "Tau-Fu Kit" and Tofu Kit" respectively. One was sold with each tofu kit; they were not sold separately.

"You have been for me a kind of guru, without knowing each other, because I have a lot of admiration for your approach. You are probably successful because you did only this: Writing about things related to soya." Address: 3, Boulevard d'Aguillon, 06600 Antibes, France. Phone: (33) 07-80-70.

2687. *SoyaCow Newsletter (Ottawa, Canada).*1993. Myanmar (Burma) soya food project. 2(3):2. July/Sept.
• ***Summary:*** "At the initiative of the California-based firm, Zin International, a SoyaCow SC-20 system has been sent to Rangoon for a pilot soyfood project. Zin International is headed by Thet Zin, a former United Nations Official in the Food and Agriculture Organization (FAO). He and his son and partner, Adalbert, are spearheading a grassroots agricultural reform initiative in Myanmar which they hope will eventually spread into other countries in Indochina."

2688. Vaidehi, M.P. 1993. "Tempe"–A biotechnological boon for nutritionally rich foods. *Beverage & Food World (Bombay)* 20(4):35-36. Sept.
• ***Summary:*** Although Indians prepare many fermented foods (such as idli, dosa, dhokla, kadabu, curds, etc.), it was not until the author visited Indonesia that she realized there are many fermented foods of which Indians are unaware. "Tempe" is the "most impressive fermented food nationally

adopted for improving nutrition and health of the children of Indonesia." The author learned about tempeh when she was offered a fellowship by the United Nations University to participate in a food fermentation technology and training/research course at the Nutrition Research and Development Centre, Bogor, Indonesia. After an extensive tour of many tempeh production places in Java, she concluded that tempeh is a food with great potential, and that in all countries it can be used "to improve the socio-economic, nutritional and health status of the great majority of the population."

A table shows the nutritional value of different types of tempeh and tempeh powders. A flow sheet for tempeh production is also given. Address: Dr., Prof. and Head, Dep. of Rural Home Science, Univ. of Agricultural Sciencs, Bangalore, India.

2689. Poninski, Piotr. 1993. Re: Tofu in Poland. Letter to William Shurtleff at Soyfoods Center, Oct. 10. 2 p. Typed, with signature on letterhead.

• ***Summary:*** After giving details about the tofu made by his company, Piotr notes: "We tbink that second generation products are absolutely the best way to popularize this kind of new food. We will soon be working on tofu with various spices and other additions such as vegetables, grains, nuts etc. as well as on dressings and spreads.

"As far as other soyfoods are concerned, both soymilk and TVP are available on the Polish market but in a rather modest way. If you want to find them you can, but since they are all imported from Western Europe, or from Hungary (TVP) and not generally known, they are not widely available. Our plan is to import and popularize TVP. You can also get some retail packaged soybeans and soy meal.

"I think we are the first company to make and sell tofu in the Warsaw area, but I know a little about other companies which make or are planning to make tofu in Poland: (1) Vietnamese immigrants make firm tofu *(Dau Phu),* probably coagulated with vinegar, and sell it only to other Vietnamese people. Their general opinion is that Poles will not eat it and it is not worthwhile to try to popularize it; (2) A 'district dairy cooperative' in Szczytno (Northeastern Poland) makes tofu and tries to sell it somewhere in Warsaw. A professor from the department of food technology at the Main School of Agriculture in Warsaw is involved in this project and probably has set up the whole technical process. We contacted with him but he refused to cooperate with us. I have not had a chance to eat their tofu but one of our customers who tried it says it has a taste inferior to ours; (3) A Polish-Chinese enterprise which presently sells soybean sprouts is planning to manufacture and sell tofu in the Warsaw area." Address: Founder and owner, Polsoja, ul. Hetmanska 61, 05-120 Legionowo (near Warsaw), Poland. Phone: (48 22) 18 21 11.

2690. Sudigbia, I. 1993. Tempeh for nutritional treatment of childhood diarrhoea [diarrhea]. Paper presented at the XV International Congress on Nutrition. Held 26 Sept. to Oct. 1 at Adelaide, Australia. *

• ***Summary:*** Tempeh is suitable for use in nutritional treatment during and after episodes of diarrhea, whether in clinical or community use.

Note: This paper was published in the ASA [American Soybean Association] Technical Bulletin series (MITA(P) No. 518/12/92 Vol. HN20 1993) (Available from ASA, Singapore). Address: Child Health Dep., Medical Faculty, Diponegoro Univ., Semarang Univ., Indonesia.

2691. *SoyaScan Notes.*1993. Manufacture and sale of soyfoods in Poland (Overview). Nov. 11. Compiled by William Shurtleff of Soyfoods Center.

• ***Summary:*** The following information about soyfoods companies in Poland was provided by the Polish consulate, the American Soybean Assoc., and a Westerner traveling in Europe:

Polsoja was started in early 1993 by Piotr Poninski and three partners. It is probably the first tofu shop in Warsaw, Poland, and the only tofu shop in Poland that makes and sells tofu on a regular basis. Five people work at the company. Address: ul. Hetmanska 61, 05-120 Legionowo (near Warsaw), Poland. Phone/fax: (48 22) 18 21 11

Solida Sp. z o. o. is a Chinese-owned company founded in 1992 by two Chinese partners: Mr. Lu Shihua (president) and Mr. Liu Zhonghua. The sales manager is Mr. Bugosiaw Zwadzki. They make and sell soy sprouts. They plan to sell tofu. Address: ul. Kmicica 1/212, 02-728 Warszawa (Warsaw), Poland. Phone/fax: (48 22) 47 23 09.

Okregowa Spoldzielnia Mleczarska is a dairy co-operative that supposedly makes or used to make tofu. They were taught how by Prof. Stanislaw Gwiazda. Polsoja has never seen or eaten their tofu. They probably started in 1992. Probably nobody speaks English there. Address: ul. Chopina 2, 12-100 Szczytno, Poland. Phone: (48 889 89) 22 11.

Prof. Stanislaw Gwiazda is said to have traveled in East Asia and claims to know tofu technology. He works in the faculty of food technology at the main School of Agriculture in Warsaw, where he specializes in proteins and fats. He helped the Szczytno start or try to start making tofu. Address: Szkola Glowna Gospodarstwa Wiejskiego, Katedra Produktow Biaikowych i Tiuszczowych, ul. Grochowska 272, 03-849 Warszawa, Poland. Phone: (48-22) 10 18 42.

Polgrunt Sp z o. o. makes soy pâtés and soy flour. They also sell soybeans, TVP (imported from Serbia via Hungary), soy sauce, and maybe other soy products. They may start making tofu in the future. They probably started in

1991 or 1992. Address: ul. Pabianicka 17/19, 97-400 Beichatow, Poland. Phone: (48 841 83) 255 64.

There is also an unknown Vietnamese man who is making tofu for the Vietnamese community in Warsaw. He probably does everything in his kitchen for just a few people.

2692. Wilson, Don. 1993. The pioneering work of Aqua Agra in Florida with sprouts and soyfoods. Part I (Interview). *SoyaScan Notes.* Nov. 24. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Don is a Seventh-day Adventist who was a sergeant with a type of special forces (Force Recon) for 2 years in the U.S. Marine Corps during the Vietnam War. He joined the marines in 1964, several years before the U.S. got involved in Vietnam. He lived in a Vietnamese village with the local people for 18 months as part of his assignment, and he learned to speak Vietnamese. After he returned to America, many Vietnamese refugees came into the Orlando, Florida, area. The company for which he was working sponsored 10 families and because he spoke Vietnamese he "got volunteered" to help the refugees. He got irritated because the woman who owned the one Oriental food store in Orlando was selling nuoc mam at an exorbitant markup, buying it for $0.50/bottle and selling it for $5.00 a bottle. "I tried to persuade her to lower her prices, and when she wouldn't do it, I got mad and opened a store named the Oriental Grocery store. I sold everything at cost. We finally signed a peace treaty and I sold the store to her, on the agreement that she wouldn't gouge these Vietnamese refugees. My wife is Korean. I met her in Atlanta, Georgia, after Vietnam, where she was a nurse in a hospital. We have been married for 21 years.

"While we were running our Oriental Grocery, my wife and her mother decided they could grow mung bean sprouts in the bathtub and sell them in our store. One day a man from Superfoods (the Albertson's buying arm for fresh produce) called and said he wanted to buy bean sprouts from us. I went and talked to the buyer whose name was Tom Kern. Their offices were 60 miles away. They wanted 15 x 10 lb bags 3 times a week. I talked to my wife and we decided that I should turn our garage (at 1521 Avalon Blvd., Castleberry, Florida), into a bean sprout growing room. In Oct. 1976 we started growing mung beans in our garage and 2-3 weeks later he asked us to start growing soybean sprouts. One day the city came by and informed me that we must have a huge water leak on our property because we used 190,000 gallons of water. I got nervous and let them walk all around the outside of the house looking for the leak. They never found it. I was running the water off into a shallow well."

Next Don got his sprouts into Winn Dixie, a huge chain. In Orlando he visited Bill Bowman, who was a typical Winn Dixie produce buyer at that time. Don took him a sample of bean sprouts to which Bowman responded, "My God, them look like white worms. There's times when my huntin' dog gets them things crawlin' out his butt, and I take him to the doctor." Having taken enough abuse, Don was about to leave when Mr. Bowman said, "I'll tell you what. I figger anybody's got enough guts to come into my office with something this damn weird, I'm gonna have to order from you just one time. But you ain't gonna get no second orders. That way it won't be a waste of your time. We've got 120 stores out of this division so I'll want one 10-pound bag for every store. How many weeks do you need to get ready for this? You've got to grow the damn things don't ya?" It was Friday and Don replied he have the sprouts ready in about 3½ days. "He looked at me like I was totally crazy. Then he said, 'Do you mean to tell me you can deliver a crop to me next Wednesday and you haven't even got it planted yet?" Don said, "Yes sir." Bowman replied, "This is gonna be worth the price of admission 'cause there ain't nobody gonna plant no damn crop and have it ready by Wednesday." When Don delivered the sprouts at the agreed time, Bowman was out waiting on the dock. He said, "They ain't never gonna sell. Don't you dare expect no extra orders." Two days later Don got an enthusiastic phone call: "Don, this is R.D." "R.D. who?" asked Don. "R.D. Bowman, you know, Winn Dixie. Don, can you bring me some more of them white things over here?" Apparently Asian-Americans and hippies were surprised and delighted to find fresh sprouts at a local supermarket in Florida. Thus were sprouts (mung bean, soy and alfalfa) introduced into mainstream American supermarket chains–one of Don's pioneering contributions. Don needed more space to grow his sprouts, so they moved into a 4,000 square foot commercial location on Seminola Blvd., Castleberry, Florida. Then they introduced alfalfa sprouts. Soon they were sprouting just about everything that would sprout. In the beginning, the company was mainly a sprouting company.

Soon Don got a call from Winn Dixie's national buyer in Jacksonville, who said Mr. Bowman had spoken very highly of Don and his products. By this time he was selling the Orlando division's 120 stores in central Florida about 300 ten-pound bags a week of mung bean sprouts and 150 to 175 ten-pound bags a week. Don had no idea how big Winn Dixie was. While Don was waiting in the buyer's office in Jacksonville, the man ordered 35 railroad carloads of potatoes and 20 carloads of onions. "I began thinking. I am in trouble. There is no way I can grow this amount of sprouts. But he told me that my company and Winn Dixie could grow together, adding on divisions one at a time. You couldn't ask for a better company to do business with than Winn Dixie. They paid every bill before it was due. They even sent their trucks by to pick up the sprouts. Soon we were shipping our sprouts to all the different Winn Dixie

divisions." Continued. Address: 2321 Virginia Dr., Altamonte Springs, Florida 32714.

2693. **Product Name:** Soybean Milk, Hard Tofu Cake, Square Tofu (not pressed), Deep-Fried Triangle Tofu, Tofu Pudding.
**Manufacturer's Name:** Binh Minh Tofu Manufacturing.
**Manufacturer's Address:** 1180 Tully Rd., Unit B., San Jose, CA 95122. Phone: 408-279-3655.
**Date of Introduction:** 1993.
**How Stored:** Refrigerated.
**New Product–Documentation:** Talk with Binh Tran, owner and founder. 1996. May 28. He is a Vietnamese-American. Tran is his family name. He started this company in May 1991. His is now the largest tofu maker in San Jose. These products were introduced after the company started. They are all Vietnamese soy products and the labels are entirely in Vietnamese, with no English.

2694. **Product Name:** Unfried Tofu (Extra Firm), Soft Tofu, Soymilk [Chocolate, or Strawberry].
**Manufacturer's Name:** Happy Tofu.
**Manufacturer's Address:** 5231 S.E. Powell Blvd., Portland, OR 97206. Phone: 503-771-2802.
**Date of Introduction:** 1993.
**How Stored:** Refrigerated.
**New Product–Documentation:** Talk with Tom Nguyen. 1994. Nov. 17. Tom is Ann Uong's partner and brother-in-law, married to her sister. He is also Vietnamese. In 1993 Happy Tofu introduced Unfried Tofu (which is extra firm tofu–doufu-gan–in 4-inch squares), Soft Tofu, and soymilk in chocolate and strawberry flavors.

2695. Chomchalow, Narong; Laosuwan, Paisan. eds. 1993. Soybean in Asia: Proceedings of the planning workshop for the establishment of the Asian Component of a global network on tropical and subtropical soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. Held 2-7 March 1992 at Chiang Mai, Thailand. RAPA Publication (FAO), No. 1993/6. Illust. No index. 25 cm. [76 ref]
• ***Summary:*** Preface. List of contributors. Acronyms and abbreviations. Part I–Opening session: Welcome address. Remarks, Inaugural address.

Part II–Endorsement and recommendations: Endorsement of network. General recommendation.

Part III–Country reports: Australia, Bangladesh, China, India, Indonesia, Japan, Malaysia, Myanmar, Nepal, Pakistan, Philippines, Republic of Korea, Sri Lanka, Thailand, Vietnam.

Part IV–Institutional Parts: AVRDC, CGPRT Centre, FAO, INTSOY.

Part V–Special Reports: Oilseed crops development project, achievements on soybean research and development. The history of soybean in the Orient. Soybean processing, utilization and marketing in the Philippines. Soybean production, utilization, research and development in Taiwan. Biotechnological research on soybean at Kasetsart University. Address: 1. Regional Plant Production Officer (Industrial Crops); Both: FAO / RAPA (Regional Office for Asia and the Pacific), Bangkok, Thailand.

2696. Chomchalow, Narong; Kueneman, E.A.; Hicks, P.A. 1993. Institutional report 3–FAO. In: N. Chomchalow & P. Narong, eds. 1993. Soybean in Asia: Proceedings of the Planning Workshop for the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. See p. 164-172. RAPA Publication (FAO), No. 1993/6.
• ***Summary:*** Contents: (1) Introduction. (2) FAO's involvement in soybean research and development in Asia. (3) The FAO-executed projects: National projects (Sri Lanka, Vietnam, Philippines), regional projects. (4) Other FAO-supported activities: Networking (Global Soybean Research Network, Asian Soybean Network), evaluation (Buhler's Full-fat soybean processing technology, Plenty's soymilk production in Sri Lanka, Danish Turnkey Dairies soymilk plant).

Tables: (1) Soybean production, area harvested, and yield in developing and developed countries in Asia: Developing countries: Bhutan, Cambodia, China, DPR Korea (north), India, Indonesia, Iran, Laos, Malaysia, Myanmar, Nepal, Pakistan, Papua New Guinea, Philippines, Rep. of Korea (south), Sri Lanka, Thailand, Vietnam. Developed countries: Australia, Japan, New Zealand. (2) Activities involving soybean sponsored by RAS/82/002 (1983-89). (3) Activities involving soybean sponsored by RAS/89/040 (1990-93).

Regional projects RAS/82/002: "During the period of 1983-89, an FAO-executed and UNDP-funded project, RAS/82/002, entitled "Research and development of Food Legumes and Coarse Grains {FLCG} in the Tropics and Sub-Tropics of Asia" was operated. This project involved Bangladesh, Indonesia, Lao PDR, Nepal, Pakistan, the Philippines, Republic of Korea, Sri Lanka, Thailand, and Vietnam. The project was planned in two phases; the duration of Phase I was 2 years, and activities began in September 1983. The proposed UNDP contribution for this phase was US $450,000 and the actual expenditure was US $454,394. Phase II was approved in August 1985 but implemented in July 1987 and concluded in June 1989. Total UNDP contribution for both phases was US $1,331,453.

"The long-term objective of the project was to increase production of FLCG in the participating countries in order to bridge the gap between the demand for protein-rich food for domestic needs and export markets and the actual

production. One of the main goals of the project was to establish a network of national institutions, linked with international institutions capable of advancing the relevant development objective of participating countries through coordinated research and extension activities."

RAS/89/040: "A follow-up project of RAS/82/002, entitled 'Regional Cooperative Programme for the Improvement of Food Legumes and Coarse Grains in Asia', funded by UNDP, is being executed by FAO. It became operational in April 1990 and has a termination date of December 1993. Four more countries (China, India, Myanmar, and Malaysia) joined the network in this follow-up phase. The Government of Indonesia continues to provide the Secretariat."

Table 1: Bhutan: Soybean production increased from 900 tonnes (metric tons) in 1981 to 1,300 tonnes in 1991.

Cambodia: Soybean production increased from 1,100 tonnes in 1981 to 16,000 tonnes in 1991–growing at 28.0% a year on average.

North Korea: Soybean production increased from 350,000 tonnes in 1981 to 460,000 tonnes in 1991–growing at 2.5% a year.

Iran: Soybean production increased from 62,000 tonnes in 1981 to 105,000 tonnes in 1991–growing at 0.8% a year.

Laos: Soybean production increased from 3,900 tonnes in 1981 to 4,200 tonnes in 1991–growing at 1.3% a year.

Papua New Guinea: Either had no soybean production or no information was available.

New Zealand: Soybean production decreased from 300 tonnes in 1981 to 100 tonnes in 1991–decreasing at -11.0% a year. Address: 1. Regional Plant Production Officer (Industrial Crops), 2. Regional Agricultural Engineering and Agro-Industries Officer: Both: FAO/RAPA, Bangkok, Thailand; 3. Senior Officer, Plant Production and Protection Div., FAO, Rome, Italy.

2697. Escano, Crisanto R.; Gaddi, Virgilio Q. 1993. Country report II–Philippines. In: N. Chomchalow & P. Narong, eds. 1993. Soybean in Asia: Proceedings of the Planning Workshop for the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. See p. 92-108. RAPA Publication (FAO), No. 1993/6. [12 ref]

• ***Summary:*** Contents: (1) Introduction. (2) Production: Status, major growing seasons and cropping systems, constraints, resolving constraints. (3) Processing, utilization and marketing: Status, supply and demand, exportation of soybean products, constraints, resolving constraints.

Figures: (1) Trend in soybean production, Philippines, 1980-90. (2) Soybean area harvested, Philippines, 1980-90. (3) Trend in the soybean yield, Philippines, 1980-90. (4) Regional shares of total production, Philippines, 1990. (5) Soybean and soybean product shares in importation, Philippines, 1990. (6) Country of origin, soybean meal import, Philippines, 1990. (7) Country of destination, soysauce export, Philippines, 1990.

Tables: (1) List of soybean-based food products popularly used in the Philippines. (2) Volume and value of soybean imports, 1980-90.

Soybean production increased from about 9,800 tonnes (metric tons) in 1980 to a peak of 11,466 tonnes in 1982, then decreased to 5,614 tonnes in 1990. Area planted to soybeans increased from about 10,000 ha in 1980 to a peak of about 11,00 ha in 1982, then decreased to about 7,000 ha in 1990. The average yield for the period 1980-1990 was 920 kg/ha, but has generally been falling since 1983. Southern Mindanao has been the single most important soybean producing region in the Philippines for more than a decade, accounting for about 67% of total Philippine soybean production in 1990; Central Mindanao comes next with about 23%.

A brief history of soybean production in the Philippines from 1983 to 1990 appears on pages 99-10. Popular soyfoods products in the Philippines include: A. Fermented products: Soy sauce (toyo), fermented soybean curd (tausi [sic, salted, fermented black soybeans]), tempeh (tempe), soybean paste (miso), soft fermented soybean curd (tahuri). B. Non-fermented products: Soybean sprouts (toge, tauge), soybean cheese [curds] (tokwa), Geerlings cheese (taho [tofu]), soybean milk (soymilk), and roasted soybean powder (soy coffee).

Philippine imports of soybeans and soybean products have increased rapidly since 1980, yet 93% of these imports in 1990 were soybean meal, of which 38% comes from India, 33% comes from the USA, 22% from China, and 7% from others.

In April 1991 the General Milling Corporation's soybean solvent extraction plant began operation in Tabango, Batangas. It is expected to reduce the country's imports of soybean meal but increase the imports of raw soybeans. Address: 1. Scientist III. 2. Subject Matter Specialist. All: PCARRD, Los Baños, Laguna, Philippines.

2698. Kitamura, Keisuke. 1993. Country Report 6–Japan. In: N. Chomchalow & P. Narong, eds. 1993. Soybean in Asia: Proceedings of the Planning Workshop for the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. See p. 64-69. RAPA Publication (FAO), No. 1993/6.

• ***Summary:*** Contents: (1) Production and uses. (2) Research activities. (3) Germplasm.

Germplasm: "Soybeans were introduced from abroad since the old days. Genetic resources of landraces were continuously collected and surveyed since the beginning of this century. In recent years, a number of soybean varieties were introduced from many foreign countries and

international institutions, including Korea, China, Nepal, Thailand, USA, AVRDC, etc. Today the total soybean accessions are about 6,000 including wild soybeans. They are conserved and managed in the National Center of Genetic Resources within the National Institute of Agrobiological Resources."

Figures: (1) Scheme of domestic soybean price in Japan. (2) Geographical distribution of soybean varieties according to their ecotypes and location of soybean breeding stations in Japan.

Tables: (1) Planted area, production and yield of soybean in Japan. Total planted area has decreased from 306,000 ha in 1960 to 146,000 ha in 1990. Production has decreased from 418,000 tonnes (metric tons) in 1960 to 220,000 tonnes in 1990. Yield has increased from 1,360 kg/ha in 1960 to a peak of 1,790 kg/ha in 1990. (2) Trends of soybean supply and demand. Japan's imports have increased from 3,244,000 tonnes in 1970 to 4,330,000 tonnes in 1991, when 97.3% of the soybeans used in Japan were imported. Uses of soybeans in 1990: Oil 3,630,000 tonnes–up from 2,505,000 tonnes in 1970. Food 725,00 tonnes–up from 522,000 tonnes in 1970. Fermented products (miso, shoyu, natto) 196,000 tonnes–down from a peak of 208,000 tonnes in 1980. Animal feed 95,000 tonnes–up from 10,000 tonnes in 1970. (3) Trends of soybean price. (4) Trends of seed production. (5) Soybean research activities in Japan. (6) Objectives of the respective breeding stations for soybean. (7) Characteristics of the leading and some unique soybean varieties in Japan. For each of 15 varieties gives: Name, year registered (1928-1991), breeding method (crossing, pure line, mutation, back-crossing), ecotype, weight of 100 seeds, seed color, hilum color, characteristics. Address: National Agricultural Research Centre, Tsukuba City, Japan.

2699. Kovitvadhi, Kovit. 1993. Special report 1–Oilseed crops development project's achievements on soybean research and development in Thailand. In: N. Chomchalow & P. Narong, eds. 1993. Soybean in Asia: Proceedings of the Planning Workshop for the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. See p. 193-195. RAPA Publication (FAO), No. 1993/6.

• ***Summary:*** Contents: (1) Introduction. (2) Achievements of OCDP in soybean R&D: Breeding, soils and fertilizer experiments in the north, cultural techniques.

Tables: (1) Yield and other characters of soybean received residual P from rock phosphate applied to rice in a rice-soybean system. Address: Director, OCDP, Thailand Inst. of Scientific and Technological Research, Bangkok, Thailand.

2700. Limtrakul, Porn-ngarm; Suttajit, M.; Semura, R.; Shimada, K.; Yamamoto, S. 1993. Suppressive effect of soybean milk protein on experimentally induced skin tumor in mice. *Life Sciences* 53(21):1591-96. [21 ref]

• ***Summary:*** Soymilk protein appears to have anti-tumor properties. Address: 1-2. Faculty of Medicine, Chiang Mai Univ., Chiang Mai, Thailand.

2701. Moe, Kyaw. 1993. Country Report 8–Myanmar. In: N. Chomchalow & P. Narong, eds. 1993. Soybean in Asia: Proceedings of the Planning Workshop for the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. See p. 75-78. RAPA Publication (FAO), No. 1993/6.

• ***Summary:*** Contents: (1) Introduction. (2) Production trend. (3) Processing, utilization and marketing. (4) Constraints on soybean production. (5) Resources available in Myanmar. (6) Research projects on soybeans. (7) Constraints to processing, utilization and marketing. (8) List of varieties available in Myanmar. (9) Information required. (10) Soybean growing seasons and cropping systems.

Tables: (1) Soybean production situation in Myanmar. (2) List of breeders, agronomists, entomologists, and pathologists working on soybeans at Central Agricultural Research Institute.

Table 1 shows: Area planted to soybeans grew from 16,427 ha in 1962 to 32,651 ha in 1990, with the peak of 34,571 ha in 1987. Soybean production grew from 11,208 tonnes (metric tons) in 1962 to 25,755 tonnes in 1990, with the peak of 27,227 tonnes in 1987. Soybean yields grew very little from 725 kg/ha 1962 to 811 kg/ha in 1990, with the peak of 890 kg/ha in 1986. Address: Farm Manager, Myanmar Agricultural Service, Aungban, Shan State, Myanmar.

2702. Na Lampong, Arwooth. 1993. Welcome address. In: N. Chomchalow & P. Narong, eds. 1993. Soybean in Asia: Proceedings of the Planning Workshop for the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. See p. 1. RAPA Publication (FAO), No. 1993/6.

• ***Summary:*** "Although being an exotic crop, soybean has a long and charitable history of cultivation and utilization in the Kingdom of Thailand. No definite record has been made about when and how this crop was introduced to this country. Based on available documents, it is believed that soybean was primarily and publicly promoted as a second crop to follow the main rice crop by then Governor of Chiang Mai in 1931." Address: Field Crop Specialist, Dep. of Agriculture, Bangkok, Thailand.

2703. Na Lampang, Arwooth; et al. 1993. Country Report 14–Thailand. In: N. Chomchalow & P. Narong, eds. 1993. Soybean in Asia: Proceedings of the Planning Workshop for

the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. See p. 128-142. RAPA Publication (FAO), No. 1993/6.

• ***Summary:*** Contents: (1) Introduction. (2) Production: Status, trend. (3) Processing, utilization and marketing: Marketing, export, domestic demand for soybean and its products, soybean price, utilization. (4) Constraints on soybean production: Agro-climatic constraints, production constraints, socio-economic constraints. (5) Research approach: Research undertaken to bridge the soybean yield gap, research undertaken to resolve the constraints, progress achieved and constraints to progress. (6) Constraints to be addressed on a priority basis. (7) Resources. (8) Training need. (9) Research projects and budget allocation. (10) Constraints processing, utilization, and marketing: Processing, utilization, marketing (processed soyfood products). (11) Effort undertaken to resolve the present constraints: Processing, utilization, marketing (processed soy food products). (12) Additional efforts: Processing, utilization, marketing (processing soy food products). (13) List of varieties. (14) Seed production and distribution: Annual seed production (in tons by DOA), seed production and distribution system (DOAE). (15) Information requirement for soybean. (16) Soybean germplasm maintenance collection. (17) Soybean growing seasons and cropping systems.

Tables: (1) Soybean planted area, production, and yield. Divided into four time periods: Pre-project (1978-1982), the period under the production enhancement and cost reduction project (1982-1985), the period under the seed exchange program (1985-1989), and the period under the production and marketing development project (1989-1992). (2) Imports and exports of soybean and its products. (3) Soybean supply and demand. (4) Average farm price of soybean.

A footnote on the first page states that the other authors are members of the Thai National Coordinating Committee for FAO/UNDP Project RAS/89/040, Improved Production of Food Legumes and Coarse Grains in Asia.

Table 1: Area planted to soybeans in Thailand grew from 1,010,000 rai (6.2 rai = 1 ha) in 1978/79 to a peak of 3,209,000 rai in 1989-90, then fell to 2,710,00 rai in 1991/92.

Production of soybeans in Thailand increased from 158,900 tonnes (metric tons) in 1978/79 to a peak of 672,400 tonnes in 1989-90, then fell to 527,000 tonnes in 1991/92.

Yield of soybeans in Thailand grew from 157 kg/rai in 1978/79 to a peak of 219 kg/rai in 1989-90, then fell to 194 kg/rai in 1991/92.

Table 2: Thailand is a major importer of soymeal and soyoil, but not of soybeans. The volume and value of both of these have increased dramatically from 1977 to 1990. Address: Field Crops Specialist, DOA, Chatuchak, Bangkok, Thailand.

2704. Napitupulu, T.A. 1993. Institutional Report 2–CGPRT Centre In: N. Chomchalow & P. Narong, eds. 1993. Soybean in Asia: Proceedings of the Planning Workshop for the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. See p. 158-163. RAPA Publication (FAO), No. 1993/6.

• ***Summary:*** Contents: (1) Introduction. (2) CGPRT centre's activities in soybean: Completed or nearly completed projects in 1991, planned projects for 1992, planned projects for 1993 onwards. (3) Publications.

From Sept. 1988 to Dec. 1991 CGPRT Centre did a Soybean Yield Gap Analysis Project, Phase II, in Indonesia and Thailand.

"Planned projects for 1992: Regional co-operative programme for the improvement of food legumes and coarse grains (FLCG) in Asia (RAS/89/040). Duration: Three years from 1991 to 1993. Countries: Fourteen countries including Bangladesh, China, India, Indonesia, Republic of Korea, Lao PDR [Laos], Malaysia, Myanmar [Burma], Nepal, Pakistan, the Philippines, Thailand, Sri Lanka and Vietnam."

"Planned projects for 1993 onward: Changes in the soybean economy in Asia: Impact on production, marketing, processing, and trade (SYRED). Duration: Three years. Countries: Thailand, Indonesia, Vietnam, and the Philippines." Address: Consultant, CGPRT Centre, Bogor, Indonesia.

2705. Obaidullah Khan, A.Z.M. 1993. Inaugural address. In: N. Chomchalow & P. Narong, eds. 1993. Soybean in Asia: Proceedings of the Planning Workshop for the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. See p. 6-8. RAPA Publication (FAO), No. 1993/6. Address: Asst. Director-General and FAO Regional Representative for Asia and the Pacific, Bangkok, Thailand.

2706. Ramli, M.N.; Jainudin, A.; Tg. Mahmud, T.Y. 1993. Country Report 7–Malaysia. In: N. Chomchalow & P. Narong, eds. 1993. Soybean in Asia: Proceedings of the Planning Workshop for the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. See p. 70-74. RAPA Publication (FAO), No. 1993/6.

• ***Summary:*** Contents: (1) Introduction. (2) Production: Status (Soybean is not presently grown commercially in

Malaysia), major growing seasons and cropping systems, constraints, resolving constraints. (3) Processing, utilization and marketing: Status, supply and demand, constraints, resolving constraints. (4) Resources: Personnel, seeds. (5) On-going research projects. (6) Information required.

Tables: (1) Import of soybean and soybean products in Malaysia. Amount and value in 1988, 1989, and 1990 of soybean, soybean flour (non-defatted), soybean oil, soybean cake & other residues, soysauce. Address: 1. Deputy Director. All: MARDI, Serdang, Selangor, Malaysia.

2707. Rosario, Ricardo R. del. 1993. Special report 3–Soybean processing, utilization and marketing in the Philippines. In: N. Chomchalow & P. Narong, eds. 1993. Soybean in Asia: Proceedings of the Planning Workshop for the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. See p. 201-209. RAPA Publication (FAO), No. 1993/6.

• ***Summary:*** Contents: (1) Introduction. (2) Post-harvest processing. (3) Soybean consumption: Soybean as food, soybean as feed. (4) Processing and utilization of soybean: Whole beans–non-fermented, ground or extracted soybean–non-fermented, fermented soybean products, soybean meal utilization and processing, soybean as animal feed, industrial uses of soybean, utilization of soybean oil in foods. (5) Marketing: Marketing of soybean, marketing of soybean products. (6) Constraints: Constraints in post-harvest processing, marketing constraints, processing constraints, efforts undertaken to resolve the identified constraints in processing, utilization and marketing. Address: Inst. of Food Science and Technology, UPLB, College, Laguna, Philippines.

2708. Saleh, Narsir; Sumarno. 1993. Country Report 5–Indonesia. In: N. Chomchalow & P. Narong, eds. 1993. Soybean in Asia: Proceedings of the Planning Workshop for the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. See p. 50-63. RAPA Publication (FAO), No. 1993/6.

• ***Summary:*** Contents: (1) Introduction. (2) Production: Production area, production systems and constraints, seed production, distribution system and constraints. (3) Utilization. (4) Marketing. (5). Research contributions and programmes: Research contributions, research priorities, budget for research programmes, research organization and management, research funding.

Figures: (1) Cropping pattern involving soybean planted on wetland during early (March to June) and late (July to September) dry season. (2) Cropping pattern involving soybean planted on rainfed wetland during the early rainy season (October to January). (3) Crop rotation pattern involving soybean on dryland planted in the rainy season. (4) Cropping pattern involving soybean on dryland, panted in the rainy season.

Tables: (1) Area harvested, yield, and production of soybean in Indonesia (1969-88). Area harvested grew from 582,000 ha in 1969 to 1,169,000 ha in 1988. Production increased from 398,000 tonnes (metric tons) in 1969 to 1,270,000 tonnes in 1988. Yield grew from 0.68 tonnes/ha in 1969 to 1.09 tonnes/ha in 1988. (2) Area, average yield, and production of soybean by region in Indonesia 1969-88. Java was Indonesia's leading soybean producing region with 58% of the total, followed by Sumatra (24%) and Sulawesi (7%). (3) Soybean utilization in Indonesia. The categories (every 5 years from 1968-72) are production, waste, seed, export, import, consumption. Imports have grown dramatically. In 1968-72 Indonesia exported on average 5,000 tonnes (metric tons) of soybeans a year. Then, in the early 1970s, the country switched to being an importer. In 1973-77 Indonesia imported on average a modest 14,000 tonnes of soybeans a year, increasing dramatically to 211,000 tonnes in 1978-82, and 359,000 tonnes a year in 1983-87. Soybean consumption in Indonesia also increased dramatically (more than 3-fold) during this 20-year period from 372,000 tonnes per year on average in 1968-72 to 1,152,000 tonnes in 1983-87. (4) Percentage of soybean marketing cost and profit margin in selected provinces in Indonesia. (5) List of improved varieties of soybean in Indonesia. Details on 24 improved varieties. (6) Manpower of the CRIFC by qualification, June 1989. Address: Scientist, MARIF, Malang, East Java, Indonesia; Director, MARIF, Malang, East Java, Indonesia.

2709. Srinives, Peerasak 1993. Special report 5–Biotechnological research on soybean at Kasetsart University In: N. Chomchalow & P. Narong, eds. 1993. Soybean in Asia: Proceedings of the Planning Workshop for the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. See p. 217-218. RAPA Publication (FAO), No. 1993/6.

Address: Prof., Dep. of Agronomy, Kasetsart Univ., Kamphaeng Saen Campus, Nakhon Pathom, Thailand.

2710. Tantera, Dewa Made. 1993. Remarks. In: N. Chomchalow & P. Narong, eds. 1993. Soybean in Asia: Proceedings of the Planning Workshop for the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. See p. 2-3. RAPA Publication (FAO), No. 1993/6.
Address: Regional Coordinator, UNDP/FAO Project RAS/89/040, Bogor, Indonesia.

2711. Tran, Van Lai 1993. Country report 15–Vietnam. In: N. Chomchalow & P. Narong, eds. 1993. Soybean in Asia: Proceedings of the Planning Workshop for the Establishment of the Asian Component of a Global Network on Tropical and Subtropical Soybeans. Bangkok, Thailand: FAO Regional Office for Asia and the Pacific. viii + 218 p. See p. 143-150. RAPA Publication (FAO), No. 1993/6.

• ***Summary:*** Contents: (1) Introduction. (2) Production: trend, major growing seasons and cropping systems, constraints, resolving the constraints, future research. (3) Processing, utilization and marketing: Consumption, processing, marketing, constraints, resolving the constraints. (4) Resources: Personnel, seeds. (5) On-going research projects. (6) Information required. (7) Conclusion.

Tables: (1) Area, yield, and production of soybean in Vietnam, 1970-90. (2) Soybean production constraints in Vietnam. (3) Several research findings on soybean breeding and farming patterns. (4) Identified constraints for soybean production in Vietnam. (5) National requirement for food and production of soybean. (6) Methods of soybean processing of Vietnam. (7) Constraints to soybean processing, utilization, and marketing. (8) Future research priority for soybean in Vietnam. (9) Number of scientists working on soybean research. (10) Training needs on a priority basis. (11) Soybean varieties of high yield potential.

Introduction: "Soybean has been cultivated in Vietnam for a long time. Le Quy Don, in his book "Van Dai Loai Ngu", written in 1773, mentioned about soybean cultivation. It is the second most important legume in Vietnam. All soybean products are used as human foods and animal feed because of its high food value (40-50% of protein and 20-25% of oil).

"The Government of Vietnam, which is conscious of the importance of soybean and its role of human food and animal feed, and the possibility to increase its production, has listed soybean as the number two most important crop after groundnut in her agricultural development policy."

Table 1: Area planted to soybeans in Vietnam grew from 17,078 ha in 1970 to 149,000 ha in 1990, projected to grow to 300,000 ha in the year 2000.

Production of soybeans in Vietnam increased from 5,277 tonnes (metric tons) in 1970 to 146,020 tonnes in 1990, projected to grow to 420,000 tonnes in the year 2000.

Yield of soybeans in Vietnam grew from 309 kg/ha in 1970 to 980 kg/ha in 1990, projected to grow to 1,400 kg ha in the year 2000.

"Most of the soybean produced in Vietnam is consumed as human food prepared by traditional methods, which include fermented products such as soysauce, soypaste (miso), soycurd (fermented tofu), and soycheese, and non-fermented products such as soymilk, soycurd (tofu) and soybean oil.

Note: This is the earliest English-language document seen (March 2009) that uses the term "soypaste" to refer to miso.

Concerning the Vietnamese names of these foods, Huong Quan Nguyen (Zomore Quan) writes, in reply to a question from Soyinfo Center. 2008. Aug. 17. Soy sauce = "xi dau" (the Vietnamese "d" written without the bar across the vertical stroke is pronounced "Z").

Soy paste = "tuong dau nanh" or "tuong Cu Da." "Tuong" is a generic term meaning "sauce." As you know, Cu Da is the name of the village famous for its soy paste. "Tuong Cu Da" literally means "sauce made in Cu Da Village." Soy paste is made in many villages in North Vietnam, not just in Cu Da. I have heard that Tuong Ban and Tuong Pho Thoi are just as good as Tuong Cu Da.

Soy curd = "dau hu" (which is unfermented. Once the soy curd is fermented, it is referred to as "chao").

Soy cheese = "chao" (this word has no diacritical mark).

Note: Zomore asked six Vietnamese people who are knowledgeable about soyfoods and all are aware of only one kind of fermented tofu in Vietnam; therefore they cannot imagine what fermented "soycheese" is. Address: Legumes Research and Development Centre, INSA, Dong Da, Hanoi, Vietnam.

2712. Zapf, Regina. 1993. Untersuchung der Lipid- und Aminosaeurezusammensetzung verschiedener Tempeproben aus Indonesien im Vergleich zu unfermentierten Sojabohnen [Investigation of the lipid- and amino-acid composition of various tempeh samples from Indonesia compared with unfermented soybeans]. Thesis, Bonn University, Germany. 112 p. Illust. 21 cm. [Ger]*
Address: Bonn, Germany.

2713. **Product Name:** Soymilk, and Taho (soymilk curd).
**Manufacturer's Name:** Kimsun International.
**Manufacturer's Address:** 35 Simoun St., Quezon City, Philippines. Phone: +63 2 47 2330.
**Date of Introduction:** 1993?
**New Product–Documentation:** Talk with Johnny Lee of Kimsun Intl. 1995. Aug. 11. He calls from the Philippines. He has been making soymilk and taho (soymilk curd) for several years. Philsoy is still made in small quantities, but is sold only around the university at Los Baños.

2714. *SoyaScan Notes.* 1994. Keywords used with more than 1,000 documents in the SoyaScan database, as of 1 January 1994 (Overview). Jan. 1. Compiled by William Shurtleff of Soyfoods Center.

• ***Summary:*** 1. USA 24,636. 2. Commercial soy products 6,565. 3. Japan 5,948. 4. Tofu 5,122. 5. Soymilk 3,884. 6. Illinois 3,642. 7. Soy sauce 3,387. 8. California 3,129. 9. Historical (documents published from 1900 to 1923) 3,013.

10. Soy flour 2,822. 11. History 2,730. 12. Soy oil 2,648. 13. Germany 2,447. 14. Miso 2,324. 15. Vegetarianism 2,319. 16. United Kingdom (England, Scotland, Wales, N. Ireland) 2,134. 17. China 1,554. 18. Soybean meal 2,019. 19. Cookery 2,017. 20. Soybean production: Cultural practices and agronomy 1,996. 21. France 1847. 22. Tempeh 1,844 23. Soybean production (General): 1,825. 24. U.S. Department of Agriculture 1,744. 25. New York 1,665. 24. Nutrition (General) 1,471. 25. Historical (documents published before 1900) 1,460. 26. India 1,397. 27. International trade in soybeans, soy oil, and/or soybean meal 1,225. 28. Canada 1,204. 29. Soy protein isolates 1,204. 30. Michigan 1,146. 31. Meatlike commercial products 1,145. 32. USDA state agricultural experiment stations in the USA 1,120. 33. Soybean production: Marketing 1,098. 34. Ohio 1,095. 35. Soybean production: Variety development 1,083. 36. Indonesia 1,063. 37. Tofu used as an ingredient in second generation commercial food products 1,062. 38. Bibliographies and literature reviews 1,049. 39. Massachusetts 1,029. 40. Macrobiotics 1,022. 41. Soy ice cream 1,014.

2715. Agriculture Canada, Oilseeds Division, International Markets Bureau, Markets and Industry Services Branch. 1994. Oilseed sector profile. Ottawa, Ontario, Canada. [iv] + 23 + 1 + 12 p. Jan. 28 cm. Spiral bound. [3 ref]

• ***Summary:*** Contents: Foreword. 1. Introduction. 2. The seed production subsector: Canola, soybeans, flaxseed, sunflower, mustard, safflower, composition.

3. The processing subsector: Background, crushing plants, industry statistics, methods of processing, oilseed crushings, vegetable oils, vegetable oilmeals, economic value of the industry. 4. The marketing subsector: Oilseeds marketing, hedging, processed oilseed products marketing.

5. Organizations: Canola, soybeans, flaxseed, crushers. 6. The environment: Domestic, international.

Appendix A: Role of the federal government in the Canadian oilseeds industry: Research, regulation, marketing. Appendix B. Oilseed industry directory: Industry association, oilseed processing companies, oilseed sector trading companies, research / education institutions, government, others.

Soybeans (p. 3): "Soybeans were introduced into Canada in 1893; however they did not become a commercial oilseed crop until the late 1920's. In that year [sic, about March 1930], the first soybean crushing plant [Milton Oil Refineries, Ltd.] was built in Milton, Ontario. The introduction of modern crushing mills occurred in the late 1930s. Increased demand for vegetable oil and protein meal during the early 1940's firmly established the crop and by 1950, soybeans had become a major cash crop in Ontario. Strong promotional efforts by the crushing industry assisted in continued expansion of the crop. During the 1980s, soybeans were introduced into Québec, the Maritimes and Manitoba as a source of livestock feed... In Québec, whole soybeans have become a viable alternative feed source. In other regions, whole soybeans are only a minor ingredient for livestock."

The soybean growers, like their canola counterparts, have shown a high degree of cohesion and organizational ability. In 1949, the Ontario Soybean Growers' Marketing Board was founded. The Board represents 25,000 producers and negotiates the pricing arrangements for Ontario soybeans. Its functions are discussed in more detail further in this report. The handling, crushing, and exporting of soybeans and soybean products is handled by private companies.

"Canadian soybean production has increased sharply from the late 1970's when up to 60 percent of Canadian soybean requirements had to be imported. In 1987, domestic production reached a level capable of supplying most internal demands for crushing (Table 3). Although some soybeans are still being imported from the U.S., Canada exports a larger volume of high quality white hilum soybeans for food utilization in Asian and European markets.

Domestic crush of these larger crops has made Canada self-sufficient in soyoil production; however, soymeal is still in a deficit position. About 600,000 tonnes representing close to 50 percent of domestic soymeal utilization requirements needs to be imported yearly.

"Up to 1991, the soybean crushing industry was operating below capacity." In that year, Victory Soya Mills in Toronto was closed. "The result is that the crushing capacity now meets the production of soybeans for crushing. Therefore, without an increase in crushing capacity, Canada will remain a net importer of oilmeals. Nevertheless, increasing the crush is economically questionable until a viable market outlet is found to absorb the additional soyoil produced. The 1992 elimination of the U.S. crude soyoil tariff (18%) could ease the situation. The two companies crushing soybeans in Canada are corporately linked to large multinational corporations, with major U.S. operations. Therefore, without tariff, the unrestricted movement of soyoil between the two countries is a possibility."

"Economic value of the industry (p. 12): The oilseed crushing industry makes a large and positive contribution to the Canadian economy. It is a processing industry and as such it provides enhanced strength to the economy through value-added contributions and the financial multiplier effect. In 1992 (table 16) the direct economic benefits were $1,810 million, and the contribution to the Canadian balance of payments was $599 million in total import replacement and $322 million in export earnings for a total contribution of $921 million.

Tables show: (3) Canadian supply and disposition of soybeans, soyoil and soymeal, 1988-1993. (5) Oilseed

crushing facilities in Canada. Owners and their soybean crushing plants are: ADM Agri-Industries Ltd. (Windsor, Ontario): 1,250 tonnes capacity per 24 hours. CanAmera Foods (Hamilton, Ontario): 1270 tonnes capacity per 24 hours.

(7) Oilseed crushings in Canada: The soybean crush was #2 largest in Canada after canola and ahead of sunflower seed. The soybean crush was 908,200 tonnes in 1988, then 916,000 tonnes in 1989, then 1,083,500 tonnes in 1990, then 943,600 tonnes in 1991, and 995,200 tonnes in 1992.

(8) Vegetable oil production in Canada. Soybean oil is #2, far behind canola oil and far ahead of sunflower oil. During these 5 years, soybean oil production ranged from a low of 159,000 tonnes in 1988 to a high of 194,800 tonnes in 1990.

(9) Vegetable oil trade. During these 5 years, soybean oil imports to Canada were very small, ranging from a low of 4,000 tonnes in 1989 to a high of 16,000 tonnes in 1990. Soybean oil exports from Canada were even smaller, ranging from a low of 1,000 tonnes in 1989 to a high of 5,300 tonnes in 1991. Both soybean crushers also have their own soy oil refineries. The capacity of the ADM Agri-Industries Ltd. refinery (Windsor, Ontario) is 159,000 tonnes per year, whereas that of CanAmera Foods (Toronto) is 147,000 tonnes per year.

(13) Vegetable oilmeal production: Soybean meal is #2, behind canola meal but far ahead of sunflower meal. During these 5 years, soybean meal production ranged from a low of 698,300 tonnes in 1988 to a high of 835,800 tonnes in 1990.

(14) Vegetable oilmeal trade. During these 5 years, soybean oil imports to Canada were large, and vastly larger than any other oilmeal, ranging from a low of 565,400 tonnes in 1990 to a high of 692,100 tonnes in 1988. Soybean meal exports from Canada were very small, ranging from a low of 200 tonnes in 1989 to a high of 33,100 tonnes in 1992. By contrast, large amounts of canola meal (about half of the total amount produced each year) were exported.

(18) Soymeal imports by province. The top 3 in 1988 were: Ontario 326,026 tonnes. Manitoba 169,687 tonnes.

(19) Soybean exports by major markets: The top 8 in 1992 were: USA 69,135 tonnes. Portugal 62,515 tonnes. Netherlands 27,349 tonnes. Former USSR 20,752 tonnes. Hong Kong 19,376 tonnes. Singapore 17,268 tonnes. Japan 11,306 tonnes. Malaysia 10,687 tonnes. Quebec 137,365 tonnes. Total 1992 245,668 tonnes.

(24) EC-12 production of major oilseeds, 1989-193. In 1992-93 the leading oilseeds produced in the European Community were: Rapeseed 6,217,000 tonnes. Sunflowerseed 3,940,000 tonnes. Soybeans 1,294,000 tonnes. Cottonseed 606 tonnes. Linseed 316 tonnes. Address: 930 Carling Ave., Ottawa, ONT K1A 0C5, Canada. Phone: (613) 995-8324.

2716. Gervais, Marc; Theriault, Sylvana; Bernard, Eric. 1994. Oilseed sector profile. Ottawa, Ontario, Canada. [iv] + 23 + 1 + 12 p. Jan. 28 cm. Spiral bound.

• ***Summary:*** Contents (each accompanied by tables and charts; each section covers the years 1991-1994): Imports of soya beans for sowing (almost all come from the USA, followed by Chile and Japan). Imports of soya beans for oil extraction (almost all come from the USA). Imports of soya beans, nes [meaning unclear] (almost all come from USA, followed by Taiwan, China, and Japan).

Imports of soya-bean oil crude, whether or not degummed (almost all comes from the USA, followed by France). Imports of soya-bean oil and its fractions, refined but not chemically modified (almost all comes from the USA, followed by Singapore). Imports of veg fats & oils & fractions hydrogenated, inter or re-esterified, refined or not (almost all comes from the USA followed by UK and Netherlands). Imports of animal or veg fats & oils...

Imports of soya bean flour and meals. Imports of soya sauce (main suppliers are: USA, China, Japan, Hong Kong, Taiwan, Philippines, South Korea). Imports of protein concentrates and textured protein substances (almost all comes from USA). Imports of Soya-bean oil-cake and other solid residues, whether or not ground or pellet (almost all comes from USA). Imports of bran, sharps and other residues of leguminous plants, pelleted or not (almost all comes from USA).

Exports of soya beans for sowing (most goes to USA, followed by France, Germany and Austria). Exports of soya beans, for oil extraction (most goes to Netherlands, followed by France, Portugal and Spain). Exports of soya beans, nes (most goes to USA, followed by Hong Kong and Singapore). Exports of soya bean flour and meals (almost all goes to USA). Exports of soya-bean oil crude, whether or not degummed (almost all goes to the USA). Exports of soya-bean oil and its fractions, refined but not chemically modified (almost all goes to Pakistan, followed by USA). Exports of veg fats & oils & fractions hydrogenated, inter or re-esterified, refined or not (almost all goes to the USA). Imports of animal or veg fats & oils... (almost all goes to USA).

Exports of soya sauce (main buyers are UK, Japan, United States, Finland, Cuba).

Exports of protein concentrates and textured protein substances (almost all goes to USA). Exports of Soya-bean oil-cake and other solid residues, whether or not ground or pellet (almost all goes to USA). Exports of bran, sharps and other residues of leguminous plants, pelleted or not (almost all goes to USA). Address: Trade Evaluation and Analysis Division, International Markets Bureau, Markets and

Industry Services Branch, Agriculture Canada, Ottawa, Ontario, Canada.

2717. Haren, Chuck. 1994. The programs: Looking ahead to 1994. Soybean utilization technical assistance. *Plenty Bulletin (Davis, California)* 9(4):1-2. Winter.
• ***Summary:*** The 1994 budget for these programs is $45,000. "Over the past two years, with funding from the Public Welfare and Threshold Foundations and individual Plenty donors, we have worked extensively with 30 groups in Liberia, Guatemala, Nicaragua, Belize, Dominica, St. Vincent, Jamaica, and on two Native American reservations... We currently have requests for assistance with soy programs from other grassroots organizations in India, Guyana, Uganda, Tanzania, Bolivia, El Salvador, Philippines, and Sri Lanka, and we would like to be able to assist them." Photos show: (1) Two women cooking soymilk over an outdoor fire in Belize. Children with soymilk and tortillas.

2718. *Agri-Book Magazine (Exeter, ONT, Canada).* 1994. Far East market can double. 20(5):29. Feb.
• ***Summary:*** Canada is selling more and more soybeans for food uses to East Asia. Thailand is the only country in the region that is self-sufficient in soybean production. Japan (population 123 million) imports more than 1 million tonnes per year, Taiwan imports 250,000 tonnes, Indonesia 150,000 tonnes, Korea 120,000 tonnes, and Malaysia 100,000 tonnes. Singapore and Hong Kong import all the soybeans they use.

In 1993 Ontario produced a record 1.7 million tonnes. Only 500,000 tonnes of this (29.4%) was exported, and only a fraction of that was suitable for making soyfoods such as tofu, natto, soymilk, Taiwanese fermented tofu *(foo yee),* etc. A large color photo shows ladies in Taiwan packing fermented tofu in jars.

Ontario has captured 56% of the Hong Kong market, and about 14% of the Malaysian market. But the Asia market is becoming more competitive because exporters from the USA are beginning to offer soybeans in bags as well as bulk shipments. Michael Loh, the OSGMB coordinator for export development, thinks Canada can achieve its goal of doubling soybean exports by the year 2000.

2719. Badani, Bernard. 1994. Edible soybean mission report, Indonesia, Taiwan, Korea, February 1994. Ottawa, Ontario, Canada: Agriculture and Agri-Food Canada. 23 p. 28 cm. Spiral bound.
• ***Summary:*** Contents: Foreword: Mission objective, countries visited, main goals, conclusion. Acknowledgments. Names of the 8 mission members. Visit to Indonesia (Jakarta): Background, visits (Nestle soymilk plant in Surabaya, BULOG), conclusions, market potential (short, medium, and long term). Visit to Taiwan (Taipei, Taichung, Tainan, Kaohsiung): Background (the pro-American soybean lobby), visits (Taiwan Tofu Manufacturers Assoc., Tet Union Corp., Great Wall Enterprises, Herng Yih), conclusions, market potential (short and medium term). Visit to Korea (Seoul): Background, visits (Hyosung Corp., AFMC, Korean and Seoul Tofu Manufacturing Co-operatives, conclusions, market potential (short and medium term). List of contacts by country (photocopies of business cards). Note: Mr. Badanai works for this federal organization in Ottawa.

This mission, whose coordinator was Michael Loh, took place between Feb. 25 and March 10, 1994; it was organized by OSGMB with assistance from the Canadian Embassies in Jakarta and Seoul, and the Canadian Trade Office in Taipei. The overall objective of the mission was to open these 3 markets to the sale of Special Quality White Hilum (SQWH) soybeans from Canada for use by their soy food industries.

Indonesia imports about 700,000 tonnes of soybeans each year, mostly grade #1 from the USA, to supplement its local production of about 1.3 million tonnes. About 250,000 tonnes of the imports are used to make soyfoods such as tempeh (which accounts for about 80% of the total), tofu, taucho (Indonesian miso), and soybean milk. The majority of their domestically grown soybeans are also used to make soyfoods. All Indonesian soybean imports are handled by BULOG, a government agency which determines yearly requirements and allocates the resulting imports to various companies under a complex price structure formula apparently designed to maintain the competitiveness and full utilization of the domestic crop whose internal prices are very high by international standards. Sarpindo is the largest Indonesian soybean crusher. Nestle operates a soymilk plant in Surabaya that makes 12,000 tonnes/year and is completing a second one of 20,000 tonnes capacity in Jakarta. Much of Nestle's production, especially for the new Jakarta plant, is oriented toward the export market, with the Philippines as their top priority.

Taiwan grows only 12,000 tonnes of soybeans domestically, but they import 2,400,000 tonnes per year. Their main suppliers are the USA (1,938,000 tonnes, 80.8% of the total), China, 297,000 tonnes), and Argentina (6,000 tonnes). Imports are handled mostly by a small number of major crushers, which then select a portion of the #2 soybeans imported, bag them, and sell them to Taiwanese soyfood manufacturers. About 8% of the total imports (200,000 tonnes) are handled in this way. Tofu is by far the most important soyfood in Taiwan, with consumption of 49.79 kg/capita/year. Most tofu is made by very small companies. The main problem facing Canadian exporters is the almost total control that the pro-American soybean lobby has shown so far in Taiwan. This lobby includes the main local crushers/importers of U.S. soybeans (which have

a strong interest in maintaining the present import and distribution systems that make local tofu manufacturers dependant on them), and the American Soybean Association (ASA) office (with a staff of 15) in Taipei. Tet (Ttet) Union Corp. in Tainan is the largest crusher in Taiwan. Fwusow (Fwu Sow) is a large edible oil company. Taiwan's largest tofu manufacturer is Herng Yih Food Industrial Co. of Kaohsiung. The 13 year old company has two plants, 14 minutes drive apart.

Korea imports between 1 and 1.1 million tonnes of soybeans a year to supplement domestic production of about 200,000 tonnes. Approximately 200,000 tonnes of the total imports and 20,000 tonnes of domestically grown soybeans are used to make soyfoods, mostly tofu. All soybeans destined for this purpose are purchased by AFMC, the Agricultural and Fisheries Marketing Corporation, a state-owned corporation and government monopoly under the Ministry of Agriculture. that resells soybeans to food processors according to their needs, charging a very high markup over the import purchase price. This markup, in turn, allows AFMC to subsidize purchases of domestic soybeans which it buys at prices close to 5 times the international price but which it resells to tofu manufacturers at the same price as the imported soybeans. It is expected that AFMC will loose its importing monopoly on food grade soybeans by 1997 due to the GATT agreement. An immediate market potential for Canadian soybeans seems to exist for sprouting soybeans, of which Korea purchases about 6,000 tonnes a year. Address: Grains and Oilseeds Div., International Markets Bureau, Agriculture and Agri-Food Canada, Ottawa.

2720. *Toyo Shinpo (Soyfoods News).*1994. Ajia no nattô–sono genryû o saguru. Biruma, Nepaaru nado e kuruma de tôsa. Ajinomoto Shohu (hin) no Bunka Fooramu no josei de. Tenpe-ken Watanabe zen kaichô ra 3 shi. 6 gatsu ni kenkyû seika happyô [Trying to find the roots of natto in Asia. Three researchers went to Burma and Nepal by car in search, helped by Ajinomoto Food Company's Cultural Forum. Among them was Tadao Watanabe, former head of the Tempeh Research Society. They are planning to present their results in June]. March 21. p. 1. [Jap]
• ***Summary:*** Photos show the three researchers who went on the trip: Tadao Watanabe, Yoshiko Yoshida, and Toshiie Maeda.

2721. Wood, Brian J.B. 1994. Bean Products Ltd.: The earliest known company to make fermented soy sauce in the United Kingdom (Interview). *SoyaScan Notes.* March 30. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Brian Wood was born in Birmingham, England. He earned his BSc and PhD degrees at Birmingham University in the Malting, Brewing, and Applied Biochemistry Department, where he studied lactic acid bacteria for his PhD. In 1959 he came to the USA on a fellowship from the National Cancer Institute for post-doctoral research at the Dept. of Biochemistry and Biophysics, University of California at Davis. With Lloyd Ingraham, he studied the mode of action and kinetics of the enzyme tyrosinase. One day in 1960 Prof. Herman Pfaff, who taught food science and microbiology at Cal-Davis and is still one of the world's leading authorities on yeasts, took a group of students (including Brian) taking a course of his to visit Lucky Lager (a beer brewery) in or near San Francisco. During the trip they also visited a small Japanese shoyu factory in San Francisco (probably in Chinatown) that made fermented soy sauce. There Brian first became interested in the soy sauce fermentation process. He wondered what involvement lactic acid bacteria might have in the process.

Then he studied with Prof. Goldman in the Department of Zoology, and in 1961-62 traveled to the Antarctic, where he studied microalgae. In 1962 he returned to Britain, spent 6 years with Unilever, then in 1968 took up his present appointment teaching and doing research at the University of Strathclyde (in Glasgow, Scotland), in the Department of Applied Microbiology (which in 1982 was incorporated into the Dept. of Bioscience and Biotechnology).

Professor Morris, the head of the department, had served in East Asia during World War II and had considerable appreciation of the importance of Oriental foods. He was trying to build a link with Singapore, and assigned Yong Fook-Min of Singapore to work with Brian for his MSc. There he and Brian began to investigate the role of lactic acid bacteria in East Asian soybean fermentations, starting with soy sauce. Yong was an exceptionally hard worker and his 1971 MSc thesis produced the four key papers on which all later work was founded. In 1974 Yong and Wood wrote "The Microbiology and Biochemistry of Soy Sauce Fermentation," a definitive 38-page study containing 270 references. After that, Brian had three students (including Sumbo H. Abiose, a Nigerian woman) complete PhD's and write doctoral dissertations on aspects of fermented soyfoods.

In 1974 Goel, Yong, and Wood applied for a British Patent on a quick method for making soy sauce; it was issued in 1976. In about 1978 Brian became interested in starting a commercial soy sauce factory in Scotland. So that year he initiated discussions with Edward North, head of the university's Center for Industrial Innovation. North referred Brian to Dr. Colin Walker and together in late 1979 they got a grant of £84,000 from the Wolfson Foundation, to study the feasibility of starting such a factory and what problems would be involved in scaling up from laboratory to commercial scale. By 1980-81 it became clear that the project was feasible. The University of Strathclyde provided some of the start-up capital, additional money came from remaining Wolfson Foundation funds, and Brian's group

obtained overdraft facilities from the university's bank (The Bank of Scotland), which meant they could borrow a specified amount of money and the university would guarantee the loans. Since no individual researchers put up any money, the university owned the soy sauce company. In April 1982 the group established a company named "Bean Products Ltd." in Cumbernauld, which is about 11 miles northeast of Glasgow. They selected Cumbernauld for various reasons, one of which was that advantageous rental terms were available there. They moved into a new rental structure, in a space with 8,000 square feet. They had a rent holiday for 1-2 years. Employees of the company consisted of a salaried factory manager (Christopher Corden), a salaried accountant/office and business manager (Michael Riddle), a PhD graduate of Brian's department served as company microbiologist, biochemist, chemist etc. (Dr. Jennifer Mackie), and they had about 4 workers who made soy sauce. Brian was employed by the university, not by the company. Some weeks he spent a great deal of time at the factory and other weeks he spent little or no time there–in part because of the demands of his extensive teaching schedule. Dr. Colin Walker spent more time at the plant than Dr. Wood. There they made one Southeast Asian-style fermented soy sauce for the UK wholefoods market. The main ingredients were whole soybeans and koji that was made in small plastic trays–ordinarily used for carrying bread. Roughly equal parts of soybeans and roasted cracked wheat were used. The soy sauce was fermented for about 3 months at 38-40ºC using a temperature controlled fermentation. The "salt mash" (moromi) was inoculated with yeasts and bacteria. A dark sugar preparation was added to the finished sauce to sweeten the flavor, darken the color, and thicken the consistency. The company bottled a small amount of the finished soy sauce and sold it mostly to health food shops under two labels: "Bean Products Japanese-Style Soy Sauce" and "Bean Products Chinese-Style Soy Sauce." But most of their product was blended with other ingredients after the fermentation to the specifications of other companies. It was shipped to these companies in bulk plastic containers; some bottled it under their own labels, but most used it as an ingredient in foods. Cauldron Foods used it as an ingredient in their tofu burgers.

After a while the university, which owned Bean Products, became uneasy as money flowed out during the startup process. So in May 1984 they sold the company to Nestle (for a relatively low price), and it was renamed Nestle Foods–Cumbernauld. After Nestle bought the plant, Dr. Wood became inactive in the company. Jennifer Mackie, Chris Corden, and Michael Riddle stayed with the company. Nestle sold their soy sauce under the Sarsen's brand–the same brand they used for their vinegar, pickles, and other related products. Nestle continues to operate the plant at its original site (though they have expanded into an additional 4,000 square feet) using the same basic process. Dr. Wood estimates that they make about 1,500 metric tons a year of the Chinese-style fermented soy sauce. Most of it is either sold to other food processors, or to other companies who package it under their own label for resale to consumers.

Concerning other early soy sauce manufacturers in the UK, Brian vaguely remembers hearing that an Indian entrepreneur was making soy sauce in the area of London at about the same time as Bean Products Ltd. He owned a number of food-related companies which sold mostly to the local Indian market. When Colin Walker was in London in about 1980 or 1981 he tried to visit the plant, but failed. Note: This company may have been either United Breweries International (UK) Ltd., or Soyco, both located in London. Address: Dep. of Bioscience and Biotechnology, Univ. of Strathclyde, Glasgow, Scotland.

2722. Mahmud, T.Y. Tunku; Kasim, A. Abu. 1994. Processing and marketing of fresh soybean milk for income and employment generation in the Klang Valley, Malaysia. *Palawija News (Bogor, Indonesia)* 11(1):9-14. March.
• ***Summary:*** "An interesting development taking place in the food processing industry is the increase of fresh soybean milk retailers in night and farmers' markets. Entry into this business is relatively easy because it requires low initial capital outlay and the raw materials are readily available. It appears that Malaysian consumers are acquiring a taste for this relatively new product."

"There are three main objectives of this study: 1. To determine the number of establishments involved in the processing and marketing of fresh soybean milk and the employment generated in the Klang Valley. 2. To determine the income and expenditure of processors and retailers of fresh soybean milk in the Klang Valley. 3. To estimate the market size of fresh soybean milk in the Klang Valley." Address: Malaysian Agricultural Research and Development Inst. (MARDI), Malaysia.

2723. Vitasoy International Holdings Ltd. 1994. New issue of 127,200,000 shares of $0.25 each at $2.28 per share: Prospectus. Hong Kong: Vitasoy International Holdings Ltd. 94 + 94 p. March 15. 28 cm. [Eng; Chi]
• ***Summary:*** This prospectus announces the first public sale of Vitasoy stock. Half the prospectus is written in English and the other half in Chinese. The sponsor and manager of this initial public stock offering is Wardley Corporate Finance Limited. Underwriters: Wardley Corporate Finance Limited, and Schroders Asia Ltd. The symbol "$" refers to Hong Kong dollars unless otherwise indicated; 7.8 Hong Kong dollars = 1 U.S. dollar, and the exchange rate is fixed.

Contents: Summary. Expected timetable. Definitions. Preliminary. Conditions of the new issue. Share capital. Indebtedness. Risk factor. Directors and corporate information. Parties involved in the new issue. Information

relating to the Group: Introduction, corporate structure, history and development (see separate record), strategy, brands, market share and competition, marketing and sales, operations, tofu, Guang Ming Farm, Gardner Merchant, financial information, future plans and prospects, directors, management and staff, trademark valuation, profit and dividend forecasts, proceeds of the New Issue and working capital, adjusted net tangible assets and net assets. Appendixes: 1. Accountants' report. 2. Profit forecasts. 3. Trademark valuation. 4. Property valuation. 5. Statutory and general information. Prospectuses and application forms. Procedure for application.

Financial summary (in million Hong Kong dollars): Turnover (sales) has grown from 795 in 1991 to 912 in 1992 to 996 in 1993. Profit before taxation has grown from 43.8 in 1991 to 88.6 in 1992 to 108.8 in 1993. The company has 5 executive directors and 4 non-executive directors. All of the directors have British, Australian, U.S., or Canadian nationality. Three of the 5 executive directors are children of the founder, K.S. Lo: (1) Mr. Winston Lo Yau Lai, age 52, of Hong Kong (British nationality). Frank graduated from the University of Illinois with a BS degree in Food Science, then earned his MSc degree in Food Science from Cornell University in New York; (2) Mr. Frank Lo Yau Ki, age 54, of Hong Kong (British nationality). Frank attended Queensland Agricultural College where he obtained a diploma in dairy manufacturing before joining the group in 1965; (3) Ms. Yvonne Lo Mo-Ling, age 45, of San Francisco (California; USA nationality). Yvonne is president of the Group's operations in the USA and has been responsible for them since 1980. She received a BA degree from Oberlin College in Ohio and took undergraduate studies in Urban and Regional Planning at the University of Toronto in Canada.

Brands: Vitasoy soybean milk is the Group's principal product. Sales (in million Hong Kong dollars) were \$337.4 in 1991 (42.5% of total sales), \$397.0 in 1992 (43.5% of total), and \$411.6 in 1993 (413% of total sales). Sales of tofu and other food products were \$32.9 (US\$4.21 million) in 1991, \$50.2 (US\$6.44) in 1992 and \$50.7 (US\$6.5) in 1993.

In terms of turnover (sales) by geographical area, Hong Kong is by far the leading area with 78.9% of total worldwide turnover (\$995 million) in 1993, followed by North America (12.0%), Macau (2.4%), Singapore (2.2%), PRC (1.6%), Australia/New Zealand (1.6%), and others (1.1%).

Senior management includes: Mr. Jerry Maynard, age 43, who is president of Nasoya. He joined the group in 1988 and became president of Nasoya in Sept. 1993. Mr. Michael Ho, age 38, is president of Azumaya. He joined the Group in 1982 and became president of Azumaya in June 1993.

Trademark valuation: An independent valuer has valued them at HK\$260 million.

Assets: The main trade marks are Vitasoy, Vita, Balanz, Azumaya, and Nasoya. Tangible: \$781 million. Net assets: \$1,051 million.

Subsidiaries: Value of issued and paid up share capital: Vitasoy (U.S.A.) Inc. US\$12.0 million. Nasoya Foods Inc. US\$6.346 million (incorporated 13 July 1990). Azumaya Inc. US\$6.5 million (incorporated 1 July 1969).

Properties: The main property, located at No. 1 Kin Wong St., Tuen Muen, New Territories, has a capital value of HK\$140 million on 28 Feb. 1994. This is a 17-story industrial building, completed in 1986, on a site of 33,250 square feet (3.089 square miles). It has a total gross floor area of approximately 311,815 square feet, including 38 lorry parking spaces and 22 private parking spaces. The property is held from the Government under New Grant No. 2606 for a term extending to 2047. The current ground rent is \$600 per annum. The Azumaya rental property comprises 37,172 square feet of interior floor space on 2 acres of land. Monthly rental is about \$20,000. Address: No. 1, Kin Wong Street, Tuen Mun, New Territories, Hong Kong. Phone: 466 0333.

2724. Vitasoy International Holdings Ltd. 1994. History and development (Document part). In: New issue of 127,200,000 shares of \$0.25 each at \$2.28 per share: Prospectus. 1994. Hong Kong: Vitasoy. 94 + 94 p. See p. 14-15. March 15. 28 cm. [Eng; Chi]

• ***Summary:*** The Company, originally named Hong Kong Soya Bean Products Company Ltd. was founded in March 1940 by four men, Mr. (later Dr.) Lo Kwee Seong, Mr. Shiu Wai-Ming, Mr. Chan Nam-Cheong, and Mr. Kwan Yim-Chor. The Company's first product, named Vitamilk, was first sold in Hong Kong just prior to the outbreak of World War II. Note: Production began on 9 March 1940. Vitamilk was fortified with calcium, cod-liver oil, and vitamins, and sold in small milk bottles. Production of Vitamilk ceased during the War, but after the War the Company relaunched Vitamilk, which was then produced at and sold from, small premises in Causeway Bay. 1950–The Company moved to new premises in Aberdeen to keep up with growing sales; it now had increased production capacity and facilities for research and development. At the same time the Company became the franchisee for Green Spot, an orange flavoured soft drink. Green Spot proved highly popular in Hong Kong and provided the company with the opportunity to gain important experience in pasteurization and sterilization techniques. 1953–This new expertise led to the Company's development of a sterilized version of Vitamilk, which had a longer shelf life. At the same time the product was renamed Vitasoy in English and repackaged in narrow-necked soft drink bottles, which replaced the traditional milk bottles. Note: In 1953 the company first began to work with UNICEF to popularize the use of soy beverages in

developing countries. 1957–The Pepsi-Cola franchise replaced the Green Spot franchise.

1960–The image of Vitasoy as a nutritious quality product received a boost when UNICEF became aware of the attractions of a high protein, vitamin enriched soybean milk for use in developing countries. 1961–An additional soymilk production plant was opened in Kwun Tong to keep up with rapid increases in sales of Vitasoy. 1962–The introduction of a malt Vitasoy helped lead to further increases in sales. From 1955 to 1970 sales of Vitasoy grew from approximately 12 million bottles to approximately 60 million bottles per annum.

1970s–The Company continued to expand and develop. 1975–A major development was the adoption of a new Tetra Pak packaging process, which brought many benefits. "In addition to enhancing the quality of the product, the new light and disposable packaging meant that Vitasoy could be sold in the non-returnable soft drinks market which significantly reduced both the delivery costs of the product and the costs associated with collecting returned bottles. The new packaging also offered greater scope for innovative design which assisted in marketing the Company's products. To coincide with this technical innovation, in the mid-1970s the Company repositioned Vitasoy in the market by promoting it as a soft drink as well as a milk substitute. The remainder of the 1970s saw the Company's product base expand away from Vitasoy and malt Vitasoy.

1976–A range of fruit juice drinks was introduced under the vita brand name. These were also packaged in Tetra Pak cartons and initial flavors included orange, lime, mango, and guava. 1976–The Company decided to relinquish the Pepsi-Cola franchise in favor of producing its own range of carbonated drinks, again under the Vita brand name. The carbonated products, which included cola, orange, lemon lime, and cream soda, were initially sold in returnable bottles and subsequently also in the form of fountain syrups. Both Vita Juice drinks and Vita carbonated drinks won immediate consumer acceptance upon their introduction. 1977–Exports to Australia began. 1978–Vita Juice drinks now have over 30% of the Hong Kong fruit juice drinks market. 1978–The Company moved its Aberdeen production facilities to Heung Yip Road in Aberdeen. 1978–The Company launched a line of traditional teas, the first of which was chrysanthemum, which were sold under the Vita brand and packaged in Tetra Pak cartons.

1979–The Company began a further significant diversification of its business by entering into an agreement with Guang Ming Farm [at Shenzhen, just inside China]. Under the initial agreement, which was for a term of 5 years, and subsequent revisions to this agreement, the Company obtained the rights to market and sell most of the farm's fresh milk output in Hong Kong and Macau. Today the farm produces approximately 55% of all fresh milk sold in Hong Kong.

The late 1970s and early 1980s were characterized by the Company's push into overseas export markets. Each of these export markets took time to develop, both in terms of developing consumer awareness of the Vitasoy and Vita products and particularly in identifying the most suitable and effective distribution channels. 1979–Exports to Papua New Guinea and to Canada began. 1979 Jan. 15–Vitasoy (U.S.A.) Inc. is incorporated.

1980–Exports to the United States began. 1982–In the United States, the Company established its own distribution operations. 1982–Exports to Singapore began. 1985–The Company acquired the operations of its Singapore distributor to gain greater control over and more efficient distribution of its products. 1987–Due to growth of operations, the Company opened a new head office and principal manufacturing facility in Tuen Mun. 1989–The Company acquired a 12% equity stake in its contract packer in Papua New Guinea to gain greater control over and more efficient distribution of its products.

1990 Sept. 24–The Company name is changed to Vitasoy International Holdings Ltd. from Hong Kong Soya Bean Products Co. Ltd. 1990–The Group made the first of two significant diversifications from its traditional business by entering into a joint venture with Gardner Merchant to provide large-scale contract catering services in Hong Kong. Gardner Merchant, headquartered in the United Kingdom, is one of the leading contract catering firms in the UK; the Group has a 40% interest in the joint venture.

1990 Aug.–In its second diversification the Group entered into the manufacture and distribution of tofu in the United States through the purchase of Nasoya, based in Leominster, Massachusetts on the east coast of the United States. 1993 May–The Group acquired Azumaya, a large tofu manufacturer based in San Francisco, California, with a distribution network covering the west coast and mid west of the United States. These acquisitions have not only made the group a [sic, the] leading manufacturer and distributor of tofu in the United States but have also provided the Group with an extensive distribution network throughout the United States and Canada for its other products. 1992–Distilled water was launched under the Vita brand.

1994 Feb.–The Group opened a new production facility on a site at Guang Ming Farm at Shenzhen in the PRC [China] to replace the group's plant in Aberdeen. The Shenzhen plant, which has been built and will be operated pursuant to a joint venture with Guang Ming Farm, is currently operating at partial capacity and is expected to be fully operational by the middle of 1994. The Group's old production and packaging facility at Aberdeen is currently being leased by the Group to provide production capacity unti the Shenzhen plant becomes fully operational. At that time the Group will cease to lease the facility at Aberdeen

and all beverage production will then be at Tuen Mun and Shenzhen. Address: No. 1, Kin Wong Street, Tuen Mun, New Territories, Hong Kong. Phone: 466 0333.

2725. Schmitz, Tom. 1994. Tofu cook believes she nourishes body and soul: Linda Lam, tofu maker. *Mercury News (San Jose, California).* April 3. p. 1E, 3E.

• ***Summary:*** A large color photo shows Linda Lam and her husband Thom Tran at their Fuji Fresh Tofu Co. in Japantown, San Jose. They make tofu 6 days a week, as well as tofu pudding, soymilk (in plastic quart jugs), tofu spring rolls, Okinawa tofu, and Peking tofu. Linda Lam learned to make tofu as a girl in Vietnam, where she was taught by the monks at her local Buddhist temple. She stayed at the monastery during school vacations, preparing meals and studying the scriptures. "Three decades later, Lam remains a devout Buddhist. And her faith in tofu is equally strong." She and her family are vegetarian. She uses nigari as a curding agent in making her tofu.

Before leaving Vietnam in 1979, she worked as a high school teacher. Later she ran a catering service.

2726. *Soyafoods (ASA, Europe).* 1994. Soya 'milk' in Vietnam. 5(1):2. Spring.

• ***Summary:*** The second Franco-Vietnamese food and agriculture exhibition will take place in Hanoi on May 11-15. More than 100 French companies plan to participate. One of these, Actimode, has been working in Vietnam on joint projects since 1990. Near Hanoi they have established a soya milk factory using the Agrolactor system (see p. 8). The products made at this plant have been well accepted by consumers and the factory now makes 400,000 liters per year of soymilk.

2727. *Canadian Export Soybeans (OSGMB, Chatham, Ontario, Canada).* 1994. Export market development. 7(2):1. May.

• ***Summary:*** "Ontario's soybean exporters are reaching into new markets in the Asia / Pacific region in an effort to expand sales for food use. Three Ontario companies raveled with representatives of the Ontario Soybean Growers' Marketing Board and Agriculture Canada to Indonesia, Taiwan and Korea, February 27-March 8, 1994.

"Ontario companies have been exporting food quality soybeans to Japan, Hong Kong, Malaysia and Singapore for almost 20 years. Soybean exporters are optimistic about prospects of doing business in the region since the economies of these new markets are booming and showing a willingness to lower trade barriers and thereby improve our access to their markets."

A photo shows OSGMB's Second Vice Chairman Tom Lassaline making a presentation to Canada's ambassador to Indonesia Mr. Larry Dickenson.

2728. Clifford, Mark. 1994. Profile: K.S. Lo, Hong Kong. Milk for the millions. Grandson of indentured servant in Malaysia epitomises the Overseas Chinese success story. *Far Eastern Economic Review.* June 9. p. 78.

• ***Summary:*** K.S. Lo is the grandson of an indentured servant who had been sent to work in Malaysia's tin mines. K.S. Lo was born into the poverty of a Hakka family in China's rural Guangdong province, the son of a would-be scholar who moved to Malaysia after failing China's imperial exams. Mr. Lo lived in Malaysia from age 10 to 20. In 1930 the future soy-milk magnate relocated to Hong Kong to attend Hong Kong University, where he studied commerce and law. After graduation, he worked as a secretary to Malaysian-Chinese property magnate Eu Tongseng.

"But a trip to Shanghai in 1937 [sic, 1936], on a mission to wind up a failed business that one of Eu's sons had started, forever changed Lo's life. Shanghai in those days didn't have much of a nightlife for sober sorts like Lo, so he often passed his evenings at the YMCA reading and listening to lectures. One of those lectures, given by an American diplomat from Nanjing, was called 'Soyabean: The Cow of China' and it extolled the role that soya had historically played in the Chinese diet."

Describes the founding and early history of Vitasoy. In 1940 he set up a soy milk factory in Hong Kong's Causeway Bay district. The company got off to a slow start. "It was only when Vitasoy opened a retail store that sales took off.

"War put an end to the business after less than two years. Fortunately, Lo managed to sell the firm's stock of soybeans and sugar before the Japanese commandeered the company headquarters, giving him enough money to survive the nearly four years of war which followed.

"What he did with the proceeds of the sale was typical of Lo's inclination to go against the grain. Rather than investing in gold, the usual Chinese store of value, Lo bought useful products such as telephone wire and tins of anti-malaria medicine."

In 1942, Lo smuggled his family over the border into China, where a tobacco-farming venture flopped. So he returned to doing what he knew best: soy. His wife made cakes and he made soy milk; the business thrived. Vitasoy was first listed on the Hong Kong Stock Exchange earlier this year; now run by his son, Winston, it has annual sales of more than HK$1 billion. The company produces more than one million drinks a day.

"To fully understand Lo, it is necessary to understand his parents. From his mother, Lo imbibed a do-good instinct. From his scholarly father, he acquired a taste for the finer objects in Chinese culture. His teapot collection, which is being readied for a world tour, was born after he stumbled on a collection of Yixing teapots in a Hong Kong antique store. Now, more than 3,000 antique teapots later,

Lo is the major benefactor of the Hong Kong Museum of Tea Ware." A photo shows K.S. Lo, smiling.

2729. *INTSOY Newsletter (Urbana, Illinois).*1994. New collaborative program promotes agribusiness in developing countries. No. 45. p. 1-2. June.
• ***Summary:*** INTSOY recently joined the new Postharvest Collaborative Agribusiness Support Program (CASP) sponsored by USAID. The program is designed to reduce postharvest losses and problems in food and feed grains, soybeans and other food legumes, fruits, vegetables, and seeds. For INTSOY a key change is the expansion of its mandate to include postharvest aspects of food legumes other than soybeans.

INTSOY is also working on extrusion-aided screw press technology, developing new techniques for texturization of full-fat and low-fat soy flour for use as a meat extender, and developing commercial products from co-extrusion of soybeans with other food legumes.

"Several projects are already under consideration in South Africa, Ethiopia, Kenya, Zambia, Nigeria, and El Salvador. Planning also is underway in Brazil on a long-term project for the transfer of soybean food processing technologies and the application of soybeans for food uses in rural communities.

"In the Philippines, the United Nations Food and Agriculture Organization, has requested support for a major soybean development project. INTSOY will focus on postharvest processing and utilization and will work with the Philippine Council of Agricultural Research to develop an agribusiness component for the project."

2730. Kollipara, Krishna P.; Singh, R.J.; Hymowitz, T. 1994. Genomic diversity and multiple origins of tetraploid (2n = 78, 80) *Glycine tomentella. Genome* 37(3):448-59. June. [41 ref]
• ***Summary:*** Among the 15 wild perennial species of the genus *Glycine* Willd. subgenus *Glycine, Glycine tomentella* is exceptional. It is composed of four cytotypes (2n = 38, 40, 78, 80), is diverse in morphological features, and covers a wide geographical area. "The aneudiploid (2n = 38) is restricted in distribution to Australia. Diploid (2n = 40) and aneutetraploid (2n = 78) cytotypes are found in Australia and Papua New Guinea, whereas the tetraploid (2n = 80) cytotype is distributed in Australia, Papua New Guinea, Philippines, Indonesia, and Taiwan." Address: Dep. of Agronomy, Univ. of Illinois, Urbana, IL 61801.

2731. Vines, Gail. 1994. Cancer: Is soya the solution? *New Scientist.* July 9. p. 14-15. [1 ref]
• ***Summary:*** "Soya protein could potentially be as effective as tamoxifen in preventing breast cancer." A large photo shows tofu being sold in an Indonesian market.

2732. Harron, Hallie. 1994. Timeless tempeh: A chef returns to Indonesia to bring us the delights of a vegetarian staple. *Vegetarian Times.* July. p. 48-54.
• ***Summary:*** The writer, a consultant for Minneapolis' only Indonesian restaurant, has a professional interest in tempeh; each year she journeys to the islands of Java and Bali for 3 weeks to learn more about it. On Bali, she rides on the back of her Balinese guide's motorbike to visit a small family-run tempeh plant in a village above Ubud. At night, in the city of Jogjakarta / Yogyajarta, Java, she goes out after the street merchants have gone home to enjoy special and favorite tempeh dishes.

Recipes: Gado-gado. Spring rolls with lime-mustard sauce. Spicy citrus broiled tempeh. White chili with tempeh. Hot and tangy peanut sauce. Saté tempeh with sambal tomat. Sweet and sour tempeh stew. Tempeh tumis bunchis.

Photos show: Various tempeh recipes. A stone statue of a seated Buddha, hands in a mudra, at Borobudur, near Yogyakarta. Address: Food writer, cookbook author, and executive chef of Premier Crew Restaurant Services, Minneapolis, a restaurant consulting, management and real estate company.

2733. Robesky, Fujie. 1994. Fuji Fresh Tofu Co. of San Jose is for sale for $80,000 (Interview). *SoyaScan Notes.* Aug. 9. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Fujie is interested in buying a tofu company. When she went to visit this company in Japantown of San Jose, she discovered that it is for sale for $80,000. Apparently the present owner, Linda Lam, is planning to return to her homeland, Vietnam.

Talk with Fujie Robesky. 1995. May 16. Apparently Linda Lam's daughter has taken over the company and is now running it.

Television broadcast on JTN Local News (Lafayette, California; 5 Sept. 1995 7:25 a.m.). Linda Lam still owns Fuji Tofu Co., which makes: Ginger syrup tofu pudding, Tofu egg rolls, Tofu steamed buns, and Seasoned yuba. They want to open a tofu vegetarian restaurant. Address: Hedge Computer Co., 1616 W. Shaw Ave., Suite B-3, Fresno, California 93711. Phone: (209) 226-3991.

2734. Loh, Michael. 1994. Early history of Vitasoy and K.S. Lo (Interview). *SoyaScan Notes.* Oct. 18. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Michael's father-on-law was named Soo Putt. Born in Malaysia, he worked for the same company as K.S. Lo, who founded Vitasoy. This company, named Eu Tong Seng, was involved in tin mining and trading. K.S. Lo, who lived in Malaya before he moved to Hong Kong, was a protege of Mr. Eu, who sent him to Hong Kong to attend college. Address: Export Development Specialist, Ontario Ministry of Agriculture and Food, Market Development

Branch, 33 Yonge St., Suite 800, Toronto, ONT M5E 1X2 Canada. Phone: 416-326-3551.

2735. Goh, Francis. 1994. Soybean in Singapore and its utilisation for the production of tofu and soymilk. Paper presented at Incoming Soybean Technical Mission. 7 p. 18 Oct. 1994 at Harrow Research Station, Harrow Ontario, Canada.

• ***Summary:*** Singapore (population 3 million, of which 78% are Chinese and 14% Malay) imports 33,360 tonnes (metric tons) per year of soybeans for local consumption and re-export. About 51% of these soybeans are imported from Canada. There are 45 small and medium sized tofu factories in Singapore (which together use 600-700 kg/day of soybeans) and 2 large factories (which together use 2 tonnes of soybeans and each have an are of 1,500 square meters of more). Unicurd is the biggest. Four tofu companies have a history of 70 years in Singapore. No family wants to marry its daughter to a tofu maker because the work requires such long hours, often all night.

Mr. Goh and his wife bought an existing company in 1981. Theirs was the first company in Singapore to bring automatic machinery from Japan to produce soymilk and pack tofu in containers. In Singapore, tofu used to be considered a poor-man's food; if it was served more than once every two weeks, family members might complain. But Unicurd repositioned tofu as a "nutritional food." The company markets its products mostly to the Japanese community of 20,000 people in Singapore.

There are 6 traditional soymilk makers in Singapore; the people like a product with a "strong beany flavor." Address: Managing Director, Unicurd Food Co. Pte Ltd., Blk. 6020 Ang Mo Kio Industrial Park 3, #01-154/156/158/160, Singapore 2056. Phone: 482-5454.

2736. **Product Name:** Tempeh.
**Manufacturer's Name:** M/S Ng Keng Huat.
**Manufacturer's Address:** Block 6018, Bedok Industrial Park C #01-1890, Singapore 1647. Phone: 242-0053.
**Date of Introduction:** 1994. October.
**New Product–Documentation:** Form filled out by Mr. Ng Pang Hua. 1994. Oct. This company began making tempeh in October 1995. They now produce 15,525 lb/month. Note: This makes the company one of the largest tempeh manufacturers in the world.

2737. Ontario Soybean Growers' Marketing Board. 1994. Ontario soybeans. P.O. Box 1199, Chatham, Ontario N7M 5L8, Canada. 7 p. Oct. Unpublished typescript.

• ***Summary:*** This is a compilation of 7 transparencies containing current statistics. 1. History. 2. Ontario soybeans: Production and disposition. Shows the number of tonnes produced, crushed, imported, and exported from 1944 to 1994. Production increase dramatically from 1,200,000 tonnes in 1989 to 2,100,000 tonnes in 1994. In 1989 about 95% of the soybeans produced were crushed, but in 1994 only about 55% were crushed. Exports rose more than 3-fold between 1989 and 1994, while imports decreased.

3. Ontario soybean exports: 1993–by destination. Of the 407,061 tonnes exported, 55.7% went to Europe, 24.4% went to Europe, 5.9% went to Japan, 5.7% to Hong Kong, 3.2% to Singapore, 2.5% to Malaysia, and the rest to Other.

4. Ontario's soybean industry consists of 20,000 soybean growers, 300 dealers, 2 crushers, 28 roasters/extruders, and many soyfoods manufacturers.

5. Soybean pricing. OSGMB has no price setting powers. A major U.S. port, Toledo, Ohio, is used as a price reference point for Ontario soybeans. 6. OSGMB Mission Statement. 7. Role of OSGMB. Address: P.O. Box 1199, Chatham, ONT N7M 5L8, Canada. Phone: 519-352-7730.

2738. Or, Gary. 1994. Our personal experiences with utilizing Ontario soybeans for Vitasoy production. Paper presented at Incoming Soybean Technical Mission. 12 p. 18 Oct. 1994 at Harrow Research Station, Harrow Ontario, Canada. [Eng]

• ***Summary:*** Contents: Company profile. Soymilk production. Our experience with Ontario soybean. Varieties to help Vitasoy International in future expansion.

The company was founded in 1940 by Mr. Guan, Mr. Chen, and Mr. Chu. In March 1994 Vitasoy shares were first listed on the Hong Kong Stock Exchange. Today Vitasoy exports to more than 20 countries via distributors in North America, Macao (Portuguese Macau, near Canton), Singapore, and China (PRC). The company's mission is to produce and promote high-quality, nutritious and wholesome products which can be purchased anywhere, at any time, at a price that everyone can afford."

The company makes two kinds of soymilk: Regular and organic. For regular soymilk, which contains 2% protein and 1% fat, Grade No. 1 Ontario soybeans are the first choice; more than 120 containers (mostly 20 tons each) were received from Jan. to Sept. 1994. No shipment was rejected. The current packaging is 45 kg gunny sacks [Note: Gunny, a term first used in 1711, is derived from the Hindi term *gani*. It is a coarse heavy fabric, usually of jute or hemp, used especially for bagging]. The soybeans are first ground into flour. A mild beany flavor is desired. For organic soymilk, which contains 3.5% protein, U.S. soybeans with OGBA [Organic Growers and Buyers Association] certification are used. The whole beans are ground to a slurry, and are not first ground into a flour. The fat content is 3.0% for regular and 1% for lite. Beany flavor is removed.

Vitasoy would like to buy high-protein, organically grown Ontario soybeans–ideally OGBA certified–but they are not readily available. Vitasoy is planning a franchising program. Address: Technical Research and Quality

Assurance Manager, Vitasoy International Holdings Ltd., No. 1, Kin Wong Street, Tuen Mun, N.T., Hong Kong. Phone: 466 0333.

2739. Shurtleff, William. 1994. Report on soybean and soyfoods research trip to Ontario, Canada: 17-19 October. Soyfoods Center, P.O. Box 234, Lafayette, CA 94549 USA. 21 p. Unpublished manuscript.

• ***Summary:*** Contents: 3-page program titled "Incoming Soybean Technical Mission." Oct. 17. Talk with Fred Brandenburg, executive director of OSGMB about food-grade Ontario soybeans exported to Asia. Canada is working to increase its sale of food-grade soybeans to Asia. Even though these soybeans are more expensive, they are of better quality and thus preferred. They are also very clean, since soyfoods makers want soybeans with little or no foreign matter. Most are not sold identity preserved, but they are large seeded, white hilum beans. Fred speaks of "crusher beans" and "food beans."

Oct. 18. Visit to Harrow Research Station, run by the Canadian federal government. (1) Talk by Michael Loh: Canada has 72% of the Singapore soybean market, 52% of the Hong Kong market, and 14% of the Malaysia market for soybeans imported for all purposes. Ontario's goal is to double exports by the year 2000. Their strategy is selling value-added products to niche markets. Food-grade soybeans now being developed in Japan include Enrei, Toyo Suzu, Toyo Masari, Otsura, and Kita Musume. (2) Talk by William Shurtleff on "Breeding Soybeans for Food Uses." (3) Presentation by Doug Jessop of the Food Processing Lab. at Harrow. He has been making and studying tofu there since 1983, and on a regular basis since 1984. He shows us his process, using lab equipment that cost about $15,000 not including the Instron system that measures texture. (4) Talk with transparencies by Dr. Dick Buzzell on breeding soybeans to make tofu. Harovinton gives the best tofu yield of all the varieties developed in Canada. A soyfoods maker can either contract with farmers in advance to have soybeans grown for them, or buy the soybeans from traders after they are harvested. To take optimum advantage of a soybean for making tofu, you must know the protein content then add the appropriate amount of water. The more protein in the bean, the more water you must add to get the highest yield. Identity preservation (IP) costs more. The yields will be lower and you must contract for it in advance; a problem is how to deliver the beans year-round to the end user. (4) Talk by Dr. Ma of Central Food and Animal Research. His specialty is vegetable protein. He is collaborating with ProSoya to make soy protein isolates from soymilk since Russia wants to make its own isolates. The soybeans with the highest protein content (on a dry weight basis) are BARC-6 53.4%, Harovinton 45.5%, Enrei 45.0%. One Japanese mutant soybean has none of the three types of lipoxygenase. Lines that lack A-4 protein give firmer tofu. In isolines, everything is the same except for one trait.

Oct. 19. (1) Visit to OSGMB with Fred Brandenburg to hear presentation, see facilities and collect documents. It takes more solar energy to lay down oil in a soybean than protein. Thus after a hot, dry summer, Canadian soybeans contain more oil. Soybeans in hot, tropical countries near the equator also generally contain more oil. In 1985 Canada became a net exporter of soybeans. The cost of producing soybeans in Canada is about the same as in the USA, but the U.S. often ships full vessels of soybeans and is near oceans, whereas Ontario often ships containers (20 or 40 tons), either out the St. Lawrence Seaway or down the Mississippi River. Some agrochemicals that are legal in America are not legal in Canada. All agrochemicals must be licensed, as must some farmers. Mr. Goh says that Chinese believe white hilum soybeans contain more protein than other soybeans. (2) Visit to Canadian Grain Commission to learn how Canada inspects and exports soybeans. The closest that a full seagoing vessel can get to Ontario is Montreal (Quebec)–the last deep-water port up the St. Lawrence Seaway. In Canada, dockage (both big and tiny foreign matter) is removed from soybeans before foreign material is calculated. This makes Canadian soybean much cleaner than those from the USA. Address: Lafayette, California. Phone: 510-283-2991.

2740. Goh, Francis Nyang Kuang. 1994. Re: Chronology of Unicurd Food Co. (Pte.) Ltd. in Singapore. Letter to William Shurtleff at Soyfoods Center, Nov. 3. 2 p. Typed, with signature on letterhead.

• ***Summary:*** 1978–This company, originally named Unicurd Food Co., is founded as a partnership by two housewives, Mrs. Tan Ai-Wang and Madam Chiang-Kuei Chin. Note: The term "Madam" is used (in writing only) to address a women when it is not clear whether or not she is married; used like "Ms." in American English.

1979 late–The company begins to make and sell tofu, operating on a small scale in a combination 2-story shop and home, with the residence located above the shop. The approximate size was 800 square feet of production space. They produced mainly *juten tofu* (lactone silken tofu), packed in 300 gm trays (known as 2B shape in Japan) and also 250 gm sausage-shaped polyethylene bags (known as sakura tofu in Japan), at the rate of about 150 kg/day. Also this year the company was changed from a partnership to a "private limited company."

1980–The company moved into a factory building at Block 1012, Aljunied Ave. 3, #01-35/37, Singapore 1438. The building, of about 2,400 square feet, was constructed by the Government of Singapore. The company was incorporated as a private limited company with capital of $220,000 Singapore dollars, invested by six shareholders. The company name is changed to Unicurd Food Co. Pte.

Ltd. They diversified the product line to include Chinese firm and extra firm tofu. Production increased to 700 kg/day.

1981–The company encountered cash-flow problems and was sold at par value to the present directors, Mr. Francis Goh Nyang Kuang and Mr. Goh Eng Huat, who are cousins, and who were not among the six original shareholders. Prior to this time, the highest annual sales had been S$500,000 (1 US$ = 1.48 S$). Part of the purchase agreement is that Mr. Ma Wen Yi, the managing director of the company, would continue to work for the company for six months to help with the transition. The new owners engaged a young graduate, Mr. Richard Tan, to learn from Mr. Ma. During this time, Mr. Francis Goh visited the company each workday for about 1 hour in the morning and 2 hours in the evening.

1982–Mr. Richard resigned and the owners decide to engage Mrs. Goh (maiden name: Kua Lay-Eng) to run the company. Prior to her appointment, she worked as a Personnel & Administration Executive in a multinational company. Also in 1982 the company purchased an automatic soymilk plant and other machinery from Foodpak Pte Ltd. (a tofu factory in Hong Kong) and from Japan for its new factory, which was built by the government and had an about 3,600 square feet, located at Block 6020, Ang Mo Kio Industrial Park 3, #01-156/160, Singapore, 2056.

1983–Introduced Beancurd Jelly, a new product.

1984–Introduced Pressed Soft Tofu, a new product. This year Unicurd began to promote tofu in Singapore as a nutritious and healthy food (a pioneering concept) by cooking demonstrations, radio publicity, regular factory tours for visitors (in groups of about 40), and annual participation in a national health promotion campaign organized by the government, using display posters, participation in an exhibition during which the company demonstrated tofu cooking and highlighted its nutritional value, and participation in a program whereby all nutritious foods sold in supermarkets were highlighted with special posters and labels.

1985–The company takes over the adjacent factory (Block 6020 Ang Mo Kio Industrial Park 3, #01-154, Singapore, 2056), increasing its area to 5,000 square feet.

1986–Introduced Tofu Puffs, a new product.

1987 Nov.–Mr. Goh joined the company as a full-time Managing Director; prior to this he usually spent 2 hours at the company each evening and a full day on Saturday.

1988 June–Recruited a Japanese manager to upgrade machinery. Introduced new Japanese tofu and pickles targeted at the Japanese community.

1989–Introduced three new Japanese-style tofu products: *Hiya-Yakko* (Chilled Tofu), *Momen-Dofu* (Traditional Japanese Firm Tofu), and *Nama-Agé* (Deep-Fried Tofu Cutlets).

1993 Nov.–In view of the rapid market growth for silken tofu and other products, the company began to look for a bigger factory. Sales have increased more than six-fold in the past ten years.

1994 Nov. 4–Construction of the new factory starts–floor area of 26,500 square feet on 40,000 square feet of land. It is expected to be completed in about one year. The company plans to invest about $2.5 million Singapore dollars in the new factory and another $1.5 million Singapore dollars (1.01 million U.S. dollars) in the purchase of more automatic equipment.

The company's accomplishments: Tofu in Singapore was traditionally sold in the market without packaging. After purchasing the company, Francis and the other new owners gradually convinced local consumers to accept packaged tofu. Moreover, their continuous promotion of tofu as a nutritious and healthy food (it was viewed as a poor-people's food before) stimulated sales immensely. Singapore consumers have now accepted tofu as a nutritious, healthy food.

Now some recollections and comments from Mr. and Mrs. Goh. Mrs. Goh: "When I joined the company, tofu was still considered a poor-man's food and tofu makers were generally fairly small in scale. The public had a low image of the tofu industry. I decided to resign from working in a reputable company for various reasons: (1) I had full confidence in the potential of the tofu business. Though the growth of the company was slow during the early years, it increased constantly; (2) For the success of small and medium-scale traditional food manufacturers, it is not possible to engage many high-ranking managers, who generally specialize in one field. It is also not easy to engage a person with a diversity of skills who is willing and able to run all aspects of a small traditional food company; (3) We owned the company and Francis did not have sufficient time to manage it. I decided to shoulder the responsibility, particularly after we moved to Ang Mo Kio Industrial Park (1982), when we invested another S$500,000; (4) Before Francis joined the company as full time managing director, my work was very taxing. I had to take charge of practically everything and the working hours were very long. However the work was challenging and the satisfaction was enormous, particularly when the company expanded rapidly." Mrs. Goh is still very active with the company on a day to day basis. She is in charge of Accounts and Sales and Marketing.

Mr. Goh adds: "I am currently in charge of the company overall, and particularly production, quality control, and other external matters (overseas visitors, Government liaison, and overseas purchasing). We have recently employed a local manager and a food technologist (from China). We plan to let them take over all the routine supervisory jobs and the development of new products. This will allow us to reduce our work load so we can invest more

time in strategic planning. For example, we may soon take over a small tofu manufacturer and use it to develop a new brand to market similar products of lower value to capture a bigger share of the low-price market. Unicurd will concentrate on existing products and developing new high-value products.

"I would only express regret for joining the company on a full-time basis a bit late. I never realized that the tofu business would be so interesting and challenging. Through the Company, I joined different organizations, such as the Singapore Food Manufacturers Association, and the Association of Small and Medium Enterprises, and played an active role. I made many new friends and learned a lot about the food industry in Singapore, especially about traditional foods such as soysauce, chili sauce, dumplings, noodles, etc. I was also nominated by the Government to join several overseas study missions."

Update: On 24-25 March 1995 a group of six soybean experts from Canada visited Unicurd. Their names and titles are given. On March 24 Mr. Goh arranged for a meeting between them and five tofu makers and 3 council members from the Singapore Food Manufacturers' Association. A copy of the paper Mr. Goh presented during the meeting is attached.

Update: On 30 May 1996 Unicurd Food Co. Pte Ltd. moved to 18, Senoko South Road, Singapore 758089. Phone: +65 759-2855. A photo shows the new factory.

Update: In April 2008 the Vitasoy Group acquired the entire equity of Unicurd Food Co., (Private) Ltd. ("Unicurd"), a leading manufacturer and marketer of soyfoods in Singapore. Address: Managing Director, Unicurd Food Co. (Pte.) Ltd., Blk. 6020 Ang Mo Kio Industrial Park 3, #01-154/156/158/160, Singapore 2056. Phone: 482-5454.

2741. Goh, Francis Nyang Kuang. 1994. Re: Desirable characteristics of soybeans for making tofu: Opinions of tofu makers in Singapore. Letter (fax) to Mr. Kim Cooper, Ontario Soybean Growers' Marketing Board, Canada, Nov. 18. 4 p. Typed, with signature on letterhead.

• ***Summary:*** This is the author's response to a questionnaire in which Mr. Cooper wishes to know Mr. Goh's thoughts concerning the effect of the following characteristics: Moisture level, protein level (%), oil level, sugar level, seed size, weight of 100 seeds, seed shape, seed coat colour, seed coat thickness, hilum colour, beany flavour (desired or not?), soaking time, general appearance, other desirable traits.

Mr. Goh responds that most tofu makers have little or no knowledge of the effect of these characteristics on the yield or quality or tofu. Address: Managing Director, Unicurd Food Co. (Pte.) Ltd., Blk. 6020 Ang Mo Kio Industrial Park 3, #01-154/156/158/160, Singapore 2056. Phone: 482-5454.

2742. Clanchin, Olivier. 1994. Laiteries Triballat, Sojasun Technologies, PLL, and soy yogurt (Interview). *SoyaScan Notes.* Nov. 21. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Laiteries Triballat is still the company that makes Sojasun (pronounced so-ya-SUN) soy yogurt. Sojasun Technologies is a part of Triballat that specializes in selling equipment and turnkey plants for making soymilk and a full range of soymilk products (including tofu, soy yogurt, and soy ice cream). All soymilk is made from whole soybeans. Sojasun Technologies has some contracts in China and in other countries.

Triballat is run by a husband and wife team, Mr. Jean Clanchin and Mrs. Françoise Clanchin. Olivier is their son.

Triballat has never used soy protein isolates as an ingredient in Sojasun or any other soy product they manufactured. Prior to August 1985 PLL *(Produits Laitiers Lausanne SA)* in Lausanne, Switzerland, made a product named Sojasun in Lausanne using soy protein isolates. They were making the product for their own use, not for Triballat. In Aug. 1985 Triballat purchased a license from PLL to use the brand name Sojasun, since Triballat wanted to make a product without isolates and PLL was no longer interested in making the product. Sojasun has never used soy protein isolates as an ingredient in Sojasun or any other product they have made. Triballat sells Sojasun mostly to the health food sector, where they introduced it in 1986 or 1987. This sector would not be interested in a product which contained soy protein isolates.

Olivier knows of one small company (not PLL) in Switzerland that presently makes a soy yogurt based on soy protein isolates. He thinks the brand name is Milco; it is sold mostly in Italy.

Note: William Shurtleff summarized the key points of this conversation in a letter and asked Oliver to please confirm them–especially the part about Sojasun never using soy protein isolates–which disagrees with previous information. Though the letter was sent 3 times, Mr. Clanchin never replied.

Talk with Mr. Kerbart. 2000. Feb. 1. He says the product is pronounced so-JAH-sun, not so-YA-sun. They now have a successful venture making Sojasun in Vietnam which started in 1998. The venture in China has not been successful, and they are thinking of taking back the equipment. Address: Sojasun Technologies, Noyal-sur-Vilaine, France. Phone: 99.04.11.04.

2743. Rawlings, Andrew. 1994. Re: Nestle and soybean production in the Philippines. Letter to William Shurtleff at Soyfoods Center, Nov. 22. 2 p. Handwritten.

• ***Summary:*** Lotus Food Products is a tofu shop run by Ananda Marga at Davao, a city in southern Mindanao, the southernmost main island in the Philippines. They are

always looking for good local sources of soybeans. "Nestle has contacts with all the farmers here to buy their 1st grade soybeans and the only thing available in local markets is 3rd grade beans.

"There is one member of Ananda Marga here in Davao who is a nutritionist working for the government. She says that whenever she tries to promote the planting of soybeans and the use of soy products in the provinces, she is blocked by her supervisors in favor of other crops. They are probably preyed upon by lobbyists." Is this light it is hard to imagine that the Philippine government is actively promoting soybeans and soy products. "Anyway, she intends to visit Nestle and see if they have any outreach programs by which we could benefit from their expertise.

"For the last 2 days we have been attending the Taiwan Agribusiness Trade Fair here in Davao. Taiwan is offering US$5 million in loans to small farmers of southern Mindanao (maximum loan $10,000). If you have any contacts here in Nestle or in the government which would be of value to us in our endeavor to expand production of soybeans and use of soy products, we would like to hear from you." Address: Lotus Food Products (Ananda Marga), Km. 6 Superhighway, Buhangin, Davao City 8000, Mindanao, Philippines.

2744. Goh, Francis Nyang Kuang. 1994. Re: More on the history of Unicurd Food Co. (Pte.) Ltd. in Singapore. Letter to William Shurtleff at Soyfoods Center, Nov. 24–in reply to inquiry of Nov. 10. 4 p. Typed, with signature on letterhead.
• ***Summary:*** Detailed answers to 13 questions from Shurtleff about the history of this innovative and pioneering tofu manufacturing company in Singapore. Address: Managing Director, Unicurd Food Co. (Pte.) Ltd., Blk. 6020 Ang Mo Kio Industrial Park 3, #01-154/156/158/160, Singapore 2056. Phone: 482-5454.

2745. APV DTD. 1994. DTD 25. Aarhus, Denmark: Danish Turnkey Dairies Ltd. 55 p. 21 x 27 cm. [Eng]
• ***Summary:*** Published on DTD's 25th anniversary, this book tells the story of the company founded on 1 Nov. 1969 by Mr. Jorn B. Jensen. In May 1971 the company signed the world's first contract for a turnkey dairy plant–signaling a new era for the dairy industry.

In 1981 DTD established a new subsidiary company, STS-Soya Technology Systems Ltd., based in Singapore together with DTD's South East Asian regional office. STS developed new technologies for production of a wide range of soy-based products.

1984–STS breaks into the European market with the building of a complete soymilk plant in Germany [for DE-VAU-GE]. Address: 2, Europaplads, P.O. Box 146, DK-8100 Aarhus C, Denmark. Phone: +45 86 12 41 55.

2746. *Canadian Export Soybeans (OSGMB, Chatham, Ontario, Canada).* 1994. What's new in exports? 7(3):4. Nov.
• ***Summary:*** "The Canadian 1993 crop year saw major export soybean increases in many areas..." A pie chart shows 1993 Canadian exports by destination region and country. In descending order of tonnage, they are: Western Europe 226,733 metric tons (tonnes), USA 99,401, Japan 24,185, Hong Kong 23,286, Singapore 12,930, Malaysia 10,362.

2747. Shurtleff, William; Aoyagi, Akiko. comps. 1995. Industrial utilization of soybeans (non-food, non-feed)–Bibliography and sourcebook, A.D. 980 to 1994: Detailed information on 2,538 published documents (extensively annotated bibliography), 65 commercial industrial soy products, 78 original interviews (many full text) and overviews, 59 unpublished archival documents. Lafayette, California: Soyfoods Center. 683 p. Subject/geographical index. Author/company index. Language index. Printed 18 Dec. 1994. Published Jan. 1995. 28 cm. [2720 ref]
• ***Summary:*** "A revolution in soybean utilization has been gaining momentum since the late 1980s in the United States. It is described by phrases such as the 'New Uses Movement,' 'value-added soy products,' or 'industrial uses of soybeans.' But few people alive today realize that this is the third–and probably the biggest–wave of a revolution that has taken place at least twice before. The first wave, which had no name, lasted from 1909 until the end of World War I. The second wave, called the farm Chemurgic Movement, began in 1929 (at the start of the Great Depression), reached its peak from 1936 to 1941, and subsided in the late 1940s after World War II.

"Industrial utilization of soybeans refers to uses other than for food and feed. The oil may be used, for example, as an ingredient in printing inks, diesel fuels, paints, resins, soaps, as a dust suppressant, etc. The protein may be used to make adhesives, plastics, artificial wool, paper coatings/sizings, fire fighting foams and a host of other products. Soy oil has always been more widely used in industrial products than soy protein.

"This is the most comprehensive book ever published about industrial utilization of soybeans. It has been compiled, one record at a time, over a period of 19 years, in an attempt to document the history of this subject. Its scope includes all known information about this subject, worldwide, from A.D. 980 to the present.

"This book is also the single most current and useful source of information on this subject, since 81% of all records contain a summary/abstract averaging 181 words in length."

"A Brief History of Industrial Utilization of Soybeans–As early as 980 A.D. the Chinese were using soy oil, a semi-drying oil, mixed with tung oil, for caulking boats. It was

widely burned as an illuminant in oil lamps to light homes and temples, until the 1920s, when it was replaced by kerosene. By the 1920s it was also widely used in China to make soft soaps (that were known for their ability to give a good lather in hard water), lacquers, paints, printing inks, and waterproof cloths and umbrellas.

"By the 1500s, soybean cake began to be widely used in China as a fertilizer, primarily as a source of nitrogen and organic matter, but also for its content of phosphorus and potassium.

"The earliest known reference to industrial uses of soybeans in the West was in 1880, when Bryan, an American, noted that soy oil could be used as a substitute for linseed oil in paints, or be burned in lamps.

"The first use of the soybean for industrial purposes in the western world began in about 1909, when the price of linseed and cottonseed oils skyrocketed worldwide. Soy oil began to be used in large quantities in soaps, and experimentally in paints, first in England, then in the United States. Henry A. Gardner of the Paint Manufacturers Assoc. of the U.S. began extensive research on the use of soy oil to partially replace linseed oil in paints and varnishes. By 1916 the main use of soy oil in America was in soaps, where it replaced cottonseed oil. Manchuria also used large amounts of soy oil in soaps.

"In 1909 Goessel, a German, developed and patented the first rubber substitute from soy oil. In 1912 Beltzer, a Frenchman, developed soy protein plastic, Sojalithe, which he soon produced commercially on a large scale. In 1917 Satow, a Japanese, published the first of many articles from that country on the use of soybean proteins to make plastics.

"The heyday of interest in industrial utilization of soybeans took place in America during the 1930s and the Great Depression, spurred largely by the work of Henry Ford, the farm Chemurgic Council (founded in 1935), the Chemurgic movement, and the U.S. Regional Soybean Industrial Products Laboratory (founded in 1936 at the University of Illinois, Urbana). The goal was to make industrial products from farm crops to help depressed farmers. The soybean was one of the great success stories of the Chemurgic movement. In 1933, the peak year percentage-wise, a remarkable 70% of all soy oil in the USA went into industrial, non-food uses–primarily paints and varnishes, followed by soaps, linoleum, and oilcloth. Large amounts of soy flour were made into plywood glue, especially by the I.F. Laucks Co. In 1936, the peak year for publications, some 59 publications on industrial uses appeared. In 1935 the Glidden Co. in Chicago built the first small plant for production of industrial grade soy protein isolate, which the called 'Alpha' protein.

"Active work in this field accelerated during World War II, when soybeans were used to make products that were in short supply. In 1941, after imports of tropical oils from Southeast Asia had been suddenly cut off by the Japanese military, use of soy oil in industrial products skyrocketed to its historical peak in absolute terms: 74.25 million lb. were used that year. Of this, 56% was used in paint and varnish, and 33% in soap. But by 1944 industrial uses of soy oil had fallen to only 17 million lb.

"During the 1950s, a period of huge surpluses for most U.S. farm crops (and forecasts of soybean surpluses... which never materialized), research focused on industrial products that could alleviate the surpluses. During the 1960s, as surpluses disappeared, the concern for world hunger and protein shortages grew, and petroleum came to dominate industrial utilization, soybean research switched from utilization to production.

"The mid-1980s in America saw a rebirth of interest in research on soybean utilization, especially industrial utilization. Foreign competition from Brazil and Argentina, and huge surpluses of soy oil drove U.S. farmers, led by the American Soybean Association, to develop new value-added products for new markets.

"Statistics compiled by the U.S. Dept. of Commerce, Bureau of Census, Industry Div. (Reprinted in *Soya Bluebook '94,* p. 234) show that in the year beginning Oct. 1992 (the latest statistics available), the main industrial uses of soy oil were in resins and plastics (95 million lb.), paint and varnish, fatty acids and 'other inedible' (163 million lb.). These nonfood uses totaled 296 million pounds in 1992/93, accounting for 2.5% of total U.S. domestic soy oil utilization. Rapidly growing new uses included printing inks, diesel fuels, and dust suppressants–to mention but a few.

"One of the shining examples of industrial uses of soybean oil in the USA is in soy inks. In 1987 the oil from 9,000 bushels of soybeans went into soy inks, but by 1993 this figure had skyrocketed to 4,000,000 bushels–a 444-fold increase in just 7 years! In 1994 about 10% of all U.S. printing inks, about 44 million pounds, were made from soy oil. About 90-95% of all daily newspapers used soy inks for color and one-fourth of the estimated 50,000 commercial printers regularly used it." Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549. Phone: 510-283-2991.

2748. *Ontario Soybean Growers' Marketing Board Newsletter.* 1995. 1994 Annual Meeting highlights. Feb. p. 3. • ***Summary:*** More than 300 soybean growers, industry and government representatives, and suppliers attended the Dec. 1994 Annual Meeting of the Ontario Soybean Growers' Marketing Board. Bernard Leung (photo shown) of Harcan Kingsoya spoke on soyfood opportunities. Garth Baxter of Maple Leaf Foods expressed his belief that the miso market holds the best potential for expansion of Canada's food soybean exports to Asia. New markets with good potential include Taiwan, South Korea, Indonesia, and the Philippines.

"Frank Daller of ProSoya reported that his company is setting up soymilk production facilities in several locations across Canada. Their strategy is to sell bulk soymilk to dairies for processing and packaging."

The Board reported a financial operating surplus of $311,225 for the year ending 31 August 1994, and a reduction in Board fees from 90 cents per tonne to 80 cents for the 1994 crop. Address: Box 1199, Chatham, ONT, Canada N7M 5L8.

2749. Goh, Francis Nyang Kuang. 1995. The tofu industry and market in Singapore. Suitability of various soybean varieties for making tofu. Paper presented at meeting of Canadian outgoing soybean mission and Singapore tofu makers. 4 p. Typewritten.

• ***Summary:*** "As you will be visiting some soybean importers this afternoon, I would take this opportunity to concentrate mainly on the technical aspects of soybean. There are 40 plus tofu makers in Singapore producing a wide variety of tofu products, such as soft or silken tofu, firm and extra-firm tofu, tofu puff, soymilk and sweet tofu. The market for soybean-based food products, particularly tofu, is growing rapidly due to its nutritious value. However competition is very keen in our line of business." Therefore we need to produce high quality products.

Mr. Goh tested six varieties of soybeans: S 20-20, Marathon, Hypro, Orient Pearl (Harovinton), Dominator, and Vinton. He summarizes the results in a table which evaluates each variety for tofu production in terms of 5 variables: Texture, firmness, fragrance, colour, yield of tofu, plus remarks. Overall, Harovinton gave the best results, but the price is 12% above the standard price. Discusses his specifications for an outstanding soybeans for making tofu and issues related to identity preservation. Address: Managing Director, Unicurd Food Co. (Pte.) Ltd., Blk. 6020 Ang Mo Kio Industrial Park 3, #01-154/156/158/160, Singapore 2056. Phone: 482-5454.

2750. Hymowitz, Ted. 1995. Plate tectonics and the dissemination of the soybean (Interview). *SoyaScan Notes.* March 24. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Plate tectonics has nothing to do with the cultivated soybean, *Glycine max,* but it helps explain the dissemination of the wild perennial relatives of the soybean. Plate tectonics has to do with the pool of genetic material which ultimately ended up in Australia, versus that pool which we seen in China and Japan today. Ted is interested in the distribution of the genus *Glycine* (pronounced glai-SEE-nee). The question is "Is the distribution of the wild perennials associated with the distribution of the soybean. The answer is "No."

Ted believes that the ancestors of both the wild perennials and the cultivated soybean were in Cambodia, Laos, and Vietnam. This has nothing to do with his contention that the soybean was first domesticated in the eastern half of North China around the 11th century B.C. These ancient ancestors existed something like 4 to 10 million years before the soybean was domesticated, roughly 3,000 years ago. From this pool of genetic material that moved north, *Glycine soja,* the farmers of China domesticated the soybean.

The Australian plate is moving closer and closer all the time to the plate in the southern part of Asia–especially Indonesia and Papua New Guinea. Eventually the two plates hit, and one plate went under the other. At that time there was a golden opportunity for what he believes to be the *Glycine* to move down from Southeast Asia into Australia. The plants that moved south remained perennials. But the plants that went north from this center were annuals; they eventually became the wild annual soybean, *Glycine soja.* Kudzu comes from that same pool. Botanists know that perennials can't survive in the cold north, so when tropical plants move north they often become annuals in order to survive.

Confounding this whole issue of plate tectonics are wild birds. They can move the seeds of wild perennial relatives of the soybean over long distances. Some seeds retain their viability during the time they are eaten by the birds, digested, and excreted. One day while Ted was sitting alone on the Pescadores Islands, he asked himself, "How could the wild soybean have gotten here?" To demonstrate this bird theory of movement, Ted and his colleagues took material that they collected on Taiwan, Pescadores Islands, Okinawa etc. and they crossed it from the material from Australia. The resulting seeds were fertile. That shows that the genetic material had to come from Australia because on the Philippines and Taiwan you only find the polyploids; you don't find diploids. The ancestors of the polyploids, those 16 species, are only found in Australia. But the polyploids, the ones composed of more than one genetic background, are found in Taiwan and elsewhere. Address: Prof. of Plant Genetics, Univ. of Illinois, Urbana, Illinois.

2751. Azevedo, Chris; Gallagher, Paul. 1995. Trends in Japan's soybean market. Paper presented at a conference titled "Producing Soybeans for the Soyfoods Market." 8 p. Held 2 March 1995 at Ames, Iowa. [6 ref]

• ***Summary:*** The pages and most tables in this report are unnumbered. One table shows per capita annual consumption (in lbs) of soybeans in selected Pacific Rim countries in 1974, 1984, and 1994, as follows, in descending order of pounds consumed per capita in 1994: Indonesia: 9.2, 14.0, 23.2. South Korea: 21.4, 18.8, 20.1. Japan 11.0, 15.3, 16.7. North Korea: 11.8, 12.2, 11.2. Malaysia: 2.9, 5.2, 10.3. China: 14.7, 13.0, 9.7. Thailand: 1.2, 3.9, 3.9. Philippines: 0.4, 0.5, 0.8. Sources: (1) USDA; (2) U.S. Bureau of the Census, World Population Profile,

1994 and 1984; (3) Statistical Yearbook, Statistical Office of the United Nations, New York, NY.

Another table shows annual soybean consumption in million metric tons in 1974, 1984, and 1994, as follows, in descending order of amount consumed in 1994: China: 5.237, 6.193, 5.350. Indonesia: 0.546, 1.072, 2.105. Japan: 0.716, 0.830, 0.950. South Korea: 0.328, 0.358, 0.410. North Korea: 0.083, 0.109, 0.117. Thailand: 0.023, 0.092, 0.105. Malaysia: 0.015, 0.036, 0.090. Philippines: 0.007, 0.013, 0.025. Source: USDA.

A final table shows the amount of soybeans used (in thousand metric tons) in Japan, by product and total, each year from 1978 to 1993, as follows: Use of soybeans for tofu rose from 486 in 1978 to a peak of 531 in 1984, falling to 492 in 1993. Use for natto rose from 71 in 1978 to a peak of 109 in 1993. Use for miso rose from 182 in 1978 to a peak of 185 in 1980, falling to 173 in 1993. The total rose from 750 in 1978 to a peak of 927 in 1992, falling to 920 in 1993. Address: Iowa State Univ. Phone: 515-294-0160.

2752. Ontario Soybean Growers' Marketing Board. 1995. Technical soybean mission: Japan, Hong Kong, Malaysia, Singapore. March 10-26, 1995. Chatham, Ontario, Canada. 23 p. 28 cm. [Eng]

• ***Summary:*** Contents: Participating members: Dr. Karen Lapsley, Mr. Ron McDougall, Mr. Michael Loh, Mr. Doug Jessop (food technologist and tofu expert, Harrow Research Station), Mr. Kim Cooper (marketing specialist, OSGMB). Note: This is the first Canadian soybean mission in which a food technologist (Doug Jessop) participated. Background. Mission objectives. Acknowledgements. Mission details–Japan: Canadian embassy.

Japan Miso-Co-op Industrial Association: Japan imports about 250,000 tonnes {metric tons} of soybeans from China each year, and about 150,000 tonnes of that amount is for the miso market. The remaining miso soybeans come from Canada, USA, and Japan. The best soybean for making miso comes from the Hokkaido area of Japan. It is a large, white hilum type, perhaps Toyomasuri. Generally the larger the soybean the better for making miso. Japanese miso makers need two types of soybeans from Canada: (1) Normal SQWH (Special Quality White Hilum); average values for color, taste and texture are acceptable though higher values would be preferable; (2) High Premium Soybeans; they would consider paying a premium for better color, taste, and texture.

Azuma Natto Foods Co. Ltd.: This natto company uses 7,000 tonnes/year of soybeans making them the third largest natto maker in Japan. They use 65% USA, 25% Japanese, and 15% Canadian soybeans. There are four sizes of natto: Small natto < 5.5 mm accounts for 72% of the natto market in Japan; Large natto, 5.5 to 6.2, account for 18%. Extra large natto > 8.5 mm account for 18%. Split seed natto account for 10%. Factors in assessing the suitability of soybeans for natto are: Fat content should be less than 19%. Total sugars–Group 1 contains sucrose, fructose, and glucose, group 2 contains raffinose and stachyose. Calcium affects the hardness or softness of natto. The ideal range is 180-250 mg/100 gm. Sanwa Company–Tofu manufacturer.

Wed., March 15–Japan Tofu Association: There are over 20,000 tofu makers in Japan, and 53 of these are members of this association, with half of the 53 being in the Tokyo area. Only 185 tofu manufacturers in Japan have 30 or more employees. Tofu makers consider there are two types of organic soybeans: true organic and semi-organic. The association imports about 2,000 tonnes of each type from the USA; they are OCIA certified.

Home Foods Company Ltd. uses 4,000 metric tons of soybeans a year, mostly a blend of 70% Chinese white hilum and 30% U.S. white hilum. The soys from the USA are I.O.M. soybeans, especially the "High Super" variety. For the more premium market they use a blend of 50% Japanese soys and 50% Harovinton soybeans. They have also just started blending 50% Chinese and 50% Canadian white hilum soybeans. The two most important criteria for their soybeans are high protein and high total sugars. Sugar levels of Chinese soybeans (24-25%) are higher than those of Canadian soybeans (23-24%).

Thursday, March 16–Takeya Miso Co.: Ikuo Fujimori, President. Takeya has two plants employing 100 production workers and using 5,000 to 6,000 tonnes of soybeans yearly. 70-80% of their products are sold in supermarkets. For years they have been using the U.S. soybean variety Kanrich.

Nagano Chushin Agricultural Experiment Station: They have been breeding soybeans since 1957 and in that time have developed and released 17 varieties, the most famous being Enrei. The staff of 34 includes 5 soybean breeders. Dr. Nobuo Takahashi has been breeding soybeans for over 18 years. Japan has domestic soybean area of 370,500 acres (150,000 ha); it is decreasing, so imports are increasing.

Nagano Miso Industrial United Co-operatives: This group consists of 8 local co-ops made up of 160 miso manufacturers, who pay a fee to this group based on sales. There was a detailed discussion of the types of sugars in soybeans necessary for good miso.

Friday March 17–National Food Research Institute. Tsukuba is developing into a science research park, now containing over 200 different research institutes. NFRI, originally founded in 1934 as the Rice Institute, moved to Tsukuba from Tokyo in 1973. Thirty years ago, all tofu in Japan was made with Japanese soybeans. Dr. Toshiro Nagai spoke about natto: In 1992 the natto needs of Japan were met by soybeans from China (45%), USA (38%), Canada (17%), and Japanese domestic (8%). Natto consumption has increased by about 10% for each of the last few years. Dr. Sayuki Nikkuni spoke about miso: In 1992 the miso needs of Japan were met by soybeans from China (87%), USA

(6%), Japan (6%), and Canada (1%). Dr. Kaoro Koyama spoke about tofu: In 1992 the soybeans for tofu totaled 490,000 tonnes and came from USA (390,000 tonnes; 80%), Canada (50,000; 10%), Japan (20,000; 4.1%), China (20,000; 4.1%), and South America (10,000; 2.0%).

Asahi Food Processing Co. Ltd. This plant, which has 350 employees and operates 365 days/year, was established in 1972 and produces tofu, fried tofu, natto, noodles, and juices. They use 15 tonnes of soybeans daily or 4,900 tonnes/year, of which 38.8% are grown in Japan and the remaining 61.2% are IOM from the USA. Each day they make 120,000 cakes of tofu, 100,000 pieces of fried tofu, and 20,000 packages of natto. Most of the soybeans they use in production are dehulled. They use about 500 tonnes/ year of OCIA certified soybeans from the USA and some semi-organic soybeans from Japan. The prices they pay per kg of soybeans are: IOM 30-40 yen; Vinton, identity preserved varieties, and Harrovinton [Harovinton] 100 yen; organic 120-140 yen; Enrei (Japanese) 400 yen.

Saturday, March 18–Hong Kong. Canadian High Commission. Canada Packers (Hong Kong) Ltd.

Monday, March 20. Shenzhen Economic Zone: This area of 30 square km, just outside the Hong Kong border, contains 1 million people or 60% of the provincial population, all of whom require a special permit to work in the area. This economic zone is booming, basically due to spiralling costs in Hong Kong, where many businesses and factories are closing and moving to this area, where land and labor costs are much lower.

Shenzhen Vitasoy (Guang Dong) Foods & Beverage Co. This plant, which is only one year old, produces a major share of the soymilk for Hong Kong. They are able to import soybeans at a low tariff rate because they ship the majority of their finished products back into Hong Kong. The plant uses Canadian SQWH (Special Quality White Hilum) soybeans, but has problems with uneven seed size. They presently receive the soybeans in 45 kg jute bags, but would prefer strong 45 kg poly-lined paper bags. A small percentage of dairy milk is mixed with the soymilk, which is thought to improve its texture and taste.

Tuesday, March 21. Dah Chong Hong, Ltd. This was the first company to import Canadian soybeans for food use in the early 1970s. Dah Chong pointed out that Ontario soybeans were experiencing increasing competition from Quebec soybeans, especially in the past two years. The Quebec soybeans are 5-10% less expensive, due to lower basis levels, lower freight costs, and being more aggressive in a new market. Their quality is similar to Ontario, though the seed coat color is somewhat darker. There are about 50 tofu makers in Hong Kong, 10 larger size and 40 smaller size, although there is not a large difference is size. Consumers believe that packaged tofu is not as fresh as that purchased fresh daily from local markets.

Amoy Food Ltd. (Dr. Alain Butler; This plant makes soy sauce and other sauces used in cooking. They use only Canadian soybeans, the Maple Glen variety from Quebec). Wed., March 22. The group visited Hung Tao Soya Bean Products Pty., a traditional Hong Kong tofu and soybean sprout plant in the New Territories.

Thursday, March 23–Malaysia. Canadian High Commission. Yeo Hiap Seng (Malaysia) Berhad (Contains excellent details on the company). Chop Lee Kit Heng Sdn. Bhd. (A soybean trader selling to end users in Malaysia).

Friday, March 24–Singapore. Canadian High Commission. Yeo Hiap Seng Ltd. (Singapore). Meeting with nine tofu manufacturers in Singapore. (The name of each company is given. There are 40 tofu makers in Singapore, and the majority now use Canadian soybeans. Tofu growth in the last 5 years has been very rapid and competition is fierce). Asia Corporation Pte. Ltd. (This company accounts for about 70% of the soybeans imported into Singapore and Malaysia. They first brought Canadian soybeans into the area in 1978). Canadec Private Ltd. Sing Yeap Trading Pte. Ltd.

Saturday, March 25–Unicurd Food Company Pte. Ltd. (Mr. Goh gave a tour of his facility and discussed his plans for a new plant in late 1995). Yam Thye & Co. (Warehouse).

Encore Ltd.: Sylvia B. Hollenstein, managing director. This company, based in Switzerland, uses Swiss technology to produce soy yogurts, chocolates, and noodles in Switzerland from Chinese soybeans–mostly for the taste. The products are shipped from Switzerland to the company's 3 retail stores in East Asia; they plan to expand to 10 retail stores by the end of 1995.

Appendixes A through J, issued as a separate document, contain extensive and detailed information and some published documents related to the technical mission. Address: P.O. Box 1199, Chatham, ONT N7M 5L8, Canada. Phone: 519-352-7730.

2753. Petrakis, N.; Wiencke, J.; Coward, L.; Kirk, M.; Barnes, S. 1995. A clinical trial of the chemopreventive effect of a soy beverage in women at high risk for breast cancer (Abstract). *J. of Nutrition* 125(3S):800S. March. Supplement. First International Symposium on the Role of Soy in Preventing and Treating Chronic Disease.
• ***Summary:*** It has been proposed that the isoflavone genistein is responsible for the low rate of breast cancer observed in women from Southeast Asia. To evaluate this hypothesis, a pilot study for a clinical trial of the chemopreventive properties of soy protein is being conducted in American women at high risk for breast cancer. Fifty such premenopausal women, previously studied at UCSF, have been recruited and are incorporating into their diet two servings a day of a soy-based nutritional beverage powder prepared using Supro isolated soy protein (made by Protein Technologies International, St Louis,

Missouri) for 12 months. The 38 gm of soy protein consumed each day contains about 70 mg of genistein (mostly as glycosidic conjugates). At 3-month intervals on the diet, tests for cytological and biochemical surrogate endpoint biomarkers (SEBs) will be conducted to see if breast cancer risk is reduced. Supported by a grant from the United Soybean Board. Address: 1-2. Dep. of Epidemiology, Univ. of California at San Francisco (UCSF); 3-5. Dep. of Pharmacology, Univ. of Alabama at Birmingham, Birmingham, AL 35294.

2754. **Product Name:** Tofu, Sweetened Soymilk.
**Manufacturer's Name:** Thanh Son.
**Manufacturer's Address:** 905 N.W. 23rd St., Oklahoma City, OK 73106. Phone: 405-525-2690.
**Date of Introduction:** 1995. March.
**New Product–Documentation:** Talk with daughter of owner of L&H Bean Sprout Co. in Oklahoma City. 1996. July 5. There is now one tofu company in Oklahoma City, named Thanh Son (pronounced TAN-sun). Talk with Mr. Trung Nguyen. 1996. July 5. He started making tofu and sweetened soymilk in March 1995 in Oklahoma City. He came to the USA from Vietnam in 1978. His surname is pronounced "Nwen."

2755. Urban, D.; Grizzie, W.E.; Coward, L.; Kirk, M.; Barnes, S. 1995. A clinical trial of the chemopreventive effect of a soy beverage in men at high risk for prostate cancer (Abstract). *J. of Nutrition* 125(3S):800S. March. Supplement. First International Symposium on the Role of Soy in Preventing and Treating Chronic Disease.
• ***Summary:*** "Men in Southeast Asian countries have a 10-fold lower risk of prostate cancer than American men. Epidemiologic data have suggested that nonfermented soy foods, which contain conjugates of the isoflavone genistein, are associated with the lowering of prostate cancer risk. Experiments carried out on human prostate cancer cell lines have shown that genistein inhibits epidermal growth factor (EDF)-stimulated cell proliferation." Address: Div. of Urology, Dep. of Surgery, and Depts. of Biochemistry, Pathology and Pharmacology, Univ. of Alabama at Birmingham, Birmingham, AL 35294.

2756. Goh, Francis Nyang Kuang. 1995. Re: M/S Encore Ltd. of Zurich, Switzerland, has opened three retail outlets in Singapore to market soyfoods. Letter to William Shurtleff at Soyfoods Center, April 7. 3 p. Typed, with signature on letterhead.
• ***Summary:*** A company (M/S Encore Ltd., Sonnenbergstrasse 60 8032, Zurich, Switzerland) has recently opened three retail outlets in Singapore to market soybean-based food products such as yogurt, salad, chocolate, biscuits, etc. These products are imported from Switzerland. The company intends to open a plant in Singapore to manufacture some of these soyfood products and has offered Mr. Goh a joint venture in which he would be in charge of production. Their main interest seems to be in sales and marketing. Address: Managing Director, Unicurd Food Co. (Pte.) Ltd., Blk. 6020 Ang Mo Kio Industrial Park 3, #01-154/156/158/160, Singapore 2056. Phone: 482-5454.

2757. *Canadian Export Soybeans (OSGMB, Chatham, Ontario, Canada).* 1995. Technical mission to the Far East. 8(1):3. April.
• ***Summary:*** Five members from the Canadian soybean industry visited Japan, Hong Kong, Malaysia, and Singapore from March 10-25, 1995. Members included Dr. Karen Lapsley (Chairperson of the Centre for Food & Animal Research, Ottawa, Ontario), Mr. Doug Jessop (Food Technologist from the Harrow Research Station, Harrow, Ontario), and Mr. Ron MacDougall, Mr. Michael Loh, and Mr. Kim Cooper (OSGMB, Chatham, Ontario).

2758. *New York Times.* 1995. Make it 'Borough of restaurants': In Queens, culinary homes for all. May 28. p. CY12.
• ***Summary:*** Contains summaries of previous reviews of the Golden Monkey and the Taipei Wall Sea Street Taiwanese Restaurant, described in detail by Ruth Reichl in the Feb. 24 issue of this newspaper (p. C24). Mentions "fermented bean curd."

In addition, there is a summary review of Penang Cuisine Malaysia which includes "Penang rojak, a refreshing peppery salad of cucumber, jicama, pineapple, zucchini and tofu enhanced by a pungent fermented shrimp paste, and tofu stuffed with ground fish and served in a spicy coconut milk and bitter melon sauce." Also: "Whole fried pompano in black bean sauce."

2759. The memorial service for Dr. Kwee-seong Lo, B.A., LL.D., O.B.E., C.B.E., J.P. 1995. Hong Kong. 6 p. 22 cm.
• ***Summary:*** This service was held at 4:00 p.m. on 11 May 1995 at St. John's Cathedral, Garden Road, Hong Kong. A nice portrait photo (p. 1) shows K.S. Lo, who lived 2 Feb. 1910 to 5 May 1995.

Obituary: "Dr. Kwee-seong Lo was born of Hakka descent in Meixian county in Guangdong province, China, on February 2, 1910. His father, Chin-hing Lo, took the family to live in Malaya when Kwee-seong was still young. Following his graduation from secondary school in 1929, Kwee-seong moved to Hong Kong to study Economics at the University of Hong Kong, from where he graduated [with a BA degree] in 1934.

"As war engulfed East Asia in the 1930's, causing much suffering among the Chinese population, Dr. Lo turned his attention to improving standards of health through the provision of nutritious of food at affordable

prices. On a business trip to Shanghai in 1936, he attended a seminar entitled "Soya Bean–the Cow of China" non the nutritional value of the soya bean, which had been a major source of protein for the Chinese for more than 3,000 years. He knew this was the solution he had been looking for and, pooling all resources, he founded Hong Kong Soya Bean Products Company in 1940, the forerunner of today's Vitasoy International Holdings, Ltd."

Discusses the history of the company, and joint ventures with China starting in 1979 with Kwang Ming Dairy Farm in Shenzhen. "This signified the first step in fulfilling Dr. Lo's ideal of "Nation Saving by Industry."

Though busy with his business, K.S. Lo made time for an active life of public service. In 1961 he was honoured as a Justice of the Peace (J.P.). In 1971 he was awarded the Officer Order of the British Empire (OBE), and in 1979 the Commander of the British Empire (CBE). In 1982 he was awarded an honorary doctorate of Law by the University of Hong Kong–thus becoming Dr. Lo. In 1994 he retired from the position of Chairman of Vitasoy International.

His many public, business, and personal contributions are then discussed. In 1986 his book titled *The Stonewares of Yixing* was published.

Dr. Lo has his early education in a Methodist School in Malaya where he had his first contact of Christianity. He was baptized in a church located at the Mount of Double Happiness, Lin County, Guangdong, during the period of Japanese occupation of Hong Kong. At that time, he had a very deep religious experience. In the last part of his journey on earth, he experienced the revival of his faith and consequently a renewal of his relationships with God and his family members. He therefore faced his destiny with peace and joy.

"Dr. K.S. Lo passed away peacefully in Queen Mary Hospital on 5th of May, 1995. Although he has now left us to sleep in the arms of God, Dr. Lo will not be forgotten. His achievements and his qualities live on and will be remembered by those whose lives he touched." Address: Hong Kong.

2760. Orthoefer, Frank T.; Liu, Keshun. 1995. Soybeans for food uses. *International Food Marketing & Technology (Germany)* 9(4):4-8. Aug. [5 ref]

• ***Summary:*** Contents: Introduction. Traditional soy foods: Soy milk, tofu, toasted whole soybeans and full-fat soy flour, soybean sprouts, yuba, soy sauce, tempeh, natto, miso. Soy protein ingredients: Soy grits and flour, soy protein concentrates, soy protein isolates. Soy nutrition: Soy protein, fat and calories, phytochemicals. Food bean market. Summary.

Two "different types of soybeans have emerged: oil beans and food beans. This is particularly true in the US soy market..."

Of the fourteen phytochemicals, seven are present in soybeans. These seven are phytates, isoflavones, carotenoids, coumarins, triterpenes, lignans, and phenolic acids. Phytochemicals have been shown to affect human health as much as vitamins and minerals, and many of them have anti-cancer properties. The discovery of phytochemicals may change how the nutritional value of food is assessed.

The world market for soybeans for food use is estimated at about 1 million metric tons (tonnes). In Japan alone about 830,000 tonnes are made into soyfoods as shown in a pie chart as follows: Tofu (552,000 tonnes, 63.4%), miso (180,000 tonnes, 21.5%), natto (90,000 tonnes, 10.7%), soymilk (10,000 tonnes, 1.2%), soy sauce (5,000 tonnes, 0.6%), and others (22,000 tonnes, 2.6%). In the USA the food bean market is estimated at 50,000 tonnes. Other major markets for food beans are in Korea, China, Taiwan, Hong Kong, Singapore, Malaysia, and Thailand. Food-grade soybeans can be sold by that the growers at a premium of 5-20% above the base price. The demand for food beans is increasing steadily. Address: 1. Vice President, R&D, Riceland Foods, Stuttgart, Arkansas; 2. Project Leader, Soy Food Lab., Jacob Hartz Seed Co., Stuttgart, Arkansas.

2761. *Soya Bluebook Plus.*1995-1997. Serial/periodical. Bar Harbor, Maine: Soyatech, Inc. Peter Golbitz, publisher and editor. Frequency: Annual.

• ***Summary:*** Preceded by Soya Bluebook. A directory and information book for the soybean processing and production industries. One of the most valuable sources of worldwide information on soybeans. The first issue (shipped Sept. 1995) is titled "Soya Bluebook Plus: the annual directory of the world oilseed industry." Crops featured on the front cover are "soya, corn, cottonseed, palm, canola, rapeseed, and sunflower." Contents (most sections are marked with a fold-out tab): Organizations and government agencies: White pages, yellow pages. Oilseed product processors and marketers. Equipment supplies and services. Oilseed statistics. Oilseed reference: Oilseed glossary, standards and specifications, oilseed technical charts and tables. Indexes: Comprehensive index, advertiser index.

Concerning the year: The edition published in mid-1994 was titled '94 Soya Bluebook. The edition published in mid-1995 was titled '95-96 Soya Bluebook. The edition published in Sept. 1996 (the 50th edition) was titled '97 Soya Bluebook. The change was made to give the company extra time (16 months) to market the latest edition before the next year arrived. Address: 318 Main St., P.O. Box 84, Bar Harbor, Maine 04609. Phone: 207-288-4969.

2762. Wilson, Lester A. 1995. Soy foods. In: D.R. Erickson, ed. 1995. Practical Handbook of Soybean Processing and Utilization. Champaign, Illinois: American Oil Chemists'

Society Press; St. Louis, Missouri: United Soybean Board. viii + 584 p. See p. 428-59. Chap. 22. [41 ref]
• ***Summary:*** Contents: Introduction. Soybean chemical composition. Unfermented soy foods: Soymilk, tofu (momen, kinugoshi or silken, packed tofu, aseptically packaged tofu, deep-fried tofu, kori tofu or dried-frozen tofu), other nonfermented soy foods (yuba, kinako or roasted whole soybean flour, fresh {edamame} and canned soybeans, texturized soy protein-based foods). Fermented soy foods: Miso, shoyu (soy sauce), natto, tempeh, sufu. Japanese Agricultural Standards. Identity preservation and transportation. Soybean quality characteristics: Overview, judging quality (tofu, miso, natto). Note: This is the earliest English-language document seen (Dec. 2005) that contains the term "roasted whole soybean flour."

Tables: 1. Nonfermented soy food products and common names by country. 2. Fermented soy food products and common names by country. 3. Chemical composition of soy foods. 4. Per capita annual consumption of soybeans (kg) in selected Asian countries (China, Indonesia, Japan, Korea, Malaysia, Philippines, Thailand; for the years 1968, 1978, 1988, 1994).

Figures: 1. Flowchart of refrigerated and shelf-stable soymilk production. 2. JAS seal of approval. 3. Diagram of equipment used in large scale tofu production (each piece of equipment is numbered and labeled). 4. Flowchart of regular tofu production. 5. Graph showing percent transmittance of whey versus coagulant concentration for soymilks at 6% solids made from Weber, Vinton, and Amsoy soybeans. A concentration of 0.023 N was selected as the optimum coagulant concentration, since it gave the most transparent whey. 6. Graph showing percent transmittance of whey versus coagulant concentration for Amsoy soymilk at concentrations of 4, 5, and 8% solids. Concentrations of 0.018N, 0.019N, and 0.035N, respectively, were selected as optimum coagulant concentrations. 7. Flowchart of kinugoshi (silken) tofu production. 8. Flowchart of packaged tofu production. 9. Flowchart of aseptically packaged tofu production. 10. Flowchart of kori (dried-frozen) tofu production. 11. Diagram of equipment used in large scale production of dried-frozen tofu (each piece of equipment is numbered and labeled). 12. Flowchart of miso production. 13. Diagram of the interactive factors producing the characteristic attributes of miso. 14. Flowchart of tempeh production. Address: Iowa State Univ., Ames, Iowa.

2763. *NSRL Bulletin (National Soybean Research Laboratory, Urbana, Illinois).* 1995. Researchers tap genetic biodiversity for benefit of soybean producers. 2(3):4-5. Oct.
• ***Summary:*** "Millions of years after their ancestors parted company on the northern shores of Australia, the world-roaming soybean plant, *Glycine max,* and its wild perennial relative, *Glycine tomentella* have been reunited by researchers from Australia and the United States." "The breakthrough came after near 15 years of painstaking laboratory work by Theodore Hymowitz, professor of plant sciences, and his co-workers in the Department of Plant Sciences at the University of Illinois." In 1993 they first succeeded in producing fertile soybeans containing genes from the Australian relative, commonly known as "woolly Glycine." Researchers hope that the new types soybeans will be able to thrive in dry conditions and have resistance to major diseases, especially soybean rust–which has not yet invaded the continental United States, though it is found on soybeans in Hawaii.

"The ancestor of the soybean and its Australian cousins probably evolved in Southeast Asia tens of millions of years ago. Australia at that time was much further south than it is today. After slowly drifting north, the Australian continent finally collided with Southeast Asia about 15 million years ago. The soybean ancestor was one of many Asian plants that used this opportunity move into Australia. The plants that stayed in Asia evolved into a wild annual type of soybean that was domesticated in China about 1100 B.C. In Australia, the soybean ancestor evolved into at least 16 different perennial species that today grow wild across much of the continent and on many south Pacific islands."

At the University of Illinois, Prof. Hymowitz began his research program in 1976 with the idea of tapping the genetic diversity of wild perennial Glycine species for the benefit of soybean producers. In 1976 only six wild perennial species were known. Today the number stands at 16. Hymowitz ran into obstacle after obstacle, as each cross he tried produced a sterile plant. Finally in 1993, he and his colleague Ram Singh, created a series of fertile plants containing all 40 soybean chromosomes plus one from woolly Glycine–carrying the trait of resistance to rust. If rust "comes to the mainland of the United States, the impact would be enormous. Much of the production in the southern states would be threatened." Hymowitz is working with Tony Brown and other scientists from CSIRO in Canberra, Australia, to screen lines of wild Glycine that carry resistance to the Asian rust. There is no other known source of field resistance to rust.

A photo shows Prof. Hymowitz examining the flowers of hybrids developed by crossing the domestic soybean with wild perennial soybean relatives from Australia.

2764. **Product Name:** Combo Tofu.
**Manufacturer's Name:** Binh Minh Tofu Manufacturing.
**Manufacturer's Address:** 1180 Tully Rd., Unit B., San Jose, CA 95122. Phone: 408-279-3655.
**Date of Introduction:** 1995.
**How Stored:** Refrigerated.
**New Product–Documentation:** Talk with Binh Tran, owner and founder. 1996. May 28. He is a Vietnamese-

American. This is a combination of ten different ingredients, marinated in a sauce.

2765. Hymowitz, Ted. 1996. Thoughts on growing soybeans in tropical Third World countries such as Cuba: Beware of plant diseases and insects (Interview). *SoyaScan Notes.* Jan. 15. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Tropical countries have no winter, so the diseases and insects continue to accumulate, until they get out of hand. The warmer the country and the closer to the equator, the bigger the problem. The main way of combatting diseases is by breeding in resistance to specific diseases; this is done in the southern states of the USA. But there are limits to its effectiveness, so farmers tend to spray on more and more agrichemicals to combat both insects and diseases. Diseases have been devastating to soybeans in Indonesia, Taiwan (which now grows mainly green vegetable soybeans for Japan), Malaysia, and they will become devastating to soybeans in new countries like Cuba. In Southeast Asia, the main disease is soybean rust. Note: Havana, Cuba, lies on the Tropic of Cancer, 22.5º north of the equator; Sao Paulo, Brazil, lies on the Tropic of Capricorn, the same distance south of the equator.

In Illinois almost no chemical sprays are used against insects or diseases, but herbicides are widely used at both the preemergence and emergence stages. These herbicides do not end up in the soybeans, whereas the chemicals sprayed on the plants when they are more mature do end up in the seeds. Address: Prof. of Plant Genetics, Univ. of Illinois, Urbana, Illinois.

2766. Zibart, Eve. 1996. The very fertile vegan field. *Washington Post.* Jan. 26. p. N24. Weekend section.
• ***Summary:*** The article begins: "It's not unusual anymore for non-vegetarians to eat at such green hot spots as the Health Zone, Food for Thought or Planet X (which is turning into the caterer-of-choice for veggie and vegan alternative rock types). Likewise, its easier and easier for vegetarians to find foods they like at new nutrition-conscious restaurants such as Felix, Greenwood, etc.–as well as at mainstream spots.

Today, more and more restaurants are offering vegan dishes, which contain no animal products whatsoever. A vegan diet precludes not only meat, poultry and seafood, but dairy products, eggs, butter, lard and other animal fats, cream sauces, cheese, etc. Yet that still leaves plenty of room for fine dining.

Most Asian cuisines (except Korean and Filipino) limit the use of dairy products and eggs. Malik, a downtown Thai restaurant, has a dozen vegetarian / vegan entrees, "including several featuring that heart-healthy favorite tofu" in various sauces such as red curry, black bean sauce, and peanut curry.

The Vegetable Garden in Rockville is the only wholly vegan Chinese restaurant in the area, although most Chinese eating place have a good variety of choices. The key words are "mock" and "Buddha." Mock chicken and mock pork are nicknames for tofu and other soy-based meat alternatives. The word "pork" sometimes refers to seasoned tempeh dishes. Since Buddhists are also vegans, correctly labeled "Buddhist delights" contain no animal products.

Most Japanese restaurants offer hot or cold tofu and "lightly salted soybean pods called edamame."

Ends with a directory of ten restaurants in the Washington, DC, area that offer a good selection of vegetarian or vegan dishes.

2767. Doidge, Brian. 1996. Canadian soybean export prospects for 1996. *Canadian Export Soybeans (OSGMB, Chatham, Ontario, Canada)* 9(1):3-4. Jan.
• ***Summary:*** "The recent formation of the Canadian Soybean Export Association (CSEA), serves to focus attention on this rapidly growing sector of the Canadian soybean industry." The 1994/95 crop set a new record with soybean exports of 524,254 tonnes (19.26 million bushels). Another strong year is projected for 1995/06.

Note: The CSEA is an association of major Canadian soybean exporters; the association does not itself export. One of its major objectives is to lobby the Canadian government for funding and promotional support.

Talk with Michael Loh of Canada. 1996. Jan. 24. Members of CSEA include W.G. Thompson, Maple Leaf Foods, Cargill, etc. Nutrisoya, Inc. will also be a member.

A half-page table (p. 3) shows Ontario soybean supply and demand for 4 years from 1992/93 to 1995/96. Under soybean supply, statistics show: Acres harvested, beginning stocks, production, imports, and total supply. Under soybean supply are: Crush, export, seed, other domestic use, and total use. Plus ending stocks and average price per bushel.

A full-page table (p. 4) lists Ontario soybean exports for 4 years from 1991/92 to 1994/95. Ontario's top four export customers in Asia in 1994/95 were: Japan (25,988 tonnes), Hong Kong (23,311), Singapore (22,502), and Malaysia (16,231). Others are Indonesia, North Korea, Philippines, and Taiwan. The top 4 customers in Western Europe in 1994/95 were: Netherlands 73,654 tonnes, Spain 61,134, France 51,119, Belgium 15,428. In Eastern Europe, Poland bough 10,000+ tonnes in 1993/94 and 1994/95 and Uzbekistan bought 7,117 tonnes in 1993/94. Total exports have grown steadily from 238,809 tonnes in 1991/92 to 495,772 tonnes in 1994/95. Address: Education and Business Manager, Ridgetown College of Agricultural Technology.

2768. *Bluebook Update (Bar Harbor, Maine).* 1996. USB earmarks $39.6 million for soya promotion programs: ASA

role limited to international marketing. 3(1):1-2. Jan/March.
• ***Summary:*** The $39.6 million in checkoff funds represents a 65% increase in spending over last year. The money will be used as follows: International marketing $11.3 million, most of which is spent by ASA's 13 overseas offices. There are plans to open new offices in Vietnam and India. Domestic marketing: $6.9 million. New uses / industrial products: $4.6 million. Soybean production: $4.6 million.

United Soybean Board (USB) is looking for a new contractor to manage a number of major programs presently managed by the American Soybean Association (ASA, St. Louis, Missouri). However USB has decided to expand its work with ASA in the area of international marketing of U.S. soybeans and soybean products.

2769. *PCARRD Monitor.* 1996. PCARRD joins global meet on soybeans. 24(1):6. Jan/Feb.
• ***Summary:*** The Second International Soybean Processing and Utilization Conference was held on 8-13 Jan. 1996 in Bangkok, Thailand. The theme of the conference was "Soybeans and Food: Green, Clean, and Healthy." It brought together 569 representatives of 31 countries.

Delegates from PCARRD were Dr. Crisanto R. Escaño, national chief technical advisor of the Accelerated Soybean Processing and Utilization Program (ASPUP); Ms. Ma. Flordeliz D. Tiamzon, national program coordinator of ASPUP; and Ms. Marita A. Carlos, subject matter specialist for legumes. Each presented technical papers on soybeans in the Philippines. Address: Philippines.

2770. Canadian Soybean Export Association. 1996. New Canadian Soybean Association forms (News release). c/o Ontario Soybean Growers' Marketing Board, P.O. Box 1199, 180 Riverview Dr., Chatham, ON N7M 5L8, Canada. 1 p. March 19.
• ***Summary:*** "The Canadian Soybean Export Association [CSEA], held their inaugural meeting today [March 19, 1996] in Wallaceburg, Ontario. The meeting was hosted by Hazzard's Farm Service Limited, of Wallaceburg. The elected executives from this new association include Garth Baxter, Maple Leaf Foods International, as Chairperson; Sue Robert, W.G. Thompson & Sons Limited, as Vice-Chairperson; Ron MacDougall, Ontario Soybean Growers' Marketing Board, as Executive Member; and Kim Cooper, Ontario Soybean Growers' Marketing Board, as Secretary-Treasurer.

CSEA "is a voluntary association of members of the Canadian soybean industry, working as a team, to promote the exports of Canadian soybeans and soya products into world markets." CSEA's objectives "are to encourage all members to work in a co-operative spirit to promote exports of Canadian soybeans, and to facilitate export promotion activities that support the CSEA mission statement.

"Soybeans are the second most important oilseed crop in Canada, next to canola. Soybean production in Canada has increased substantially from 600,000 tonnes in 1981, to 2,279,000 tonnes in 1995, which translates to a 280% increase in the last 14 years.

"The majority of Canada's soybeans are crushed to produce soybean oil for food and industrial uses, and soybean meal, which is mainly used as a protein supplement for livestock feeds. In recent years, the two Ontario soybean crushers have processed approximately 1,000,000 tonnes of soybeans annually. An additional 500,000 tonnes are destined for export markets, and of this amount, over 1,000,000 tonnes are exported for soya food processing, mainly in South East Asia. The Canadian Soybean Export Association is targeting this food market usage for continued expansion for Canadian soybeans and soya products.

"For more information on the soybean industry in Canada, or about the Canadian Soybean Export Association, please contact Mr. Kim Cooper, Ontario Soybean Growers' Marketing Board in Chatham, at (519) 352-7730." Address: Chatham, Ontario, Canada. Phone: 519-352-7730.

2771. Nugraha, Udin S.; Smolders, H.; Saleh, Nassir. 1996. Seed quality of secondary food crops in Indonesia. *Palawija News (Bogor, Indonesia)* 13(4):1-11. March.
• ***Summary:*** This survey report focuses on soybeans, maize, groundnuts, and mungbeans. In Indonesia, a presidential decree on seed policy in 1971 marked the beginning of a more modern seed program. Seed related agencies were established to give structure to the new system: (1) the National Seed Board; (2) Sukamandi Research Institute for Food Crops (SURIF); (3) the Seed Control and Certification Services (SCCS); and (4) the National Seed Corporation (NSC, Sang Hyang Seri). Table 1 shows the locations and capacity of SCSS stations in five provinces of Indonesia. Table 2 gives quality standards for certified and pink labeled seeds of the four main crops discussed. For soybeans, statistics are given for the following five variables for five different colors of seed classes: Germination (minimum = 70-80%). Moisture content (maximum = 11%). Pure seed (max = 97-98%). Inert matter (max = 2-3%). Off types (max = 0.1 to 1%). The highest quality seed class is FC (white/purple), which has an 80% germination rate, 11% moisture (max), 90% pure seed (max), 2% inert matter (max), and 0.1% off types (max). The lowest is LMJ/TDL (pink). Similar statistics are given for groundnut, mungbean, and maize.

Table 4 shows the leading varieties of the four main crops planted by farmers in Indonesia. The leading soybean variety by far is Wilis, followed by Orba and Lokon. Table 6 shows incidence of 14 seed-borne pathogens in soybean seed planted by farmers in East Java. Table 7 shows

soybean yield benefit from different qualities of seed tested under farm conditions.

The detailed conclusions begin: "It appears that the local seed system for soybean in Indonesia is working pretty well."

2772. Soyfoods Association of America, Standards Committee. 1996. Voluntary standards for the composition and labeling of soymilk in the United States. Accepted by the Soyfoods Association of America, March 1996. Bar Harbor, Maine. 15 p. Unpublished manuscript. 28 cm. [22 footnotes]

• ***Summary:*** Contents: Purpose of voluntary standards. History and terminology: History, existing standards in other countries, terminology. Definition and classification of soymilk products: Soymilk definition, soymilk classification (soymilk, soymilk drink, soymilk powder, soymilk concentrate). Labeling of soymilk products: General, modifiers to the statement of identity, use date labeling, refrigeration information labeling. Microbiological guidelines for soymilk. Standards Committee; Adoption and amendment of standards.

A table (fig. 1, p. 5) titled "Soymilk standards for various countries," lists minimum protein, fat, and soybean solids requirements for various soymilk products. In the following, the minimum protein content is given for various products: Japan (soymilk 3.8%, blended soymilk 3.0%, soymilk beverage 1.8%, soy protein beverage 1.8%), Taiwan (soymilk 2.6%, formulated soymilk 2.0%, soy drink 1.4%), Singapore (soymilk 2.0%, soy drink >2.0%), France (soymilk {tonyu} >3.6%, fortified soymilk {extra tonyu} >3.8%), and Thailand (soymilk 2.0%). Fat content ranges from 0.5% in Taiwan to >1.5% in France; it is not specified in Japan or Singapore.

A table (fig. 2, p. 11) titled "Soymilk composition," defines four different types of soymilk in the USA. The three numbers after each are for minimum percentages of soy protein, soy oil (fat), and total solids: Soymilk 3.0, 1.0, 7.0. Soymilk drink 1.5–2.9, 0.5, 3.9. Soymilk powder 38.0, 13.0, 90.0. Soymilk concentrate 6.0, 2.0, 14.0.

Note 1. These standards, which are very similar to the last draft, were accepted by the Soyfoods Association of America in March 1996. A note on page 2 of a final draft circulated in April 1997 states that the Soyfoods Association was formed in 1989; it was actually established in July 1978.

Note 2. In a letter dated 27 June 1996, Peter Golbitz, Standards Committee Chair, notes that the Soyfoods Association of America "is filing a formal 'Citizen's Petition' for a common and usual name for 'soymilk.' Along with this petition, we will be submitting a copy of our standards. We need to have copies of all documents cited in our standards when we make this filing." He asks that Shurtleff send copies of 10 hard-to-find documents located in the Soyfoods Center library. Address: 318 Main St., P.O. Box 84, Bar Harbor, Maine 04609. Phone: 207/288-4969.

2773. Ansell, Mike. 1996. Aseptically processed and packaged tofu. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 521-22.
Address: Managing Director, Tetra Laval Food-South East Asia, Singapore.

2774. Astuti, Mary; Marseno, Djagal W.; Marsono, Y.; Gitawati, Iswani. 1996. Development of antioxidant enzyme superoxide dismutase in soybean tempe. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 399-402. [12 ref]

• ***Summary:*** "The purpose of this study was to observe the development of antioxidant enzyme Superoxide Dismutase (SOD) during soybean tempe fermentation using inocula of *Rhizopus oligosporus, Rhizopus oryzae* and commercial. Soybean was fermented for 0-72 hours and the activity of SOD in crude extract was evaluated using the nitrite method. In the early stage of fermentation (0-12 hours), SOD activity was not detected, but after 12 hours of fermentation, SOD activity gradually increased up to 60 hours then decreased. The highest activity was in tempe fermented with *Rhizopus oryzae* followed by commercial culture and *R. oligosporus*. Tempe was a good source of natural antioxidant and all the incocula showed similar patterns of producing SOD during tempe fermentation."

Oxygen is vital for the life of many creatures, but it is also potentially toxic. Superoxide anions are known to be capable of stimulating lipid peroxidation. "One of the terminal products of lipid peroxidation is malondialdehyde which can reach into cells and tissues which cause not only damage to lipid molecules but also non-lipid biomolecules such as protein that cause cell mutation. Since lipid peroxides are suggested as one of the substances responsible for degeneration diseases, more attention should be paid to foods which have a beneficial effect on lipid peroxide prevention."

Note: Organic peroxides tend to decompose easily to free radicals, which can damage living cells and cause unnatural aging. Address: 1-3: Faculty of Agricultural Technology, Gadjah Mada Univ., Yogyakarta, Indonesia; 4. Badan Tenaga Atom Nasional, Yogyakarta, Indonesia.

2775. Buchanan, Alex. ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. Illust. No index. 30 cm. [Eng]

• ***Summary:*** The first international conference of this type was held in Jilin, China, in 1990. Contents: Foreword, by Dr. Saipin Maneepun, Chairman, Scientific Committee. Scientific committee (13 members plus 2 secretaries). Executive summary, by Alastair Hicks. Keynote address. Part I: Crop technology related to processing (2 plenary papers, 2 regular papers, and 13 poster sessions). Part II: Post-production systems (1 plenary paper, 4 regular papers, and 2 poster sessions). Part III: Food processing technology (1 plenary paper, 7 regular papers, and 21 poster sessions). Part IV: Food science and nutrition (1 plenary papers, 5 regular papers, and 7 poster sessions). Part V: Tempe (6 regular papers, and 1 poster session). Part VI: Feed technology (2 plenary papers, and 7 regular papers). Part VII: Marketing technology (1 plenary paper, and 2 regular papers). Part VIII: Industrial technology (1 plenary paper, 4 regular papers, and 5 poster sessions).

This conference was organized by the Department of Agricultural Extension, Ministry of Agriculture and Cooperatives, Thailand. In collaboration with Institute of Food Research and Product Development, Kasetsart Univ., Thailand. Supported by FAO, American Soybean Association, and United Soybean Board.

On the rear cover, below a logo of an orange soybean superimposed on a globe inside a yellow square, is written: "Soybeans and soyfoods: Green, clean and healthy." Address: Bangkok, Thailand.

2776. Carlos, Marita A. 1996. Audience-based social marketing strategy to promote soyfood in Ilagan, Isabela, Philippines. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 109-12.

• ***Summary:*** Contents: Introduction. Background. Results: Intended audiences' characteristics, knowledge, attitudes and practices with respect to soybean, communication practices, communication resources, nutritional status of children, communication / social marketing strategy, recommendations.

The immediate goal is to have families, and especially children, use foods made from soybeans more often in their daily diets. The broader goal is better, affordable nutrition since in Ilgan, Isabela, there is extensive and severe malnutrition. Mothers have the greatest influence on children's eating habits, followed by teachers–so they must be the focus of education and outreach. "Growing soybean in Isabela has already been proven to be feasible." Address: Senior Science Research Specialist, Crops Research Div., Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD), Los Baños, Laguna, Philippines.

2777. Chaimanee, K.; Srinives, P.; Kaveeta, R.; Santisopasri, V.; Lersrutaiyotin, R. 1996. Development of Thai soybean cultivars to reduce green beany flavour. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 231-37. [15 ref]

Address: 1. Researcher, Chiang Mai Field Crops Research Center, Sansai, Chiang Mai 50290, Thailand; 2-3&5. Prof. and Asst. Profs, Dep. of Agronomy, Faculty of Agriculture, Kasetsart Univ., Kamphaeng Saen, Nakhon Pathom 73140, Thailand; 4. Asst. Prof. and Head, Dep. of Biochemistry, Faculty of Science, Kasetsart Univ., Chatuchak, Bangkok 10903, Thailand.

2778. Chansa-Ngavej, Kanjana; Niyomrit, Sutthirux; Vethchagarun, Siripen. 1996. Halophilic protease-producing lactic acid bacteria as starter culture in soy sauce fermentation. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 288-90. [4 ref]

• ***Summary:*** "Abstract: From 1993-1995 our research has focused on a novel process of utilizing halophilic protease-producing lactic acid bacteria as starter culture in the moromi stage of soy sauce fermentation." The goal of the research is to increase the protein content of soy sauce for local consumption and for export.

One traditional way to preserve soybeans is to transform them into soy sauce by fermentation, using the mold *Aspergillus oryzae.*

Two photos show transmission electron micrographs of a lactic bacterial isolate (LAB 1.1) grown in two different media. Address: 1-2. Dep. of Microbiology, Faculty of Science, Chulalongkorn Univ., Thailand; 3. Scientific and Technological Research Equipment Centre, Chulalongkorn Univ., Phya Thai Road, Bangkok 10330, Thailand.

2779. Charoenthamawat, Pornthip. 1996. Tempeh research and activities in Thailand. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 395-97. [12 ref]
• ***Summary:*** Contents: Introduction. Research review: Varieties of material, product development, supplementation, nutritional therapy. Consumption promotion.

"Tremendous work on peanut tempeh has been conducted over the past ten years under the Peanut Collaborative Research Support Program at the Department of Product Development, Faculty of Agro-Industry, Kasetsart University." A great deal of additional research and development has also been conducted on okara tempeh, made by fermenting the residue from tofu or soymilk production.

"The main obstacle to promotion of tempeh consumption is the need to integrate tempeh products into the Thai culture and life style." Address: Researcher, the Inst. of Food Research and Product Development, Kasetsart Univ., Bangkok 10900, Thailand.

2780. Cuptapun, Yaovadee; Varanyanond, Warunee; Hengsawadi, Duangchan; Tungtrakul, Patcharee. 1996. Nutritional evaluation of traditional fermented soybean (tua nao). In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 220-24. [5 ref]
Address: Inst. of Food Research and Product Development, Kasetsart Univ., Bangkok 10903, Thailand.

2781. Hermana, -; Karmini, Mien; Karyadi, Darwin. 1996. Health significance of tempe for human nutrition. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 391-94. [15 ref]
• ***Summary:*** Contents: Introduction. Nutritive value of tempe: Overview, tempe and infective diarrhea, hypocholesterolemic effect, inhibition of fatty acid peroxidation.

Throughout Indonesia tempe is consumed by people of low as well as high socio-economic level. Tens of thousands of tempe makers produce tempe at home using 10-150 kg of soybeans daily. The largest tempeh maker uses 2 metric tons of soybeans daily. Producers are united in the Koperasi Produsen Tempe Tahu Indonesia (KOPTI; Cooperatives of Producers of Tempeh and Tofu in Indonesia).

"In the future more people are expected to consume tempe because there has been training in tempe technology by the Nutrition Research and Development Center in Bogor in 1986 and 1990." The two training workshops "were sponsored by the United National University and attended by 22 fellows from 10 countries in Asia and Africa." Address: Nutrition Research and Development Centre, Bogor, Indonesia.

2782. Husin, Adinan; Ahmad, Hasimah Hafiz. 1996. Soybean as a consistent industrial resource. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 497-507. [30 ref]
• ***Summary:*** Contents: Abstract. Introduction. Processing of soybean. Food uses of soybean. Processing of soybean oil. Processing of protein products: Flours, protein concentrates, protein isolates, textured protein products. Unfermented soy products: Soy curd/tofu, soymilk, snacks. Fermented products: Tempe, soy sauce, cheese (Commercial cheese alternatives claim to taste, melt, and stretch like regular cheese. Soy cheese now comes in Jalapeno Jack style, Cheddar style, mozzarella style, Garlic-herb style, and Monterey Jack style). Non-food uses ("Soy oils are used in non-food applications such as in the preparation of soaps, paints, varnishes, resins, plastics, lubricants and agrochemicals"). Promoting the use of soybean. Conclusion. Address: Food Technology Research Centre, MARDI, G.P.O. Box 12301, 50774 Kuala Lumpur, Malaysia.

2783. Irwe, Stern. 1996. Soy milk processing–quality aspects on products and process. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 515-20.
Address: Tetra Pak Processing Systems Div. Asia/Pacific, Singapore.

2784. Krusong, Warawut; Yongsmith, Busaba. 1996. Factors affecting acid formation in soymilk from high vitamin B-12–tempeh. In: Alex Buchanan, ed. 1996.

Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 403-07. [10 ref]

• ***Summary:*** Cooked, dehulled soybeans were inoculated with both *Rhizopus oligosporus* and with *Propionibacterium shermanii* then incubated to make a "high vitamin B-12 tempeh (HVT)."

Vitamin B-12 is produced only by microorganisms. *Propionibacterium shermanii* is widely used in large-scale production of vitamin B-12 (Florent and Ninet, 1979). Krusong et al (1991) reported that non-sequential mixed fermentation of *Rhizopus oligosporus* and *Propionibacterium shermanii* was able to produce vitamin B-12 in tempeh, called high vitamin B-12 tempeh (HVT); this tempeh contained 10 times as much vitamin B-12 per gram as the original soybeans.

In this article, the HVT tempeh was used to prepare HVT soymilk, and "lactic soydrink" was prepared from the HVT soymilk using a mixed culture of appropriate lactic cultures, a mixed culture of *Lactobacillus bulgaricus* and *Streptococcus thermophilus* at 5% concentration. No sucrose was added to the HVT soymilk during its lactic acid fermentation. It was fermented for 16 hours to attain the highest acid production. Address: 1. Dep. of Agro-Industry, Faculty of Agricultural Technology, King Mongkut's Inst. of Technology, Ladkrabang, Bangkok 10520; 2. Dep. of Microbiology, Faculty of Science, Kasetsart Univ., Bangkok 10903, Tbailand.

2785. Lancon, F.; Fardiaz, D.; Herlina, L.; Puspitasari, N.L. 1996. Soybean characteristics effect on tahu quality in small-scale processing units. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 177-82. [5 ref]
Address: 1. Economist, Annual Crop Dep. of the Centre de Cooperation Internationale pour la Recherche Agronomique pour le Developpement (CIRAD); 2&4. Inter-University Centre for Food and Nutrition, Institut Pertanian Bogor, Indonesia; 3. Department of Industrial Technology of the Faculty of Agricultural Engineering and Technology, Institut Pertanian Bogor.

2786. Leelawatcharamas, Vichien. 1996. The effect of soybean type on soy sauce production. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 183-88. [7 ref]
Address: Dep. of Biotechnology, Faculty of Agro-Industry, Kasetsart Univ., Bangkok, 10900, Thailand.

2787. Maneepun, Saipin. 1996. The role of formulated soyfoods and their enrichment. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 291-99. [10 ref]

• ***Summary:*** Contents: Abstract. Introduction. Using full-fat soyflour (FFSF) in formulated soyfoods: Traditional full-at soyflour production, processing technology for full-fat soyflour production, baby food products (and conclusions of a metabolic study), cookies, concentrated soymilk, formulated cereal-soy snackfoods (made by an extrusion cooker), soynoodles (using 10% FFSF with wheat flour). Using defatted soy flour (DSF), soy concentrates and isolates. Development of tempeh flour as a food ingredient. Conclusion.

Tables show: (1) Protein content and protein score in various cereal-soy combinations (wheat, corn, or rice unfortified or fortified with soy). (2) Ingredients for six high-protein snacks. (3) Proximate analysis of these 6 high protein snacks. (4) Nutritional evaluation of 8 high protein snacks. (5) Composition of four commercial formulated soyfoods (supplementary baby food, cookie, concentrated soymilk, soynoodle). Address: Director, Inst. of Food Research and Product Development, Kasetsart Univ., P.O. Box 1043, Bangkok 10903, Thailand.

2788. Nguyen, M.H.; Hicks, P.A. 1996. Australian membrane technology for soybean processing. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 534-39. [6 ref]

• ***Summary:*** The most common membrane technology processes are microfiltration (MF), ultrafiltration, reverse osmosis (RO–also known as hyperfiltration, HF), and electrodialysis. Contents: Abstract. Introduction: Principles. Simple applications. Ultrafiltration membrane as a membrane reactor. Potential applications: Microfiltration of process water, ultrafiltration of soy whey, nanofiltration for soy whey recovery, advanced applications (counterdiffusion for the desalting of soysauce {fig. 3}, microfiltration, ultrafiltration, osmotic distillation). Address: 1. Senior

Lecturer, Univ. of Western Sydney, Hawkesbury, Australia; 2. Agricultural Engineering/Agro Industry Officer, RAP, FAO of the UN, Bangkok, Thailand.

2789. Oates, C.G. 1996. Soybean: Successful agribusiness development. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 479-87.
• ***Summary:*** Contents: Abstract. Introduction. Soybean composition. Protein fractions: Glycinin, β-Conglycinin. Protein functionality. Water relations: Solubility, viscosity, gelation. Lipid interactions: Lipid absorption, emulsions. Soy protein products and their manufacture. Flours and grits. Protein concentrates. Soy protein isolates. Texturisation. Extrusion. Spinning: Wet spinning of denatured proteins, wet spinning of native proteins. Soy protein as a food ingredient: Baked products, meat products, noodles and pasta products, soups and sauces, snack products. Industrial non-food, non-feed products: Adhesives, paper coating, plastics, inks, potential for increased utilisation. Protein hydrolysates. Recent advances. Address: Lecturer, National Univ. of Singapore.

2790. Okabe, Shiro. 1996. The global role of soybean. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 14-19. [6 ref]
• ***Summary:*** Contents: Abstract. Introduction. Soybean production, marketing and consumption, producing countries. Lessons from the soybean development in Thailand: Government policy instruments, intensive and extensive participation of the private sector, agricultural diversification with horizontal, vertical and multi-dimensional forms. Breeding for improvement in nutritional and processing quality and other traits: KTI-free cultivars as a feedstuff (no Kunitz trypsin inhibitor), lipoxygenase-free cultivars as a food source, improvement of high-yielding and pest-resistant cultivars. Conclusions.

In Thailand, during the 6-year period from 1983 to 1989 total soybean production increased more than three-fold, to 617,000 tonnes in 1989. Address: Principal Researcher, Food and Agriculture Policy Research Centre, Tokyo, Japan.

2791. Pongsawatmanit, R.; Suklampoo, L. 1996. Soy yoghurt quality from various preparation processes. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 225-30. [9 ref]
Address: Dep. of Agro-Industry, King Mongkut's Inst. of Technology Ladkrabang, Bangkok 10520, Thailand.

2792. Quang, Le Trong; Chau, Pham Tran. 1996. Some biochemical properties of several soybean lines with different resistance characteristics. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 71-77. [4 ref]
• ***Summary:*** "All the seeds were hybrids, produced by the Institute of Agricultural Technology. The seeds were harvested in the summer of 1993 and stored at this Institute." The following were measured: Dry matter content, protein content, proteolytic activity, trypsin inhibitor activity (TIA) and chymotrypsin inhibitor activity (ChIA), the change of TIA and ChIA after heat treatment.

The weight of the seeds in the study ranged from 10-12 gm pr 100 seeds. Address: Hanoi National Univ., 90 Nguyen Trai Road, Hanoi Vietnam.

2793. Rivera, F.T.; Sinchaisri, P. 1996. Soybean utilization as a poverty and food deficit alleviation strategy in the Philippines. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 102-08. [5 ref]
• ***Summary:*** More than 50 soyfoods were prepared and tested on adults and children. Those which were liked very much one or both groups were: Longgasoy, soy milk, soy cafe, choco soy, soy adobo, soy nut mix [meaning not clear], tokwa, tahu [tofu], soy polvoron, soy lumpia. "More than 3,000 rural women, landless farmworkers, and out-of-school youths were trained in village soybean processing and utilization."

Tables show: (1) Results of nutritive analysis of selected mixed soyfoods (such as rice soy, soy corn, soy fish). (2) Cost and sensory analysis of soy products (per kg raw soybeans). Address: 1. Univ. Prof. Emeritus, Chairperson, Binhi ng Buhay Village Soybean Processing and Marketing Centre and Lingap Tao sa Kabuhayan Foundation, Inc., Central Luzon State Univ. Muñoz, Nueva

Ecija, Philippines; 2. Agricultural Chemistry Div., Dep. of Agriculture, Bangkok, Thailand.

2794. Sein, Maung Maung. 1996. Refining of soya oil and protecting its quality in a new and novel package. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 322-25.
Address: General Manager, Emeritus, Tetra Laval Food, Fats and Oils, 11 Joo Koon Circle, Jrong, Singapore 629043.

2795. Shanmugasundaram, S. 1996. The evolving global vegetable soybean industry. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnersbip. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 472-78. [6 ref]
• ***Summary:*** Contents: Abstract. Introduction & history. Vegetable soybean–Area, production, supply, demand, domestic and foreign trade: Japan, Taiwan, USA, other countries (Thailand, China, Vietnam, Indonesia, Australia, New Zealand). The role of AVRDC in the evolving scenario of vegetable soybean (Malaysia, Sri Lanka, Granada, Philippines). Address: Plant Breeder, and Director, International Cooperation Program, Asian Vegetable Research and Development Center, P.O. Box 42, Shanhua, Tainan 741, Taiwan.

2796. Soetrisno, Noer. 1996. Socio economic aspects of tempe production in Indonesia. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 371-76. [7 ref]
• ***Summary:*** Contents: Abstract. Background. Tempe production and marketing system. Tempe industry products. Challenges and future of tempe industry.

Originally tempeh was made only in a limited area in Central and East Java. Today, there are more than 93,000 home industry units recorded as tempe makers throughout Indonesia; they employ more than 265,000 workers.

Tempe makers often employ a number of tempe vendors–often friends or relatives–to distribute and sell their products–either finished tempe or half-fermented tempe. Under this system, job seekers can enter the market quickly and easily with almost no experience or capital. This has helped tempe production to expand quickly.

The fact that tempe makers require water and produce waste can create difficulties in dense urban settings. This problem first arose in the mid-1970s as tempe makers migrated into big cities such as Jakarta, and it caused them to organize themselves and to attract government attention. By early 1980, makers of soyfoods, especially tempe and tofu, began to organize cooperatives of tempe and tofu producers, starting in the big cities. Today there are 111 primary cooperative societies (KOPTI) organized by tempe and tofu makers; these have joined into a National Federation of Tempe and Tofu Producer Cooperatives (GAKOPTI).

In Indonesia there are only few large tempeh manufacturers. The largest production capacity reported so far is less than 3,000 kg of soybeans per day, while the average capacity is 50-200 kg of soybeans per day. Address: Faculty of Industry Technology, Parahyangan Catholic Univ., Jalan Gunung Mas c-11, Bandung 40142, Indonesia.

2797. *Soyafoods (ASA, Europe)*.1996. Kikkoman to build European production plant. 7(1):2. Spring.
• ***Summary:*** Kikkoman, the world's largest maker of soy sauce, plans to built its first European plant in Hoogezand, the Netherlands. Work is scheduled to start in July 1996 with a completion date of March 1998. The plant will have a capacity of about 4 million liters/year. Kikkoman currently imports about 20 million bottles of soy sauce to the European market from its plant in Singapore.

But Kikkoman may face some new competition. A Japanese company named Wadakan has announced that it also plans to make soy sauce in the Netherlands, in Zoetermeer, starting in Nov. 1996, with initial production of 10 million liters/year.

Kikkoman also has plans to build a second plant in the United States, to complement their existing plant at Walworth, Wisconsin.

2798. Suharto, Ign. 1996. Global transfer of food technology in small scale tempe industry. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 377-81. [2 ref]
• ***Summary:*** Contents: Abstract. The development of low cost protein food. The problems of technology transfer in small-scale tempeh industries. The population triangle. Vertical patterns of transfer in small-scale tempeh industries: Role of foreign countries, modern tempe industries, supply of production equipment. Conclusions.

Address: Faculty of Industrial Technology, Catholic Univ. of Parahyangan (Unpar), Ciumbuleuit 94, Bandung 40141, Indonesia.

2799. Swick, Robert A. 1996. Feeding full-fat soybean meal to swine. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 418-27. [19 ref]
Address: American Soybean Assoc., Singapore.

2800. Tiamzon, Ma. Florideliz D. 1996. Institutional mechanisms for an effective soybean technology transfer in the Philippines. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 450-53.
• ***Summary:*** "The Soybean Development Program (SDP) was launched by the Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD)–Department of Science and Technology (DOST) in 1983 and later renamed as the Accelerated Soybean Production and Utilization Programme (ASPUP)." The goal of the program is to contribute to community development and improved nutrition.

Lists ASPUP's four main goals related to vertical integration of soybean production and small-scale soybean processing of soybeans for food and animal feed in six regions of the Philippines (in Luzon and in Mindanao) where soybean is grown.

A second list shows six strategies used by ASPUP to attain these goals. The last strategy reads: "(6) Create new markets and promote the use of soybean-based food products like ice cream, soy curd [tofu], soy cheese, soya milk, soy burgers and others as part of the daily diet."
Address: National Program Leader, Accelerated Soybean Production and Utilization Programme (ASPUP) and Supervising Science Research Specialist, Crops Research Div., Philippine Council for Agriculture, Forestry and Natural Resources Research and Development (PCARRD), Los Baños, Laguna, Philippines.

2801. Tuitemwong, P.; Ronpirin, C.; Tuitemwong, K.; Tanasupawat, S.; Insorn, S. 1996. A novel frozen soy yogurt with bifidus. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 214-19. [4 ref]
Address: 1-2. Dep. of Microbiology, KMIT Thonburi; 3. Dep. of Microbiology, Kasetsart Univ., Thailand; 4. Dep. of Microbiology, Faculty of Pharmacy, Chulalongkorn, Univ., Thailand; 5. Dutch Mill Dairy Co.

2802. Vinning, Grant. 1996. Wholesale market analysis of green vegetable soybean in Japan and Taiwan. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 488-96. [1 ref]
• ***Summary:*** Contents: Price profiling. Background and table showing names of green vegetable soybeans in English, Chinese (mao dou = "hairy bean"), Indonesian (kedelai, kacang jepu, kacang bulu, dele, dekeman, gadele, kedele), Japanese (eda mame), Malaysia (kacang bulu rimau), Philippines (utau, balatong), Thailand (thua lueang, thua phra lueang, thua rae) and Vietnam (dau nanh rau, day tuong, dau nanh). Production trends in Japan. Wholesale throughput and prices in Japan. Monthly wholesale throughput and price data. Japanese imports of frozen and fresh edamame. Taiwan production, wholesale prices, and export volumes. Conclusion.

Japan is the world's largest importer of edamame and Taiwan is the major supplier. It appears that Japan's domestic production is decreasing but demand is not. Taiwan's production will probably not be able to meet the export demand. The demand-supply gap is estimated at 10,000 tonnes (metric tons) and is widening. While Thailand and China may attempt to fill this gap with frozen products, freshness is a major issue.

Note: This paper contains numerous graphs, however they have no units on the x or y axis, so are almost impossible to interpret. Address: Asian Markets Research, 157 Horizon Drive, Westlake 074, Australia.

2803. Watanabe, Takeshi; Pongmaneerat, Juadee; Viswanath, Kiron; Boonyaratpalin, Mali. 1996. Utilization of soybean meal in aquafeeds. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 408-17. [43 ref]
Address: 1&3. Tokyo Univ. of Fisheries, Konan 4, Minato, Tokyo 108, Japan; 2. National Inst. of Coastal Aquaculture,

Muang, Songkhla 90000. Thailand; 4. National Inland Fisheries Inst., Jatujak, Bangkok 10900, Thailand.

2804. Yee, Yeong Boon. 1996. Update and review of soybean oil in health and medical research. In: Alex Buchanan, ed. 1996. Proceedings of the Second International Soybean Processing and Utilization Conference: 8-13 January 1996, Bangkok, Thailand. Bangkok, Thailand: Printed by Funny Publishing Limited Partnership. Distributed by The Institute of Food Research and Product Development, Kasetsart University. xviii + 556 p. See p. 326-34.
Address: American Soybean Assoc., Singapore.

2805. Unicurd Food Co. (Pte.) Ltd. 1996. Removal notice (Postcard). Blk. 6020 Ang Mo Kio Industrial Park 3, #01-154/156/158/160, Singapore 2056. 4 p. [Chi; Eng]
• ***Summary:*** This 3½ by 6-inch 4-panel card, printed black and red on white, announces that Unicurd Food Co. will move its operations (offices and plant) to 18, Senoko South Road, Singapore 758089. Phone: (65) 759 2855. Fax: (65) 759-5411. A photo on the front of the card shows the front of the 2-story building. A map inside shows the new location. The old address was: Ang Mo Kio Industrial Park #3, Block 6020 No. 156, Singapore 2056.

Note: According to *Ontario Soybean Growers' Marketing Board Newsletter* (June 1996, p. 3). Unicurd now has the largest tofu plant in Singapore. The guest of honor at the grand opening was Noble Villenueve, Ontario Minister of Agriculture, Food & Rural Affairs. Address: Blk. 6020 Ang Mo Kio Industrial Park 3, #01-154/156/158/160, Singapore 2056. Phone: 482-5454.

2806. Chambers, Norm. 1996. Growing and selling low-lipoxygenase soybeans in Iowa for making improved tofu and soymilk (Interview). *SoyaScan Notes.* July 29. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Please begin by reading the July 1996 interview on this subject with Dr. Walt Fehr of Iowa State University. Norman and John Chambers, a father and son team, refer to the soybeans that they grow under license from Iowa State University in various ways: "low lipoxygenase soybeans," "low lipo (pronounced LAI-po) beans," "Laura beans," and 2001 beans. They grow these mostly under contract with end users, so each company or person who wants some places a firm order in the spring before planting time and receives the special soybeans in about September. Last year they grew about 50 acres of these special soybeans, with a yield of about 50 metric tons cleaned. Since 1 metric ton = 2,204.6 lb and a bushel of soybeans weighs 60 lb, there are 36.74 bushels in a metric ton, and 50 acres would yield about 1,837 bushels. The price last year was $13.00 per bushel FOB Iowa. They are sold in 30 kg (66 lb) bags. Fairview Farms always grows somewhat more than the amount contracted for; they presently have 107 bags and about 425 bushels unbagged in the bins available for sale.

All of their customers for these special soybeans are overseas. From last year's crop they sent one container to Slovakia (to Alfa Bio), one to Singapore, and one to Japan *(Taishi Shokuhin).* They did not sell any in the USA. Address: Fairview Farms, 2304 150th St., Corwith, Iowa 50430. Phone: 515-583-2198. Fax: 515-583-2192.

2807. *Soyafoods (ASA, Europe).*1996. Compact soyamilk processing machine. 7(2):3. Summer.
• ***Summary:*** This soymilk machine, the size of a washing machine, is made by: Tantraco Enterprise Pte. Ltd., P.O. Box 72, Jalan Kayu Post Office, Singapore 91 8003. Phone: +65 482 3575.

2808. Takai Tofu & Soymilk Equipment Company. 1996. Catalog of small and medium-scale equipment. 1-1 Inari, Nonoichi-machi, Ishikawa-ken 921, Japan. 8 p. 30 cm.
• ***Summary:*** This is a new edition of this catalog, printed with brown ink on glossy white paper. Across the top of the first page is written "The world's leading supplier of tofu & soymilk equipment."

Page 1 states: "During the 1960s and 1970s Takai gained a great deal of experience exporting our equipment to large and small Japanese- and Chinese-run manufacturers of tofu and soymilk in the United States, Europe and Southeast Asia. Then in early 1977, with the rapid growth of interest in soyfood products in tbe West, we began to work closely with William Shurtleff, author of *The Book of Tofu* and *Tofu & Soymilk Production,* to develop our first- and the world's first–English-language catalog, which appeared in August 1977. Since that time we have become the world's leading supplier of tofu and soymilk equipment. We have sold our equipment to hundreds of new and established companies worldwide, and we are constantly upgrading our equipment materials and quality (as with stainless steel) to meet the highest standards. To give you the widest possible choice of the best equipment available, we also include a number of items produced by other well-known Japanese manufacturers." Address: Ishikawa-ken, Japan. Phone: +81 76 294 1712.

2809. **Product Name:** Firm Tofu, Mushroom Tofu, Soymilk.
**Manufacturer's Name:** Hung Vuong Tofu #2.
**Manufacturer's Address:** 4138 Monterey Road, San Jose, CA 95111. Phone: 408-229-9255.
**Date of Introduction:** 1996. September.
**New Product–Documentation:** Talk with Lieu Ta of San Jose, California. 1997. Aug. 19. This company is run by a Vietnamese-American family, with which she is associated. They started making tofu and soymilk on 10 Sept. 1996.

The manager, Scott Truong, is the only one at the factory who speaks English. They also make vegetarian foods.

2810. Hill, Allan R. 1996. New continuous protein or tofu process and equipment developed in Canada (Interview). *SoyaScan Notes.* Nov. 25. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Highland Equipment Co. and Agri-Food Canada have a joint venture which has developed a process and equipment for making protein or tofu using a continuous process. Allan is the project coordinator. The basic steps in the process are as follows: Make liquid soymilk with a high protein content. Denature the soymilk protein by adding natural chemicals (not through heating) to precipitate the protein. Pasteurize using a high-temperature short time (HTST) heating process to lower the bacterial count with the required range. Run into a holding tube, so that it goes from a flow pattern into a laminar flow. Run into a coagulation tube system, where acid is injected into the flow after the product goes into a manifold; this changes it from a laminar to another type of flow, allowing the coagulant to mix in uniformly and completely. Run into a conveyance system and then into either of two packaging systems: (1) Pump bulk soymilk curds are through a standard augur hopper into 30 lb (5 gallon) plastic pails for food processing companies; (2) Run into an in-line static mixer to homogenize the product, then pump through an extrusion device (a stainless steel box) which forms it into cakes for retail sale. The process can make either regular or silken tofu.

The federal government of Canada holds the patents on the process and equipment, and the patent numbers are presently confidential. His company is part of the "Team Canada" group going to Seoul (Korea), Manila (Philippines), and Bangkok (Thailand) this coming January. He plans to talk with heads of soybean companies in Asia about licensing this process and technology. He thinks the equipment would be too expensive to ship overseas–even in 40-foot containers. It would be less expensive to have the equipment manufactured in the country of the licensee.

This process was largely developed at the Harrow Research Center in Ontario by Doug Jessop. It was developed originally for making continuous-process ricotta cheese.

The smallest commercial plant they sell will produce 2.6 million kg/year, working 8 hours/day and 5 days/week. This works out to be 1,250 kg/hour. They also have plants that make 2,500, 5,000, and 10,000 kg/hour. They will be able to deliver plants in the second quarter of 1977. They have built and tested one lab-scale plant that makes 250 liters/hour. Doug Jessop says that the finished product is definitely tofu.

Update: Talk with Margaret Vokes, Director-International. 1998. Jan. 5. Allan R. Hill is no longer with the company, whose name is now Highland Equipment Limited, 136 The East Mall, Toronto, Ontario M8Z 5V5, Canada. Phone: 416-236-9610. Fax: 9611. They have made and sold one system for ricotta cheese and are in negotiations with two tofu manufacturers. Address: JV Project Coordinator, Highland Equipment Co. Ltd., 645 Woodbine Ave., Toronto, ONT M4E 2J3 Canada. Phone: 416-698-0806.

2811. *Soybean Digest.*1996. ASA opens marketing office in India. Nov. p. 32.

• ***Summary:*** The American Soybean Assoc. has opened its 13th international marketing office in New Delhi, India. It will be called the Asia Subcontinent Office. Virgil Miedema has been appointed regional director. Miedema previously worked for the U.S. Agency for International Development as Director of their Program and Project Support Office in Jakarta, Indonesia. He brings to ASA over 20 years of international experience in the Asian Subcontinent.

2812. Kluis, Alan. 1996. Global soybean demand continues to increase: A price rebound likely in 1997. *Soybean Digest.* Dec. p. 54.

• ***Summary:*** A table shows U.S. soybean exports to leading nations and regions from 1990/91 to 1995/96, with Northstar estimates for 1996/97. China began importing U.S. soybeans in 1995/96 with 12 million bushels, project to rise to 26 million in 1996/97.

Europe is the largest market: European imports of U.S. soybeans rose from 212 million bu in 1990/91 to 339 million in 1995/96.

Japan is the 2nd largest market. Japan's imports of U.S. soybeans rose from 131 million bu in 1990/91 to 149 million in 1995/96.

Taiwan is the 3rd largest market. Taiwan's imports of U.S. soybeans rose from 69 million bu in 1990/91 to 96 million in 1995/96.

Mexico is the 4th largest market. Mexico's imports of U.S. soybeans rose from 59 million bu in 1990/91 to 95 million in 1995/96.

South Korea is the 5th largest market. South Korea's imports of U.S. soybeans rose from 32 million bu in 1990/91 to 51 million in 1995/96.

Indonesia's imports of U.S. soybeans rose from 3 million bu in 1990/91 to 25 million in 1995/96.

Israel's imports of U.S. soybeans rose from 15 million bu in 1990/91 to 16 million in 1995/96.

Total imports of U.S. soybeans rose from 557 million bu in 1990/91 to 845 million in 1995/96. Address: President, NorthStar Commodity Co.

2813. **Product Name:** Sobe (Soymilk in Pure-Pak Carton). **Manufacturer's Name:** Fortune Food Manufacturing Pte. Ltd. (Affiliate of Provisions Supplies Corp.).

**Manufacturer's Address:** 348 Jalan Boon Lay, Singapore 2261, Singapore. Phone: +65 266 4188.
**Date of Introduction:** 1996.
**How Stored:** Refrigerated.
**New Product–Documentation:** Letter (fax) from Wataru Takai in Singapore. 1996. April 22. In Singapore, Fortune Foods Manufacturing Ltd. started making "Sobe" soymilk in a Pure-Pak carton. Sales are now booming. Company listing in '95-96 Soya Bluebook Plus. p. 116. But soymilk is not mentioned. Natalie Yap, factory manager.

2814. **Product Name:** Soymilk Beverage.
**Manufacturer's Name:** Unicurd Food Company (Pte) Ltd.
**Manufacturer's Address:** Singapore. Phone: +65 759-2855.
**Date of Introduction:** 1996.
**New Product–Documentation:** Soya Bluebook Plus. 1997. p. 163. This company makes soymilk beverages. Contact: Francis N.K. Goh, Managing Director.

2815. Ang, Eng Tie. 1996. Delightful tofu cooking. Seattle, Washington: Ambrosia Publcations. 160 p. Illust. Index. 23 cm.

• ***Summary:*** This cookbook, which is not vegetarian, includes recipes using pork, beef, chicken, fish, shrimp, crab, etc. It contains 152 original recipes from around the world. Contents: Acknowledgements. Introduction. About the author. 1. Condiments and sauces. 2. Appetizers and snacks. 3. Soups. 4. Salads. 5. Vegetables. 6. Seafood. 7. Meat and poultry. 8. Rice and noodles. 9. Desserts. Appendix: Diagrams, suggested menus, glossary. Ordering information.

"Eng Tie Ang was born in Indonesia of Chinese parents, moved to Brazil at the age of five, and came to the United States at the age of twenty-five. She learned cooking at an early age at home and in her parents' small restaurant in Suzano, Sao Paulo, Brazil. Her first and most influential cooking teacher was her mother, a master of various kinds of Oriental cooking. As a teenager, she studied Western cooking at a cooking school in her hometown. In addition to *Delightful Tofu Cooking* she has published three other cookbooks: *Delightful Thai Cooking, Delightful Brazilian Cooking,* and *Delightful Vietnamese Cooking...*

"In addition to writing cookbooks, Ms. Ang has been a cooking instructor for the University of Washington's Experimental College. She also frequently teaches courses through the Puget Consumers' Co-op and other cooking schools in the Seattle area. She offers courses in tofu cooking... Moreover, she is an avid organic gardener and an accomplished batik painter.

"Ms. Ang lives in Seattle with her husband, Donald Richard Bissonnette, and two sons, Alex and André." A small black-and-white photo on the rear cover shows Eng Tie Ang. Address: Seattle, Washington.

2816. Jay, Sian. ed. 1996. Indonesian heritage. 5 vols. Jakarta, Indonesia: Published by Baku Antar Bangsa for Grolier International; Singapore: Editions Didier Millet. Illust. (some color). Index. 30 cm. Distributed exclusively by PT. Widyadara. *

• ***Summary:*** The five volumes are: 1. Ancient history. 2. The human environment. 3. Early modern history. 4. Plants. 5. Wildlife. This encyclopedia is scheduled to eventually contain 15 volumes.

2817. Mai, Pham. 1996. The best of Vietnamese and Thai cooking: Favorite recipes from the Lemon Grass Restaurant and Cafes. Rocklin, California: Prima Publishing. xii + 274 p. Illust. (Some color photos). Index. 24 cm.

• ***Summary:*** The author's family name is "Mai" and her given name is "Pham." She prefers to write and say her name, Asian style (and as in American phone books), with her family name first.

The book is dedicated with a free-verse poem to her father, Xuan Pham, and her mother Thom Vo. Born in Vietnam and raised for ten years in Bangkok, Thailand (where her father was the Vietnamese military attaché to Thailand) Mai Pham (like her sister Denise, and her two brothers) was brought up with food as the center of her family and universe. She came to the U.S. with her family in 1975. "One minute we were in the comfort of our home in Saigon, and the next we were fleeing our country with just the clothes on our backs. After graduating from the University of Maryland with a degree in Journalism in three years, she pursued a career in broadcast journalism. At age 16 she hosted a radio show for American GIs. At age 18 she managed to talk ABC News into giving her her first break as a television reporter. In 1983 she "landed a reporting job as the first Vietnamese-born television journalist in the United States." Just a few years earlier she had been living in a refugee's quagmire. After several years of reporting, she went to work in public relations and then as a speech writer for the governor of California.

When she met her husband-to-be, Trong, her life again changed dramatically. He was a scientist turned entrepreneur who had founded the successful La Bou bakery / cafe chain in Sacramento, California. Trong convinced her to open a restaurant with him. "He talked about the incredible excitement and satisfaction of taking a simple idea and turning it into a successful business. Inspired by his success and encouraged by his infectious enthusiasm, she decided to go for it. So in 1998, with practically no experience in the food industry, a do-or-die kind of commitment, and a strong belief in their unique concept, the two young people opened the Lemon Grass Restaurant. Mai Pham had found a way to express her passion for cooking. Vowing to share with Sacramento the best of Vietnams and Tahi Foods, she worked day and night

to adapt to a restaurant setting the recipes handed down from her mother and grandmother (p. x-xiii).

Today, in addition to being chef and owner of the award-winning Lemon Grass Restaurants and Lemon Grass Cafes in Sacramento, California, Mai teaches Southeast Asian cooking. She is married to Trong Nguyen, founder of the Northern California-based La Bou Bakery / Cafe chain and "the biggest cheerleader behind this and almost every major project I have encountered."

As she got deep into her research and reflected on her own experiences, she "became convinced that Vietnamese- and Thai-style cooking could be a healthful alternative to a modern Western diet. The typical Asian diet consists mainly of carbohydrates, vegetables, fish, and very little red meat. To stay full, we eat large portions of inexpensive foods such as rice and noodles and lots of greens, many of which grow in the wild. Meat is served only in garnish-size portions.

Often they enjoyed a typical meal-in-one dish. Vietnamese cooking is influenced by Chinese, Indian, French, and Thai cookery, but it more delicate in its execution. For example, a Vietnamese stir-fry is less greasy than its Chinese counterpart. Instead of salt or soy sauce, Vietnamese cooks season almost every dish with *nuoc mam,* or fish sauce [its Thai counterpart is *nam pla]* (p. 4-5). Almost all meals are planned around rice.

Basic ingredients related to soy: (1) Bean sauce: Made of fermented soy beans, water, and salt, it comes in a chunky form with whole soybeans or as a purée. The author prefers the chunky variety sold in jars by Koon Chun. (2) Hoisin sauce: Made from soybean purée, sugar and caramel sauce. Never serve it strait. Try Koon Chun. (3) Soy sauce: Each brand is different and she uses them all. Kikkoman all-purpose Japanese. Golden Mountain light Thai-style. Sweet soy sauce made from dark soy and caramel, to give a rich, dark color. Chinese-style dark soy sauce containing molasses. Flavored soy sauces such a mushroom or onion, sold in small glass bottles. "Make sure the mouth of the bottle is wiped clean after each use."

Sauce recipes include: Hoisin-peanut sauce (p. 35). Cilantro-lime soy sauce (p. 36).

Chapter 7, titled "Those four days: vegetables" (p. 155-77) begins: "Walk into the Lemongrass kitchen and if it happens to be the 1st 14th, 15th, or 30th day of the lunar month, chances are you will find many of our staff eating vegetarian. By abstaining from meat on those sacred days, they are reaffirming their belief in the teachings of Buddha and rededicating their commitment to a life free of indulgence, greed, and conflict." As a child Mai Pham looked forward to those four days because if her grandmother, a devout Buddhist, happened to be visiting, her mother would prepare a sumptuous vegetarian meal for all to enjoy together. One favorite was vegetarian spring rolls, which were no less tasty than their meat counterpart. The family's favorite sweet and sour soup, usually served with shrimp or fresh catfish, was prepared with fresh pineapple, tofu, cabbage, bean sprouts, and chopped saw-leaf herb. Actually, Mai Pham has always preferred the vegetarian version.

When Lemon Grass Restaurant first opened there was only one vegetarian dish on the menu. Now the menu features an entire vegetarian section, with entrees, salad rolls, spring rolls, etc. "To enhance flavor and texture, sometimes a simple ingredient such as tofu is first fried then simmered before being added to the finished dish. Because of the skill required for this specialized cooking, temples–where the monks and nuns eat a strict meatless diet year-round–are known to have the best vegetarian food." In Vietnam, vegetarianism is observed for religious rather than for health or other reasons.

Recipes: Vegetarian fisherman's soup (with "¼ pound extra firm tofu, cubed (fried or plain)"). Vegetarian spring rolls (with "½ pound extra firm tofu, drained and mashed with the back of a fork"). Su Co's delight (with "¼ pound extra firm tofu, drained and cut into 1-inch cubes"). Water spinach and cabbage in garlic-bean sauce (with 1½ tablespoons bean sauce").

Flat noodles with chicken and Chinese broccoli (with 1 tablespoon fermented whole yellow soybeans, p. 180-81. Called *rad na,* this dish "gets its distinctive flavor from the fermented yellow beans. In Bangkok, you can find this dish on practically every street corner and even in hotels"). Steamed striped bass with black beans, ginger, and green onions (with "1 tablespoon drained Chinese-style fermented whole black [soy] beans, chopped," p. 219). Address: Chef and owner, Lemon Grass Restaurant and Cafe, Sacramento, California.

2818. Nguyen, Loan; Nguyen, Hoai; Do, Viet Hung. 1996. Tu' dien món an Viet Nam [Dictionary of Vietnamese dishes]. Hanoi, Vietnam: Van Hoa Thong Tin [Culture and Information Publishing House]. 931 p. Illust. Index. 21 cm. [Vie]*

• ***Summary:*** Includes four gourmet tofu recipes: Fried tofu with lemon grass. Tofu roll with corn. Sweet and sour breaded tofu. Steamed tofu with meat. Address: Vietnam.

2819. Palmer, R.G.; Hymowitz, T.; Nelson, R.L. 1996. Germplasm diversity within soybean. In: D.P.S. Verma and R.C. Shoemaker, eds. 1996. Soybean: Genetics, Molecular Biology, and Biotechnology. Wallingford, England: CAB International (Commonwealth Agricultural Bureaux). x + 270 p. See p. 1-36. Chap. 1. [234 ref]

• ***Summary:*** Contents: Introduction. Germplasm–Subgenus *Soja.* Germplasm–Subgenus *Glycine.* Germplasm–Characterization of diversity: Soybean breeding and loss of diversity, diversity for 'yield' traits within *G. max,* diversity for value-added traits within *G. max,* diversity for pest resistance/tolerance within *G. max,* diversity for

physiological traits within *G. max*, soybean breeding and use of *G. soya*, diversity for cytogenetic and molecular traits within *G. max* and *G. soja*. Conclusions.

The introduction states: "There are more than 100,000 *Glycine max* accessions, probably less than 100,000 *Glycine soja* accessions, and approximately 3,500 accessions of perennial *Glycine* species in germplasm collections throughout the world. Inasmuch as the only worldwide survey of soybean collections is a decade old (Juvik et al., 1985), the exact numbers are unknown. Major *Glycine* collections exist in Australia, Brazil, China, Germany, India, Indonesia, Japan, Russia, South Korea, and the United States. Many other smaller but important collections exist throughout Asia and Europe."

Tables show: (1.1) List of species in the genus *Glycine* Willd., three-letter code, 2n, standard (PI), genome symbols and distribution. (1.2) Origin and number of accessions of *Glycine soja* in the USDA Soybean Germplasm Collection from China. (1.3) Origin and number of accessions of *Glycine soja* in the USDA Soybean Germplasm Collection from Japan. (1.4) Origin and number of accessions of *Glycine soja* in the USDA Soybean Germplasm Collection from South Korea. (1.5) Origin and number of accessions of *Glycine soja* in the USDA Soybean Germplasm Collection by country and maturity group. (1.6) Origin and number of accessions of *Glycine max* in the USDA Soybean Germplasm Collection. (1.7) Number of accessions of *Glycine max* in the USDA Soybean Germplasm Collection by maturity group. (1.8) Representative examples of plant introductions and their descendants used in pest reaction studies in soybean (19 references from 1951-1992). (1.9) Representative examples of plant introductions and their descendants used in qualitative genetic studies in soybean (34 references from 1918-1992). (1.10) Representative examples of plant introductions and their descendants used in protein and isozyme studies in soybean (13 references from 1977-1992).

Figures show: (1.1) Summary of genomic relationships based on cytogenetics and seed protein profiles among 11 of the 16 wild perennial species of the subgenus *Glycine*. Address: 1. United States Dep. of Agriculture, Agricultural Research Service, FCR and Dep. of Agronomy and Zoology/Genetics, Iowa State Univ., Ames, IA 50011; 2. Dep. of Agronomy, Univ. of Illinois, Urbana, IL 61801; 3. USDA-ARS and Dep. of Agronomy, Univ. of Illinois, Urbana, IL 61801.

2820. Seubsman, Sam-ang. 1996. A trial social marketing of fermented whole soybean (tempe) for complementary feeding of infants among mothers in Jakarta. PhD thesis, University of Queensland, Australia. 351 p. Illust. 30 cm. *
• ***Summary:*** Includes bibliographic references. Address: St Lucia, Queensland, Australia.

2821. Steinkraus, Keith H. ed. 1996. Handbook of indigenous fermented foods. 2nd ed., revised and expanded. New York, Basel, and Hong Kong: Marcel Dekker, Inc. xii + 776 p. Illust. Index. 26 cm. Food Science and Technology Series, Vol. 73. Index. 26 cm. [350+ soy ref]
• ***Summary:*** This 2nd edition is about 108 pages longer than the original 1983 edition. Contents: Introduction to indigenous fermented foods. (1) Indonesian tempe and related fermentations: Protein-rich vegetarian meat substitutes. (2) Indigenous fermented foods involving an acid fermentation: Preserving and enhancing organoleptic and nutritional qualities of fresh foods. (3) Indigenous fermented foods involving an alkaline fermentation. (4) Indigenous fermented foods in which ethanol is a major product: Type and nutritional significance of primitive wines and beers and related alcoholic foods (incl. Chinese koji (big *qu* {bricklike in shape and made from barley or wheat and soybeans, inoculated with *Aspergillus}* molds), and small *qu* ({spherical, plate-circular or rectangular in shape and made from rice or rice bran with various herbs, inoculated with *Mucor* and/or *Rhizopus* molds}, p. 449), Japanese amazake (p. 480-81).

(5) Indigenous amino acid / peptide sauces and pastes with meatlike flavors (p. 509-654): Introduction.

(A) Soy sauces: Japanese shoyu: Koikuchi, usukuchi, and tamari; Chinese chiang-yu, by Yokotsuka (p. 511-17). Biochemistry of *Saccharomyces (Zygosaccharomyces) rouxii*, by Steinkraus, Franta, and Ayres (p. 517-24). Umami flavor, by Kawamura and Kare (p. 524-28). Chinese fermented product related to soy sauce (big *qu*, small *qu*, and jiang, by Chen & Ho, p. 528). Taiwanese soy sauce, by Liu (p. 528-33). Malaysian soy sauce: Kicap, by Ong, Mercian, Poesponegoro and Tanuwidja (p. 531-39). Indonesian soy sauce: Kecap, by Saono, Poesponegoro and Tanuwidja (p. 539-43). Korean soy sauce, by Chang (incl. homemade kanjang and meju, p. 543-44). Taiwanese black bean sauce: Inyu, by Jan et al. (p. 544). Philippine taosi, by Steinkraus (p. 544-45).

(B) Fermented soybean pastes: Japanese miso, by Ebine, Shurtleff and Aoyagi (p. 545-56). Indonesian tauco, by Saono et al. and Winarno (p. 556-59). Korean Doenjang and kochujang, by Chang, Shurtleff and Aoyagi (p. 559-64).

(C) Fermented fish-shrimp sauces and pastes (p. 565-606).

(D) Fish-soy sauce and fish-soy paste, by Ismail, p. 607-11).

(E) Miscellaneous Oriental fermentations. Japanese natto (itohiki natto), by Hayashi and Ota (p. 611-24). Japanese Hama-natto (hamanatto) and related products (incl. yukiwari natto, p. 624-26). Chinese red rice: Anka (Ang-kah), by Lin, Su and Wang, Sooksan and Gongsakdi, and Pichyangkura (p. 626-33). Chinese sufu, by Su and L.-P. Lin (p. 633-41). Preserved duck eggs / Century eggs, Chinese pidan (p. 641-42). Pidan are made by a chemical

process, not by fermentation. Note: Chapter 5 contains about 240 references. Much of the text in this chapter is similar to that in the original 1983 edition, although this chapter is 7 pages longer and contains 3-4 new sections.

(6) Mushrooms: Producing single-cell (microbial) protein on lignocellulosic or other food and agricultural wastes.

(7) General papers related to indigenous fermented foods. Address: Inst. of Food Science, Cornell Univ., Geneva, New York.

2822. Nguyen, Q.V. 1997. Production of vegetable green soybean for the domestic market and trial shipments to Japan. Barton, ACT, Australia: Rural Industries Research and Development Corporation. ii + 43 p. Jan. Illust. 30 cm. Series: RIRDC Research Paper No. 97/8. *

• ***Summary:*** A report for the Rural Industries Research and Development Corporation by the Horticultural Research and Advisory Station, NSW Agriculture, principal investigator, Q.V. Nguyen. Address: Barton, ACT, Australia.

2823. **Product Name:** Tempe.

**Manufacturer's Name:** Toko Ramé Indonesian Restaurant.

**Manufacturer's Address:** 17155 Bellflower Blvd., Bellflower, CA 90706. Phone: 562-920-8002.

**Date of Introduction:** 1997. January.

**Ingredients:** Incl. soybeans, tempeh starter.

**New Product–Documentation:** Talk with Daniel Ungerer, food industry consultant. 1997. Dec. 9. Ms. Vera Yuliansyah started making tempeh at this restaurant about 6-9 months ago. Bellflower is in southern California, directly south of Los Angeles between Paramount and Norwalk.

2824. Indonesian Tempe Foundation (Yayasan Tempe Indonesia). 1997. International Tempe Symposium: "Reinventing the hidden miracle of tempe." Jakarta, Indonesia. 8 panels. 21 cm. [Eng]

• ***Summary:*** This brochure (first circular) announces the International Tempe Symposium to be held on 13-15 July 1997 at Denpasar, Bali, Indonesia. The symposium fee for participants (if paid before 15 May 1997) is $250.00. For those presenting a paper it is only $150.00. Accompanying persons pay $100.00. A tentative program and rates at 3 hotels are given. There will be a pre-symposium tour of Denpasar, Bali.

The second circular for this symposium, sent by e-mail on March 21, gives details on the papers to be presented at each of the sessions. Session I: Global prospects of tempe in the world–5 papers. Session II–8 papers. Session III–8 papers. Parallel session IIIA: Socio-economic aspects of tempe–7 papers. Parallel session 3B: Processing–8 papers. Total: 36 papers. Address: Gd. Bulog II, 2nd floor, Jl. Kuningan Timur M.2/5, Jakarta 12950, Indonesia. Phone: 062-021-520-7239.

2825. Witt, Barbara. 1997. Pan-Asian express: Quick fixes for Asian food fans. New York, NY: Bantam Books. xiii + 194 p. Index. 24 x 14 cm.

• ***Summary:*** The author, who grew up in Connecticut, loved Chinese food and Mott Street in New York City. An excellent writer, she won the James Beard award in 1993. The section on "Seasonings" (p. 8-13) gives descriptions of: Hoisin sauce, sesame seeds, soy sauce (Kikkoman is a good brand; tamari is darker and stronger), soy sauce–dark (sometimes called "black soy"; Koon Chun is a good brand), soy sauce–mushroom (flavored with straw mushrooms; Pearl River Bridge is a good brand). Soy sauce–shrimp (The Chinese equivalent of Thai and Vietnamese fish sauce. Pearl River Bridge is a good brand), soy sauce–Indonesian *(Ketjap manis;* not to be confused with the less subtle Chinese sweet soy sauce).

The section on "General packaged goods" (p. 15-18) gives descriptions of: Black beans–Chinese salted (Chinese salted black beans: "The ancient and original soyfood that produced miso and soy sauce looks kind of pitiful..." Good brands are Mee Chun and Pearl River Bridge. Avoid those flavored with five-spice powder), coconut milk (canned is excellent), coconut cream, tofu ("innocuous").

Soy-related recipes include: Seared corn, tomato, and black bean relish (with "chopped Chinese black beans," p. 40-41). Silky tofu walnut dip (p. 50-51). Bean paste soup *(miso shiru,* with red bean paste, p. 91). Romaine salad with lemon soy dressing (with soy sauce, p. 95-96). Tropical fruit, avocado, and tofu salad (p. 110-11). Scallops with pork and black beans (with "Chinese fermented black beans," p. 146-47). Curried mushrooms, peas, and potatoes (p. 171-72). Address: Washington, DC.

2826. Rawlings, Andrew. 1997. Re: Work with soyfoods in Guyana. Letter to William Shurtleff at Soyfoods Center, March 20. 1 p. Typed, with signature on letterhead.

• ***Summary:*** Andrew came to Soyfoods Center in Nov. 1994 and was given one of the Center's books on soyfoods production. He found it filled with valuable information, which he has been using. From the Philippines he wrote [in Nov. 1994] about their production and sale to the public of tofu, using sea water and vinegar as a coagulant.

He has now become an Acharya of Ananda Marga (AM). His name is Acharya Jiivanmukta Brahmacari [Brahmachari] "Dada." For the past year he has been living in Guyana. He travels to Brazil every 3-4 months to attend seminars and retreats of AM. It is expensive since Guyana is cut off from Brazil by the Amazon Basin and is really part of the Caribbean community; it is the only English speaking country in South America.

In the past he has financed his travel by buying soy meat "chunks" in Sao Paulo, Brazil, and reselling them in Georgetown. It was a very successful venture and the chunks have become so popular that even the butcher shops carry them for the public. Though his predecessor was the first to bring chunks into Guyana, both of them have been left out of the growing market because many entrepreneurs are now importing the chunks from Trinidad, the USA, etc. and selling them in Guyana for half the former price.

Ever since he arrived in Guyana he thought how nice it would be if he and AM could grow soybeans there and make the chunks themselves rather than importing. That way they could provide a very nutritious and inexpensive food stuff made locally and still create enough finance for travel and maintenance of AM projects there. Now it seems that this is the only way they can continue with the soy line at all. He asks Soyfoods Center for information on making such soy chunks. Address: Ananda Marga Yoga Society of Guyana Limited (Self Realization), 83 Rail Way Line, Stewartville, Guyana. Phone: 068-384.

2827. Fairbrother, Anthony; Petterson, David. 1997. *Tempe–a nutritious food for developing countries. Food Chain (Intermediate Technology, England)* No. 20. March. p. 13-15.
• ***Summary:*** A good introduction to tempeh and its production in developing countries. Contains recipes for Tempe Goreng and Tempe Bacem. Photos show. (1) Four cakes of finished tempeh of different sizes. (2) People packing inoculated soybeans into small plastic bags of 200 gm each. (3) Tempeh being made in long plastic tubes, 3 cm in diameter; when done, these are cut into ½ kg and 1 lg portions. Address: 1. Curtin Univ. of Technology, GPO Box U 1987, WA [Western Australia] 6001, Sydney, Australia; 2. Agriculture Western Australia, Baron-Hay Court, S. Perth, WA 6151, Australia.

2828. Kyi, Hla. 1997. Production, consumption, and marketing of pulses in Myanmar [formerly Burma]. *Palawija News (Bogor, Indonesia)* 14(1):12-19. March.
• ***Summary:*** Table 1 shows the 16 major food legumes of Myanmar and their yield and production in 1995/96. The soybean (whose name in Myanmar is *Peboke)* was harvested on 191,111 acres (third in acreage after green gram = *Vigna radiata* [mung beans] and black gram = *Vigna mungo).* Pigeonpea, chickpea, and lentil are also important.

Table 3 shows which legumes are most widely consumed in Myanmar and what percentage of total legume consumption each accounts for: Chickpea 29.0%. Peas 16.9%. Sultani/pya (colored lima bean) 10.3%. Lablab bean 9.3%. Pebyugale (white lima bean) 8.0%. Pigeonpea 6.4%. Soybean 4.7%. Black gram 3.6%. Cowpea (pelus & bocate) 4.7%. Others 7.1%. Thus the soybean is relatively unimportant in the Myanmar diet.

Large amounts of pigeonpea, black gram, greengram, chickpea, and lentil are exported.

2829. **Product Name:** Tran's Soymilk (Canned) [Plain Sweetened].
**Manufacturer's Name:** Quang Thai Co.
**Manufacturer's Address:** 6645 Stockton Blvd. #300, Sacramento, CA 95823. Phone: 916-393-2825.
**Date of Introduction:** 1997. March.
**Ingredients:** Incl. soybeans, sugar.
**Wt/Vol., Packaging, Price:** 11 oz can.
**How Stored:** Shelf stable; refrigerate after opening.
**New Product–Documentation:** Talk with (call from) Thai Tran, owner. 1997. May 5. He launched this product on 20 March 1997. He is Vietnamese by birth and he is mainly in the canned soup business, selling beef broth and seafood broth soups to Asian-Americans. He also exports some of his canned soymilk and other products–as to Australia and Canada. The soymilk has, up to now, been purchased from White Wave. He recently placed an order for 20,000 gallons of soymilk from White Wave but today they called him to say they will not be able to deliver it due to production problems. Hence he is looking for a new supplier. His soymilk is canned by Pokka Beverage Co. in American Canyon (a city located in the 707 area code region near the Napa Valley, California).

2830. Vance, Sherry. 1997. Soy-related index cards in the Bailey Hortorium's index system of botanic garden seed lists and nursery or seed catalogs developed by Ethel Zoe Bailey (Interview). *SoyaScan Notes.* April 10. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** In this index system, there are eleven major cards and eight minor cards related to the soybean. The minor cards each have 3-part scientific names beginning with *Soja hispida* (e.g., *Soja hispida alba)* which are not well known, and which appear in only 1-4 catalogs–usually from Germany. On each card are two-part coded entries referring to botanic gardens. Part 1 is the code for the name of the botanic garden, and part 2 is the last two letters of the earliest year in which the plant for that card appeared in this garden's catalog. For example "Kew 33" refers to the 1933 catalog of the Royal Botanic Gardens at Kew, England. [LR 1982] means that a list of seeds and plants (whether or not it contained soy) was "Last Received" from that source in 1982.

Eight cards, all listing only foreign (European) sources, contain the supposedly scientific names (listed here alphabetically) of the following subspecies or varieties of *Soja hispida;* none of these names, however, appear in the SoyaScan database (May 1997). *Soja hispida alba* (1 source). *Soja hispida brunnea* (1 source). *Soja hispida Dickmana* (1 source). *Soja hispida japonica* (2 sources). *Soja hispida lutea* (3 sources). *Soja hispida nigra* (4

sources). *Soja hispida ochroleuca* (1 source). *Soja hispida vilnensis* (2 sources).

Many of these early catalogs were divided into two parts: Farm seeds and garden seeds. When she looked for soybeans in some of these early seed catalogs, Sherry usually found them listed in the Farm section, often under the scientific name *Soja hispida*. When one seed company [perhaps W. Atlee Burpee 1896] "re-introduced" the plant as the "German Coffee Berry" the other firms were a little annoyed since they had already been offering it under *Soja hispida*, and now this newcomer was getting all the credit for introducing a supposedly new seed or plant. Address: Research Aide, L.H. Bailey Hortorium, 462 Mann Library, Cornell Univ., Ithaca, New York 14853-4301. Phone: 607-255-7981. Fax: 607-255-7979.

2831. Hymowitz, Ted. 1997. Recent important discoveries related to wild perennial relatives of the soybean, and progress on the Samuel Bowen book (Interview). *SoyaScan Notes*. April 15. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Ted called to explain why, because of exciting research during the past 3½ years on wild perennial relatives of the soybean, he has not made much progress in writing his two forthcoming books on: (1) The life of Samuel Bowen, and (2) The early history of the soybean. For posterity, Ted has willed his entire collection of Samuel Bowen materials to the Georgia Historical Society.

Ted and his coworkers will be publishing a number of articles based on their research with wild perennial Glycine species. It looks like they have transferred resistance to soybean cyst nematodes from wild perennial species, and there may be many other genes in the wild species which could offer major protective benefits to the soybean. The genetic approach, as described in the recent article in *Genome* (Feb. 1997) gives information that is consistent with other earlier approaches. Moreover, Ted's group has great control over their results because they are using known material with known SPI numbers.

When Ted began this work in the late 1960s, there were only 5 known wild perennial species and a total of 65 accessions in the USDA germplasm collection. Since then they have greatly expanded their knowledge in this area. One major discovery is that the diversity in the wild perennials roughly 100 times as great as that in *Glycine max*. The basic idea is to transfer economically valuable traits from the wild perennials to Glycine max. Once the trait is in any cultivar of *Glycine max,* it can easily be transferred to any others. This approach, using wide crosses but based on traditional genetics, is much simpler than the transgenic (pronounced trans-JEEN-ik) approach, where breeders face many obstacles, from Greenpeace and consumers to the FDA. And the potential looks great. For example, a researcher at Cornell University crossed a cultivated tomato with a wild ancestor of the tomato that was a little runt of a plant from Brazil. He was amazed to discover that he had transferred a gene for fruit color that gave the tomato a very appealing red color; but more important he had also transferred a gene for higher yield. There was no way to know that such a gene existed. The same could apply to the wild perennial ancestors of the soybean. The possibilities are huge and limitless–and they could break the business of soybean breeding wide open. Some of Ted's colleagues are buying stock in Monsanto, in the belief that Roundup Ready soybeans and other transgenic crops are the wave of the future, but Ted thinks that the transgenic approach may end up offering little real benefit to the farmer.

For the last 3½ years Ted's research has focused on the wild perennial species, so he has not been able to make much progress on his books on Samuel Bowen and on the history of the soybean. He has organized his documents, computerized them, and drawn up an outline for the Bowen book.

A new wild perennial species has been found. Ted saw a specimen in Australia. To find it, one must fly into a remote part of Western Australia by helicopter. Mary Tindale in Australia will be given the responsibility for naming it.

One upcoming project is to travel to Vietnam and the former Indochina to look for ancestors of the ancestors of the soybean. But one big obstacle to field research is the presence of many landmines left over from recent wars there. The ancestors of the wild perennial Glycine species must have come from Southeast Asia. This goes back to plate tectonics. When the Australian plate rammed into the Southeast Asian plate, they jumped onto a the Australian plate, where there was little competition, except from primitive plants. Therefore it was a fertile area for these wild perennials to thrive. There were no legumes on the Australian plate before the collision, since it had moved from a very cold part of the Earth, through a dry area. All this research will help push back and explain the very early history of the soybean and its genus.

Two interesting questions which were not discussed in the *Genome* article but which Ted and his colleagues are now addressing are: (1) Which of the wild perennial species is closest to the soybean genetically? That is the one you want to use for crossing. (2) Which is the oldest species and where did it come from? This may give some clues about even earlier relatives in Southeast Asia. Address: Prof. of Plant Genetics, Univ. of Illinois, Urbana, Illinois.

2832. Labbé, Max. 1997. Ces étonnants aliments végétaux fermentés et lacto-fermentés [Those astonishing fermented and lactic-fermented vegetable foods]. Auvers sur Oise, France: Published by the author. 116 p. Preface by Richard Hwei-Ming Bau. Illust. No index. 21 cm. [Fre]

• ***Summary:*** Part III of this popular book, titled "Asiatic Specialties," contains the following sections and subsections (p. 77-103): Chinese and Japanese fermented foods: Shoyu and tamari, miso, umeboshi, nuka pickles, natto, sufu. Characteristics and way of tempeh: Definition, preparation, arrangement of grains before inoculation. Indonesian tempeh: Preparation of the cakes, preparation of the inoculum. Javanese tapé (tapeh) and its culture. American-style tempeh. A color photo on the rear cover shows Max Labbé. Address: 3 rue Emile Level, F- 75017, Paris.

2833. Seemo (H. Shapira). 1997. Re: History of Dakini Health Foods Pvt. Ltd., in Pune/Puna, India. Letter (fax) to William Shurtleff at Soyfoods Center, May 13–in reply to inquiry. 7 p. Handwritten.

• ***Summary:*** Seemo is Mr. H. Shapira from Israel and Kairava is Mrs. J. Spaelstra from the Netherlands. Seemo is in charge of tempeh, Kairava in charge of tofu & soymilk. They are making the earliest known commercial soybean tempeh in India. For their first letter see Dakini (1997).

Both Seemo and Kairava are devout disciples of Osho (formerly called "Sri Rajneesh"), he since 1984 and she since 1986. They arrived in Pune to stay in about 1988/89. Initially to support themselves, they had a gem and crystal shop, a wholesale new-age jewelry operation, and a motor bike repair shop. Now they have finally found what they want to do for work. "It's love and Zen." Osho died in Pune on 19 Jan. 1990; they returned to India the next day; the fire was still burning at the burning ghat. In the year before his death, his discourses were mostly about Zen. He died in Pune due to heavy metal poisoning and radiation damages done to him by U.S. marshalls in an Oklahoma jail cell, where he was kept unlawfully in 1985.

Their company started with the idea of making white tahini and possibly Turkish halva [halvah] (in which white tahini is a main ingredient). It was extremely difficult to get started. As foreigners doing business in India, they had to register a "Pvt. Ltd." company. Then they could not find a space for the company, since Pune is a rapidly growing city. So Seemo pulled down the back garden in his rented house, constructed a shed with a floor area of 25 square meters, and moved his bedroom up to the second floor. This gave him an additional 24 square meters where the bedroom used to be. They also have a 25 square meter storeroom where they make the tempeh. He got electrical connections then waited for 8 months while a colloid mill (copy of a 1940 model), hot air oven, and filling machine were delivered. The mill proved to be a technical nightmare; he had to totally rebuild it. Finally their small factory started operation. Then they added peanut butter and brown tahini to their product line–with no additives or preservatives. They had to set aside their plan to make halva.

Spicer College, run by Seventh-day Adventists, is located in Pune. They have a health food store and they make peanut butter–nearly edible, with too much sugar and salt, plus other ingredients. Their sesame butter (brown tahini) is gritty, rancid, and inedible. They also produce grape juices (very, very sweet), pastries (Mmmm good). And they make and bottle soy milk in plain and chocolate flavors, but it is loaded with white sugar and Class II permitted preservatives! They also make pretty good tofu; Seemo used to eat it now and then for the last 8 years. "Besides being actually able to taste the Bible in it, I had no reason to complain." This tofu is now served at the Osho commune. "Pune old timers told me that once–20 years ago–the place was managed by an enthusiastic old American woman and the quality of their products was very good.

At Dakini, they now also make hummus in their kitchen, 15 kg/week in summer and 60 kg/week in winter. They pack it in 200 or 400 gm cups and sell it at various shops in town to foreigners and Indians. They like it.

Seemo started developing the tempeh about 8 months ago. Last year a friend of his found a book titled *Handbook of Indigenous Fermented Foods,* edited by Dr. Keith H. Steinkraus, in a pavement stall for 400 rupees (US$13.00). Since he had been to Bali, Indonesia, many times, he tried making some of the foods but rarely got any edible products. So before leaving Pune, he gave the book to Seemo as a gift. As he read it, Seemo got really excited. He had grown up in a meat-eating family. Even while traveling and living in Europe, he continued to eat meat and junk foods. "Then I understood it was not good for me on all levels, and went vegetarian." Living in Holland later on, he started to learn about tofu, and then tempe, tamari, etc. "So now I was a healthy, well-fed vegetarian." Then he moved to India, but after some years of eating fried foods, lentils and lots of dairy products, he started to eat meat again, 2-3 times a month. "It did not feel too good, but I had no idea how to manage my diet, and living on mostly dairy products did not suit my body. So when Dr. Steinkraus' book fell into my hands, I got excited and realized that it might be possible to make tempe here in India at a small, affordable investment.

"So I first got a small incubator built; its actually like a cool box ½ meter wide and 1½ meters high, made of galvanized sheet metal with insulation and 8 shelves (of which I now use only 3)." At the bottom are heaters, which give 250-540 watts of heat. Two old computer cooling fans distribute the heat, and a thermostat regulates it. "It's not a perfect machine but I can do 5-12 kg/day when I want and, most important, I can produce in it excellent spore powder–since it is difficult to import anything here. Actually, I nearly gave up the project, because I was making sporulated tempeh, then sun-drying it and running in through my spice grinder. The powder looked great. The tempe cakes used to

get hot, then very hot, then smelly with funny colors (no white mold). I double-checked everything. In the end, only the grinding was left, so I bought a small hand-turned grain mill (500 rupees = US$15.00). Since then, perfect tempeh has been happening.

"For starter, I first got a packet of spores from Holland. Later I got 1 gram of white tempe starter from an American friend in Goa (she used to make her own supply down there), and playing with it I found it a bit more suitable for my use. So most of my spore stock now is from this starter, and some is mixed. I still have to study how to make tempe and starter during the different seasons here. Now it is very hot and dry. Next month is monsoon (wet), followed by a month that is hot and humid, and then the 3-month 'cold' season."

About half of all tempe produced is sold frozen; the other half is sold fresh. Seemo also plans to try making dry tempeh. He gives away lots of tempe as samples; most people love it. Starting this July, it will appear on the menu of one restaurant, possibly two–first as Tempeh Stroganoff and Tempeh Shashlik (steamed, then spiced, then barbecued). "When I get *The Book of Tempeh* I will introduce it to more places. Meanwhile, I have totally forgotten about eating meat. I feel strong and light. I find my vision benefits too; I haven't noticed that with tofu. Now that I am a bit more confident working with the mold, I hope to raise some capital, move to a suitable place (possibly well out of town), and then start to make tamari shoyu, and definitely some miso too. So that's a little of our story. Thank you." Address: Dakini Health Foods Pvt. Ltd., Vidyut Nagar, Plot A2, Kawdewadi, Pune/Puna 411 001, India. Phone: 0091-212-63-1990 (phone and fax).

2834. Tibbott, Seth. 1997. The tempeh market in the United States (Interview). *SoyaScan Notes.* May 29. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** A total of about 55,000 lb/week of tempeh is now made in the USA, compared with 34,700 lb/week in Jan. 1984 (based on a Soyfoods Center survey, published in Soyfoods Industry and Market, 5th ed.). This is the result of a major phone survey that Seth has just completed; he interviewed each of the major U.S. tempeh makers by phone, on the condition that their individual production figures would not be revealed–only the aggregate. Seth plans to present this information at a tempeh conference in Bali, Indonesia, on July 17. Seven U.S. companies make more than 1,000 lb/week of tempeh. The top 3 manufacturers are Lightlife Foods, White Wave, and Turtle Island (in that order). Of these three, Turtle Island has experienced the greatest percentage growth since 1984. The next four are Quong Hop, Surata Soyfoods, Northern Soy, and Cricklewood. In 1984 the four largest tempeh makers had 63% of the U.S. market (by weight); now they have 84%. The best-selling type of product is soy tempeh in an 8-oz package; it sells even better than tempeh burgers.

The average retail price of an 8-oz package of tempeh in the USA is $1.81. Shurtleff suggests that Seth compare this with the price in Indonesia. The yearly per capita income in Indonesia is $560 compared with $18,690 in the USA. The U.S. figure is 33.37 times as large as the Indonesian. Dividing $1.81 by 33.37 we see that if tempeh sold for 5.42 cents per 8 oz in Indonesia, it would be the same relative price as tempeh in the USA.

In terms of packaging, 80% of the tempeh in America is vacuum packed–even though most manufacturers admit that vacuum packaging lowers the product quality by imparting a slightly bitter flavor and less desirable texture. Seth's company is one of the few that does not vacuum pack its tempeh.

By product type, there are: 13 different burgers on the market, 9 soy tempehs, 6 multi-grain tempehs (soy plus several cereal grains), 5 bulk soy tempehs, 4 soy & brown rice tempehs, 2 soy & sea veggie tempehs, 2 soy & wild rice tempehs, 2 soy & millet tempehs, and 2 sloppy joe tempehs.

Seth plans to take his family to the Conference in Bali (he will be there July 11-20; the conference ends July 15), and then to travel to Malang to study how tempeh is made there. They will leave Indonesia on July 29. Address: Turtle Island Foods, Inc., P.O. Box 176, Hood River, Oregon 97031. Phone: (503) 386-7766.

2835. Messina, Mark J. 1997. Soyfoods: Their role in disease prevention and treatment. In: KeShun Liu. 1997. Soybeans: Chemistry, Technology, and Utilization. Florence, Kentucky: Chapman & Hall. xxvi + 532 p. See p. 442-77. Chap. 10. Index. [185 ref]

• ***Summary:*** Contents: Introduction. Diet, health and soyfoods. Macronutrients in soybeans: Protein, fat. Soy isoflavones: Isomer structure and occurrences, absorption and metabolism, estrogenic/antiestrogenic activity. Soy intake and cancer risk: Genistein as an anticarcinogen, breast cancer, prostate cancer, cancer treatment. Soy intake and osteoporosis: Protein, soy protein and bone health, isoflavones and bone health. Soy intake and kidney disease. Soy intake and heart disease: Serum cholesterol-lowering effect, role of isoflavones. Soy intake and menopause. Potential concerns related to soy consumption: oligosaccharides, phytate, saponins, trypsin inhibitors, isoflavones. Summary. References.

Breast cancer: Starting in the early 1990s, interest in the idea that increased soy intake might reduce cancer risk focused mainly on breast cancer. This hypothesis was based primarily on three observations: (1) The relatively low death rates from breast cancer in Asian countries where soy is traditionally consumed. In Japan, for example, the rate is ¼ the U.S. rate. (2) The potential antiestrogenic effect of isoflavones (Folman & Pope 1966), including soybean

isoflavones (Mäkelä et al. 1995). (3) The relatively high blood isoflavone levels in Asian people (Adlercreutz et al. 1993).

Barnes et al. (1990, 1994) reported that rates fed diets containing soy developed fewer mammary tumors induced by 7,12-dimethylbenz(a)anthracene than those fed a control diet without soy or a diet containing soy from which the isoflavones had been chemically removed. Then in 1991 Lee et al. reported a case control study conducted in Singapore that found regular consumption of soyfoods was associated with a marked decrease in risk of breast cancer in premenopausal but not in postmenopausal women. These two studies did much to draw attention to the soy-breast cancer hypothesis. Overall, however, findings on the relationship between soy intake and breast cancer risk are equivocal. Three studies (Lee 1991, Yuan et al. 1995, and Hirose et al. 1995) are cited to show that there is some evidence indicating that soy consumption can decrease premenopausal breast cancer risk, but little if any suggesting soy consumption reduces risk of breast cancer in postmenopausal women. These findings are consistent with the notion that soybean isoflavones can function as antiestrogens when placed in the high estrogen environment found premenopausally, though genistein has been found to inhibit the growth of both estrogen-dependent and estrogen-independent cancer cells. Address: PhD, Nutrition Matters, Inc., 1543 Lincoln Street, Port Townsend, Washington 98368.

2836. Ngo, Nga. 1997. Two Vietnamese-American manufacturers of tofu and soymilk in Little Saigon, Orange County, California (Interview). *SoyaScan Notes*. June 12. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Nga works for a dairy plant in Southern California. Her employer is thinking about introducing its own brand of soymilk which has a beany flavor–since that is what Vietnamese like. There are already two companies in the area, each run by Vietnamese-American families, that make tofu and soymilk, but they hot-pack their soymilk and it spoils quickly. The older and larger of the two companies is Tan-Tan Tofu, located in Westminster or Santa Ana, Orange County, which was in business by the late 1980s. Its younger competitor is Buong Son, which started in about 1992 and is located in the same area. Address: Orange County, California. Phone: 818-961-3399.

2837. Kikkoman Corporation. 1997. Annual report 1996. 339 Noda, Noda-shi, Chiba 278, Japan. 24 p. 28 cm. [Eng]
• ***Summary:*** The information in this English-language annual report is current as of April 1997. Contents: Financial highlights. Profile. A message from the president: The year in review, an emphasis on growth, principal management issues, looking ahead. Overseas operations–A world brand: The Americas, Europe, Asia and Oceania. Financial section. Corporate history. Global network (directory of Kikkoman names, addresses, and phone numbers worldwide). Board of directors and officers. Corporate data.

During fiscal 1996, ended 31 December 1996, consolidated net sales worldwide rose 1.3% over the previous fiscal year to 206.0 billion yen, down from a peak of 211.7 billion yen in 1992. Net income surged 63.8% to a record 7.3 billion yen, up from 4.4 billion yen in 1995. In 1993 net income was 4.7 billion, in 1992 it was 4.9 billion, and in 1991 it was 6.2 billion–very volatile.

Overseas sales jumped 21.8% in 1996 to 54.4 billion yen, and accounted for 26.4% of consolidated net sales, up 4.4 percentage points from fiscal 1995. "Although the declining value of the yen helped boost overseas sales, this impressive result mainly reflects the excellent performance of the company's subsidiaries in the United States." In Japan, difficult conditions resulted in a 4.4% decrease in sales.

During the past year: Kikkoman increased efforts to boost sales of its premium-quality *Marudaizu* Soy Sauce (made from whole soybeans rather than defatted soybean meal). July 1996–Kikkoman starts construction of its first soy sauce manufacturing plant in Europe, located in the city of Hoogezand-Sappemeer, in the northern Netherlands. Aug. 1996–Relocated its Tokyo Head Office to Nishi-Shinbashi in central Tokyo, in a move to expand the role of this office–and introduced E-mail. Feb. 1997 began constructing its second U.S. soy sauce manufacturing plant in Folsom, California, on a 52-acre site; the ground-breaking ceremony took place in March 1997. Feb. 1997–Launched a new *Yakiniku no Tare* (Steak Dipping Sauce) in *Akadare* (Red Label) and *Kurodare* (Black Label) flavors.

"The Americas." Kikkoman's new plant in Folsom, California, is scheduled to come on stream in autumn 1998 with an initial production capacity of 10,000 kiloliters per year (about 2.64 million gallons per year). The plant will be operated by Kikkoman Foods, Inc., the company's wholly-owned Wisconsin-based subsidiary, and approximately 25 local employees will be hired. The plant will supply Kikkoman *Koikuchi Shoyu* (regular soy sauce) to customers in the western United States and Canada. Kikkoman's first shoyu plant outside Japan began operation in Wisconsin in 1973. Kikkoman has increased the production capacity of that plant 10-fold to meet expanding demand. [Note: Since the initial capacity was about 10,000 kiloliters/year, the current capacity must be about 100,000 kiloliters/year or 26.4 million gallons/year.] Over the years, Kikkoman has captured approximately 50% of the market for soy sauce and soy sauce-related seasonings in the USA. A bar chart shows the relative production volume growth at the Wisconsin plant. It has increased 2.4 fold since 1986. In addition to its plant in Wisconsin, Kikkoman has four subsidiaries in the USA: (1) Kikkoman International Inc.

(San Francisco, California), which markets a broad range of Japanese and Asian foodstuffs, primarily soy sauce, teriyaki sauce, noodle sauce, and tempura sauce. (2) JFC International Inc. (San Francisco), North America's largest importer and distributor of Japanese and other Asian foodstuffs. (3) Japan Food (Hawaii), Inc., which wholesales soy sauce plus other Japanese and Asian foodstuffs in Hawaii. (4) Japan Food Canada Inc., which wholesales soy sauce plus other Japanese and Asian foodstuffs in Canada.

In Europe, Kikkoman's plant in the Netherlands is expected to start deliveries of soy sauce in Oct. 1997. It has an initial production capacity of approximately 4,000 kiloliters per year. "Kikkoman currently supplies the European market with soy sauce produced at its Singapore plant. When operations commence at the Dutch plant, this volume will be available to meet the burgeoning demand for soy sauce in Asia and Oceania."

In Asia and Oceania: Kikkoman has two production plants, in Singapore (est. 1983) and Tainan, Taiwan (President Kikkoman Inc., which makes a sweet soy sauce developed for local tastes; it was established in Feb. 1990 as a joint venture company). "Marketing activities in Asia are performed by Kikkoman Trading (S) Pte. Ltd. of Singapore, and JFC Hong Kong Limited, while in the competitive markets of Australia and New Zealand, Kikkoman Australia Pty. Limited is enhancing the Kikkoman name. The latest addition to Kikkoman's Asian marketing network is Shanghai Kikkoman Trading Co. Ltd., which was established in December 1995" [in China]. Address: Noda, Japan.

2838. Gibson, Marianne. 1997. New developments at the American Soybean Assoc. and the United Soybean Board (Interview). *SoyaScan Notes.* July 18. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** After 16 years of working for ASA, at age 62, Marianne is looking forward to retiring in 74 days. Her database, which now contains 15,000 to 20,000 records is in limbo, and when she leaves no one will know how to use it. It may just evaporate. She recently ordered software from InMagic that will enable her to put all or part of her database on the Internet. The Internet has changed her view of the database; she would like to put all of the important materials produced by ASA on the Internet; the rest, because of copyright protection, may not be used much more. Moreover, most of ASA's overseas offices have Internet access and they can get the information they need from the Internet; they also have their own home pages and their own little databases, created initially from information that Marianne has supplied to them. The Singapore office, for example, produces many publications; they travel a lot and have many consultants.

Since the USB took over, it has been all downhill every year for ASA. That is the general consensus. There are few people left who remember what things were like before USB–Marianne, Jim Guinn, Gil Griffis, Tom Brennan in Vienna [Austria], and Joseph Zack in Brussels [Belgium]. Every year she has to justify her existence. Pay increases 3% a year, no matter how well you perform. Most ASA employees are unhappy and feel they have not been treated well. USB administrators are mostly bureaucratic types and nit-pickers, who don't really know what is going on. Before USB took over, ASA has about 350 employees; now they have 36, divided into two groups; 13 work with the association on membership, communications, and corporate relations (they get no money from USB) and the other 23 are in international marketing, under contract with USB–which can discontinue their contract at the end of any year. One of the big changes is that USB contracts out a lot of work to groups who don't known what they are doing and don't really care. They just write nice proposals and the money starts flowing in–big time. It uses to be that the real experts all worked for ASA. Ken Bader, and most other ASA employees, thought that when the checkoff passed, the money was just going to start pouring in to ASA–which would decide how it should be spent. EvansGroup, the PR firm in Seattle, Washington, puts out material that is all flash, no substance. Basically glossed-over garbage. Address: Librarian, American Soybean Assoc., P.O. Box 419200, 540 Maryville Centre Dr. #400, St. Louis, Missouri 63141-9200. Phone: 1-800-688-7692 X-300.

2839. Tibbott, Seth. 1997. Re: Tempeh in Indonesia (Color postcard). Letter to William Shurtleff at Soyfoods Center, July 19. 1 p.

• ***Summary:*** "Over here in the Tempeh Kingdom where the tempeh in the market costs 500 Rupiah ($0.20) for 250 grams. After speaking with the owner of the Murni Tempeh Shop in Denpassar, Bali, I determined that an Indonesian tempeh worker has to work 72 minutes to buy a 250 gram cake of tempeh, where a worker at Turtle Island can earn one in 14 minutes (at USA retail price).

"The [Tempeh] Symposium was fantastic–well worth the trip–lots of papers on isoflavones & anti-diarrheal properties as well as vitamin B-12 production using mixed cultures. In Ubud [a little town that does arts and crafts in the mountains of Bali] now, then Yogyakarta to visit Pedro's tempeh shop that makes 2½ tons/day employing 3 people + 20 "helpers" with whom he trades work for tempeh. Best regards–Seth."

A color photo on the other side shows "The exciting kecak dance performed at Tanah Lot temple on Bali's western shore."

Talk with Betsy Shipley of Perry, Michigan. 1997. Nov. 28. She and Gunter Pfaff went to this 2½ day tempeh symposium; the proceedings are scheduled to be published soon. Bali was overrun by tourists and overcrowded. All the

tempeh production they saw was done under very trying, unsanitary conditions.

Talk with Seth Tibbott. 1997. Dec. 8. Pedro (H. Pedro Sudjono) is a remarkable guy with a remarkable tempeh shop. His shop and office are located at: Jalan Hos Cokroaminoto 136, Yogyakarta. Phone: (0274) 564-378. Seth took photos of the shop. An actor and a politician, he is a character and a real presence in the world of tempeh in Indonesia, involved with many associations. He doesn't incubate any of the tempeh at his shop. Mostly women come in and seal the perforated plastic bags, then they throw the bags into empty soybean sacks, take them home on their bicycles, incubate the tempeh in the bags, then sell the tempeh. They pay him for the bagged, inoculated soybeans then they keep whatever they can make selling the tempeh. Its a clever marketing guy. Address: Turtle Island Foods, Inc., P.O. Box 176, Hood River, Oregon 97031. Phone: (503) 386-7766.

2840. American Soybean Association. 1997. ASA foreign offices–August 28, 1997–Directory (Leaflet). St. Louis, Missouri. 1 p. 28 cm.
• ***Summary:*** Contains details on ASA's 13 overseas offices in Japan, Taiwan, Korea, Singapore, Austria, Belgium, Venezuela, China, Mexico, Russia, Cyprus, Germany, and India. For each entry: Name of director, address, phone and fax numbers, e-mail address. Address: Missouri. Phone: -.

2841. Chua, G.P. 1997. Re: Plans to establish over 1,000 franchise outlets to make and sell instant soya milk and tofu. Letter to William Shurtleff at Soyfoods Center, Sept. 25. 1 p. Typed, with signature on letterhead.
• ***Summary:*** Mr. Chua is looking for sources of information, soybeans, tofu coagulants, and equipment. He plans to establish over 1,000 franchise outlets to make and sell instant soya milk and soft tofu.

Note: A record in the SoyaScan database dated 1 Nov. 1985 showed: Mr. G.P. Chua, Cai Consultants, Industrial Pk 3 #03-18, 6024 Ang Mo Kio, Singapore 2056. At the bottom of his letterhead the following address is crossed out: Cai Technologies, 20, Bideford Road, #05-02 Wellington Building, Singapore 0922. Phone: 732-1991. The top of his letterhead states that Cai Technologies has offices in Los Angeles [California], Chicago [Illinois], Hong Kong, Melbourne and Perth [Australia], London [UK], and Tokyo [Japan]. Address: President, Cai Technologies, 153A Rochor Road, Singapore 188428, Singapore. Phone: +65 339-3733. Fax: +65 339-1733.

2842. Rahardjo, Grace. 1997. Making tempeh in Canada (Interview). *SoyaScan Notes.* Oct. 6. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Grace, who was born in Indonesia, has been making tempeh at her home in Canada for the last 5 years (i.e. since about 1992). She sells it to her friends and church members, but not in stores. Her emphasis is on quality: it has a whiter mycelium and is more juicy than commercial tempeh. She comes from central Java, about 200 km from Yogyakarta. She will soon be visiting Java and would like to meet Dr. Sastroamijoyo. Address: 1442 West 33rd Ave., Vancouver, BC V6M 1A5, Canada. Phone: 604-264-0181.

2843. Kluis, Alan. 1997. El Niño suggests higher [soybean] prices. *Soybean Digest.* Oct. p. 42.
• ***Summary:*** Each year around Christmastime, a warm equatorial current flows southward along the coast of Peru. In the 19th century, Peruvian fishermen named the current "El Niño" in honor of the Christ child *(el niño* means "the child" in Spanish). Later (in about 1925), when scientists noted that in some years this warm current which flows along the western coast of South America is warmer or more intense than usual, they adopted the name for the more potent but erratic climatic / weather phenomenon that is accompanied by abnormal and sometimes violent weather worldwide. This huge change in ocean temperature often changes weather patterns worldwide. Problems such as floods and droughts are common during and after a year in which El Niño occurs.

During the last strong El Niño, world soybean and corn production decreased by 9%. There was also a large drop in the fish catch in the South American Pacific ocean because these fish seek cooler water by moving elsewhere or diving deeper. With less fishmeal, additional soybean meal will be required. This year many nations in Southeast Asia are now experiencing drought. If this continues, it may lead to a large drop in palm and coconut oil production in Malaysia, Indonesia, and the Philippines during the first half of 1998.

Graph 1, titled "Southern Oscillation Index" shows the difference in the sea-level barometric pressure between Tahiti in the mid-Pacific and Darwin, Australia–from 1977 to 1997. The last strong El Niño was in 1983; another strong one is predicted for 1997. Graph 2 shows world corn and soybean production, year by year during the same period.

Note: This warm current also prevents upwelling of nutrient-rich cold deep water causing a decline in the regional fish population. Address: President, NorthStar Commodity Co.

2844. Adnan, M.; Sudarmadji, S. 1997. Contribution of tempe for the economy and health of Indonesia. In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 11-21. 26 cm. [9 ref]
• ***Summary:*** Contents: Abstract. Introduction. Tempe and people's economy: Tempe is a daily necessity, continuity of supplies, simple technology, low cost, wide marketing

distribution, income for the people. Contribution to health. Tempe and anemia. Processing consideration. Support for development. Address: Faculty of Agricultural Technology, Gadjah Mada Univ., Yogyakarta, Indonesia.

2845. Astuti, Mary. 1997. Superoxide dismutase in tempe, an antioxidant enzyme, and its implication on health and disease. In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 145-156. 26 cm. [22 ref]
• ***Summary:*** Contents: Abstract. Introduction. Free radicals and lipid peroxidation in the body. Tempe as a source of superoxide dismutase. The role of tempeh on the modulation of superoxide dismutase in the body. Conclusion. Address: Faculty of Agricultural Technology, Gadjah Mada Univ., Yogyakarta, Indonesia.

2846. Astuti, Mary. 1997. Effect of tempe on iron availability on bologna sausage (Abstract). In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 263. 26 cm.
• ***Summary:*** Sausage has a high cholesterol content, which lowers its consumption. Tempe, which contains no cholesterol, and actually lowers serum cholesterol in humans, was added to bologna sausage at levels of 0, 5, 10, 15, and 20%. With increased tempe levels, the flavor, texture, and slicing characteristics all improved, as did the shelf life, but the availability of iron decreased. Address: Faculty of Agricultural Technology, Gadjah Mada Univ. Yogyakarta, Indonesia.

2847. Astuti, Mary; Kartika, Habsari Esti. 1997. Effect tempe powder on the physical and organoleptic properties of cookies (Abstract). In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 263. 26 cm.
• ***Summary:*** When 15% of the wheat flour in cookies is replaced by tempe powder, the taste and crispness of the cookies are acceptable, and the protein, crude fiber, lipid, and ash (mineral) content were all increased. Address: Faculty of Agricultural Technology, Gadjah Mada Univ. Yogyakarta, Indonesia.

2848. Brady-Robeau, C.B.; Sutardi, -; Ismoyowati, D.; Fairbrother, A.H.; Boughton, T.J.; Petterson, D.S. 1997. Acceptability of lupin-based (Abstract). In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 261-62. 26 cm.
• ***Summary:*** Research in Australia has shown that lupin seed *(Lupin angustifolius)* can be used to make acceptable tempe. Yu (1988) stated that lupin was a better substrate for fermentation than soybean, and that taste panelists preferred the nutty flavor and golden color of lupin tempe. Address: Curtin Univ. of Technology Perth Western Australia (e-mail cbrobeau@health.curtin.edu.au). Phone: 6189-351-2771.

2849. Brata-Arbai, Arsiniati M. 1997. The effect of tempe diet on uric acid and plasma lipid level. In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 187-98. 26 cm. [29 ref]
• ***Summary:*** "Few studies have been done to investigate the effect of soybean on uric acid, and the product of purine metabolism. It was assumed that foods containing purine increase uric acid level... The average purine content of beans varies from 50 to 150 mg per 100 gm." Address: Indonesian Tempe Foundation Nutrition, Dep. Faculty of Medicine, Airlangga Univ., Surabaya, Indonesia.

2850. Gandjar, Indrawati; Santoso, Iman. 1997. The role of *Rhizopus* spp. in biotechnology. In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 55-63. 26 cm. [37 ref]
• ***Summary:*** Contents: Abstract. Introduction. Soybean tempe. Moulds. Tempe and bioconservation of the genus *Rhizopus.* The nutrition of tempe. Biotransformation by *Rhizopus* spp. Enzymes produced by *Rhizopus* strains. *Rhizopus* spp., agroindustrial wastes, and non-soybean tempe. *Rhizopus* and related genera in biotechnology.

Early studies on tempe conducted before World War II and reports by Gandjar in 1960 showed that *Rhizopus oryzae* and *Rhizopus arrhizus* were the two dominant mold species isolated from the two types of tempe most highly preferred in Java for their delicious taste: Tempeh Malang and Tempe Purwokerto. "However, since Dr. Ko Swan Djien (1961) from the Bandung Institute of Technology went to Peoria [Illinois, USA] to study tempe fermentation at the laboratory of Dr. Hesseltine, and brought with him tempe samples from West Java, *Rhizopus oligosporus* (now: *Rhizopus microsporus* var *oligosporus)* was claimed to be the best tempe mould. This mould was then used by many Indonesian microbiologists for their studies on tempe... At present an inoculum for tempe, composed of *Rhizopus oryzae* and *Rhizopus oligosporus* has been developed by the

National Chemistry Institute–Indonesian National Institute of Science (LKN-LIPI) and distributed to tempe makers top prevent failure of their products. This is, of course, a very great success for Indonesia..." Address: Dep. of Biology, Faculty of Science and Mathematics, Univ. of Indonesia, Depok 16424, Indonesia.

2851. Handajani, Sri. 1997. Bioactive compound of *Mucuna* tempe. In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 133-142. 26 cm. [22 ref]
• ***Summary:*** *Mucuna* tempe is velvet bean tempeh *(tempeh benguk).* Address: Sebelas Maret Univ., Solo, Indonesia.

2852. Hermana, H; Karmini, Mien; Affandi, Erwin. 1997. Symbiosis of *Rhizopus* sp. and vitamin $B_{12}$ forming bacteria and gastrointestinal pathological findings. In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 163-173. 26 cm. [4 ref]
• ***Summary:*** A new and improved type of inoculum was developed using the *Rhizopus oligosporus* mold and two species of bacteria that produce vitamin B-12: *Klebsiella pneumoniae* and *Citrobacter freundii.* These bacteria are contaminants that find their way into the fermentation during the stage of soybean cooking. This study also showed that tempe made with the mixed inoculum resulted in better growth of experimental rats than regular tempe. Address: Center for Nutrition Research and Development, Ministry of Health, Bogor 16112, Indonesia.

2853. Isnijah, Siti; Saragih, Raskita. 1997. Study on vacuum drying of tempe (Abstract). In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 259. 26 cm.
• ***Summary:*** To make tempe flour, fresh tempe can be dried at 70ºC for three hours, then ground and sifted. Note: This could be done most economically using a solar dryer. Address: 1. Research Development Centre for Applied Chemistry, Indonesia Inst. of Sciences; 2. Industrial Technology of Agriculture, Indonesian Inst. of Technology.

2854. Isnijah, Siti. 1997. Promotion tempe production through development of second stage industry of tempe (Abstract). In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 259. 26 cm.
• ***Summary:*** Making second generation food products, which use tempeh as an ingredient, offers to opportunities for using tempeh and expanding production. Address: Research Development Centre for Applied Chemistry, Indonesia Inst. of Sciences.

2855. Karmini, Mien; Affandi, Erwin; Hermana,-; Karyadi, Darwin; Winarno, F.G. 1997. The inhibitory effect of tempe on *Escherichia coli* infection. In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 157-162. 26 cm. [4 ref]
• ***Summary:*** Tempe was found to inhibit enteral bacterial infection by enteropathic *Escherichia coli.* Address: 1. Center for Nutrition Research and Development, Ministry of Health, Bogor 16112; 2. Bogor Agricultural Univ., Bogor 16002. All: Indonesia.

2856. Karossi, A.T. 1997. Introduction of Indonesia's tempe centre. In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 47-51. 26 cm.
• ***Summary:*** Contents: Abstract. Introduction. The program of ITC. Program of training. Program on R&D activities: Nutrition and health, technology, microbiology. Program on information service. Program on process development. The Indonesian Institute of Sciences in the establishment of ITC.

The writer proposes the establishment of an Indonesian Tempe Center (ITC), which is viewed as "the best way to sustain our food heritage through assisting the local producers to lift up their capabilities in producing standard quality product for global market." Address: Indonesian Inst. of Sciences, Jakarta, Indonesia.

2857. Karyadi, Darwin; Lukito, Widjaja. 1997. Functional characteristics of tempe in disease prevention and treatment. In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 199-204. 26 cm. [16 ref]
• ***Summary:*** Tempe was originally developed in Central Java, Indonesia. Address: Regional SEAMEO Center for Community Nutrition, Univ. of Indonesia, Jakarta 10430, Indonesia.

2858. Marseno, Djagal W.; Astuti, M.; Wastoni, A.T. 1997. Intracellular distribution and characterization of superoxide

dismutase from tempe fermented by *Rhizopus oligosporus* (Abstract). In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 264. 26 cm.
• ***Summary:*** The superoxide dismutase (SOD) was mainly distributed in the cytosolic fraction. Note: The cytosol or intracellular fluid is the liquid found inside cells. Address: Faculty of Agricultural Technology, Gadjah Mada Univ., Jl. Socio Yusticia, Bulaksumur, Yogyakarta, Indonesia.

2859. Pawiroharsono, Suyanto. 1997. Prospect of tempe as functional food. In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 101-113. 26 cm. [30 ref]
• ***Summary:*** Contents: Abstract. Introduction. Tempe potency. Nutritive value of tempe. Active substances. Formation of active substances and its benefit for health. Isoflavone. Unsaturated fatty acid. Ergosterol. Antibacterial compound. Vitamin. Characterization of strains and improvement of active substances. Strain development (incl. through genetic engineering). Development steps to functional food. Address: Directorate for Industrial Process Technologies, BPP Teknologi, Jakarta, Indonesia.

2860. Rukmini, Herastuti Sri; Subardjo, B; Astuti, M. 1997. Development of superoxide dismutase during pigeonpea tempe fermentation (Abstract). In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 264. 26 cm.
• ***Summary:*** The pigeon pea, pigeonpea or red gram–*Cajanus cajan* (L.) Millspaugh. Formerly *Cytisus cajan*–can be used to make good-tasting tempe using *Rhizopus oligosporus* as a starter / inoculum. Address: 1-2. Jenderal Soedirman Univ.; 3. Gadjah Mada Univ. Both: Indonesia.

2861. Siregar, Effendi; Pawiroharsono, Suyanto. 1997. Inocula formulation and its role for biotransformation of isoflavonoid compounds. In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 85-98. 26 cm. [7 ref]
• ***Summary:*** The addition of *Brevibacterium epidermis* and *Micrococcus luteus* to the tempe fermentation increased the content of isoflavonoids in the finished tempe. Address: Directorate for Industrial Processing technology, Agency for the Assessment and Application of Technology, Jakarta, Indonesia.

2862. Soenarto, Yati; Sudigbia, I.; Hermana, -; Karmini, M.; Karyadi, D. 1997. Antidiarrheal characteristics of tempe produced traditionally and industrially in children aged 6-24 months with acute diarrhea. In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 174-186. 26 cm. [23 ref]
• ***Summary:*** Consumption of tempe was effective in treating acute diarrhea. Breast milk also appears to have a protective effect against the negative impact of diarrhea.

2863. Soetrisno, Noer; Sulaeman, Suhendar. 1997. The cooperative production of tempe in Indonesia. In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 247-55. 26 cm. [5 ref]
Address: 1. Office of the Ministry of Food Affairs; 2. Agency for Cooperative and Small Enterprise Research and Development Ministry of Cooperative and Small Enterprise Development. Both: Jakarta, Indonesia.

2864. Sudarmadji, Slamet; Suparmo, -; Raharjo, Sri. eds. 1997. Reinventing the hidden miracle of tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. No index. 26 cm. [293 ref]
• ***Summary:*** The cover states: This symposium was organized by the Indonesian Tempe Foundation, in cooperation with the Ministry of Food Affairs (Republic of Indonesia), Indonesian Institute of Sciences, and American Soybean Association. The introductory section consists of: Foreword. Symposium highlights. Welcoming address, by Dr. Sapuan. Opening remarks by the Minister of Food Affairs of the Republic of Indonesia at the opening ceremony of the International Tempe Symposium, Bali, 14 July 1997, by Excellency Mr. Joop Ave. 24 papers by various authors (each cited separately), were presented at this conference. They were arranged under the following categories: The global prospects of tempe (5). Progress in tempe fermentation research (4). Development in tempe processing technology (4). Bioactive compounds and health benefits of tempe (8). Socio-economic aspects of tempe (4). In addition, there were ten poster presentations, each with an abstract. Appendixes: List of presenters at the International Tempe Symposium. List of participants in the International Tempe Symposium (directory of 82 people). Address: Indonesian Tempe Foundation, Bulog II building, 2nd floor, Jl. Kuningan Timur M 2/5, Jakarta 12950, Indonesia.

2865. Suharto, I. 1997. Bioprocessing and equipment in the modern tempe industry in Indonesia. In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 114-124. 26 cm. [5 ref]

• ***Summary:*** Contents: Abstract. Introduction. Development of modern tempe industry. Framework for bioprocessing development. General bioprocessing. Fabrication of equipment. Techno-economic evaluation. Conclusion. Acknowledgements.

Small scale businesses in the traditional tempe industry need to transform into the modern tempe quality industry using Codex Alimentarius Commission, quality assurance, good manufacturing practices, ISO 9.000 & ISO 14.000, total quality management (TQM), and HACCP. This will give Indonesian tempe access to the international market. Address: Faculty of Industrial Technology, Parahiyangan Univ., Bandung 40141, Indonesia.

2866. Susanto, Tri; Sawitri, Meita; Widaryanti, Eni. 1997. Research on the utilization of tempe as raw material in the production of milk and tempe sausage. In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 125-132. 26 cm. [7 ref]

• ***Summary:*** To produce good quality tempeh sausage: Cut and grind fresh tempeh to yield 100 gm. Add 3.5% egg white, 2.5% wheat flour, 10 ml water, 1 gm garlic, and spices. Mix well, then mix in 40 gm vegetable oil, fill into a casing, and steam at 100ºC. Cool and serve. Contains 17.3% protein.

To make tempeh milk: Dice fresh tempeh, steam for 3 minutes, add 2 parts boiling water, grind, and extract the soymilk. Filter the milk and mix in a 0.08% agar (to reduce sedimentation) plus 4% skim milk and 7% sugar. Heat to 90ºC for 5 minutes, filter, bottle, pasteurize at 90ºC for 15 minutes, and cool. This soymilk contains 3.25% protein. Address: Research Centre on Traditional Foods, Brawijaya Univ., Malang, Indonesia.

2867. Suyitno, -; Astuti, Mary; Basir, L.I.S. 1997. Moisture sorption isotherm and critical water activity of cookies supplemented with tempe (Abstract). In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 262. 26 cm.

• ***Summary:*** "The critical water activity of cookies was 0.57 (equivalent to critical moisture content of 7.70% db), above which" the cookies lose their crispness. Address: Gadjah Mada Univ. Yogyakarta, Indonesia.

2868. Syarief, Rizal. 1997. Production and marketing of small scale tempe industry in Indonesia. In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 221-34. 26 cm. [8 ref]

• ***Summary:*** "Urban population growth has stimulated a rise in the number of tempe processors in many cities throughout the country. Migration from rural areas to urban centres has created a daily need among many working people to eat outside the home. Demand for relatively inexpensive, ready-to-eat food has increased as people, especially women, have less time to prepare meals.

"The significance of the tempe industry has often been ignored because it is considered part of the informal sector. Previously, the informal sector was thought to symbolize a lack of economic development that would and should disappear with modernization. Until more permanent jobs could be provided by the modern sector, the former was expected to absorb unskilled workers who migrated to the city from rural areas.

"However, this phenomenon has lasted longer and may be less transitional in nature than previously anticipated. The informal sector in the urban areas to be growing more rapidly than the formal sector of many countries. Because of the rapid rise in urban populations and increasing awareness of the limited employment generated by large-scale industries, planners are beginning to acknowledge the importance of the informal sector, including small scale tempe industry.

"Tempe was formerly considered an inferior food in part because of its costs, compared to other protein foods such as meats, fish and eggs. Over the last 15 years the attitude towards tempe has changed. Today, more attention has been given to tempe because it is an inexpensive source of proteins, vitamins and calories. However the quality of tempe products should be developed in order to increase the segment market of the product such as supermarket." Address: Community Services Inst., Bogor Agricultural Univ., Bogor, Indonesia.

2869. Tanuwidjaja, Lindajati. 1997. Study on the effect of inoculation techniques in tempe fermentation (Abstract). In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 261. 26 cm.

• ***Summary:*** Using a powdered inoculum, compares two inoculation techniques, namely the dry inoculation and the wet inoculation methods. "There was no significant difference in appearance, taste, texture and aroma of tempeh produced by these two methods." Address: Research and Development Centre for Applied Chemistry, Indonesian Inst. of Science.

2870. Tibbott, Seth. 1997. Current state of the North American tempeh [and tofu] market. In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 28-35. 26 cm. [7 ref]

• ***Summary:*** Contents: Abstract. History of the North American tempeh market. Current US tempeh market–May 1997: Basic statistics, who is the typical tempeh consumer?, where is tempeh sold?, how is tempeh packaged?, how is tempeh used by the consumer in North America?, what is the future of tempeh in North America?, factors that affect future growth of tempeh (health benefits of soy and label claims, consumer education, development of the food service and industrial market, development of Indonesian cuisine and restaurants in America).

In 1984 some 53 companies in the US made approximately 34,000 pounds/week of tempeh. At that time tempeh was the fastest growing soy product in the US, growing by about 28% a year.

As of May 1997 there are ten tempeh manufacturers in the USA; seven of these produce more than 1,000 lb/week of tempeh, and only one produces less than 200 lb/week. All ten US companies make an estimated 55,580 lb/week of tempeh, and these 7 largest companies make about 95% of the total. Canada has only 3 tempeh makers and they produce a total of about 1,100 lb/week. In Mexico, there are only a few tempeh makers, mostly in tourist areas. All of the 7 largest US and the 3 largest Canadian tempeh manufacturers are owned and operated by Caucasians. Caucasians also consume an estimated 95% of the tempeh made in the USA. In North America, tempeh is marketed in a variety of forms and flavors, of which soy tempeh is the most popular, followed by tempeh burgers and soy & grain tempehs. All of the existing tofu shops in the USA and Canada trace their roots to The Farm, a spiritual community in Summertown, Tennessee.

By contrast, tofu is much more popular in North America than tempeh. More than 70 manufacturers produce over 1.5 million lb/week. Three of the four largest manufacturers are owned and operated by Asian Americans. Whereas 75% of all Americans know what tofu is, only 14% know what tempeh is.

Although tempeh sales grew very rapidly during the 5-year period from 1980 to 1984, they were stagnant during the next five years, from 1985 to 1989. This was caused in large part by competition from more sophisticated meatless burgers, such as the Gardenburger, launched in March 1985 by Wholesome & Hearty Foods of Portland, Oregon. Also microwavable and ready-to-eat foods became more popular. The period of stagnant sales led to a great consolidation within the industry. By 1990 there was renewed interest in tempeh, which paralleled the new interest in the health benefits of soy, and the rise new "meat alternatives" category. Today, tempeh sales are growing at 10-20% a year. And most Americans still like tempeh very much when they taste it. All US tempeh makers agree that education is the crucial need.

In 1984 about 20% of US tempeh was sold vacuum packed, compared with 70% today. Main advantage of vacuum packing: Longer shelf life. Main disadvantage: Imparts a somewhat bitter taste to the tempeh. A 1992 survey of 400 tempeh users by Turtle Island showed that the number one use was in stir-fried recipes, usually with rice and vegetables.

Tables show: (1) Tempeh market statistics (USA): Average retail price per 8 oz cake of soy tempeh: $1.81. Percentage of tempeh sold refrigerated: 80% (the rest is sold frozen). Total retail dollars spent on tempeh: In 1983 = $4.96 million. In 1996 = $13.15 million. Spent (retail) on tofu in 1996 = $116 million. Spent (retail) on soymilk 1996 = $100 million. Market share of the four largest tempeh makers in 1983: 63%, In 1997: 84%. (2) Number of brands of different types of tempeh on the US market in May 1997: Tempeh burgers 14, soy tempeh 9, multi-grain (mostly 3 or 5 grains) 6, bulk soy tempeh 5, soy & brown rice tempeh 4, sea veggie tempeh 3, wild rice tempeh 2, soy millet tempeh 2, sloppy Joe tempeh 2, other 8.

Talk with Seth Tibbott of Turtle Island. 1999. Dec. 6. The existing tempeh companies with the strongest ties to The Farm in Tennessee are (1) Lightlife Foods (Michael Cohen; see Sept. 1991 interview) and (2) Turtle Island (Seth; in 1977 he learned how to make tempeh at The Farm in Tennessee). Those with weaker ties are (3) Wildwood Natural Foods (Jeremiah Ridenour; he lived at The Farm for a while, has a lot of Farm history, and one of his kids was born on The Farm), (4) White Wave (In about 1980 Alexander Lyon was hitchhiking through Boulder, Colorado, and had no money. He taught Steve Demos how to make starter culture for something like $20 and a good meal), and (5) Surata Soyfoods (Benjamin Hills learned how to make tempeh from his former wife, who learned it from The Farm in Tennessee).

Turtle Island now makes tempeh for: Lean Green Foods (Hawaii; Benjamin Hills), Wildwood Natural Foods, and Quong Hop. It starts out when you're at a trade show and "people saddle up to you" and say "Uh, we're not sure exactly which way we're going with our tempeh, but do you any extra plant capacity? It's just a thought." Then "If you

give any kind of encouragement to them, the next week they're begging you on their hands and knees, they'll pay anything to have you make it for them. It's such a hassle and they have to devote plant space to it. Tofu is now growing so much faster than tempeh, they just keep tempeh to fill out their product line." Seth expects that White Wave and Surata will come to him next, begging him to make tempeh for them. Address: Turtle Island Foods, Inc., P.O. Box 176, Hood River, Oregon 97031.

2871. Wuryani, W.; Subaranti, W.; Yahya, V.J.; Sibarani, S. 1997. The effect of tempe starters and fermentation time on antihemolytic activity of isoflavones. In: Sudarmadji, Suparmo and Raharjo, eds. 1997. Reinventing the Hidden Miracle of Tempe: Proceedings, International Tempe Symposium, July 13-15 1997, Bali, Indonesia. Jakarta, Indonesia: Indonesian Tempe Foundation. xi + 280 p. See p. 211-18. 26 cm. [7 ref]

• ***Summary:*** The two types of tempe starters (inocula) used in this experiment were: (1) Ragi-pasar, the traditional inoculum, and (2) A starter prepared under strict quality control named ragi-LIPI. Address: 1. Researcb Development Centre for Applied Chemistry–LIPI, Bandung; 2-4. Dep. of Community Nutrition and Family Resources, Bogor Agricultural Univ. All: Indonesia.

2872. Hymowitz, Ted. 1997. Update on recent writings related to wild perennial *Glycine* and cultivated soybeans. The differing approaches of DuPont and Monsanto. Personal use of tofu. Proceedings of the last World Soybean Research Conference V are now available (Interview). *SoyaScan Notes.* Dec. 31. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Ted Hymowitz's soybean genetics lab. now has a home page on the World Wide Web. The address is www.cropsci.uiuc.edu/~hymowitz/. It contains a complete bibliography (about 400 references worldwide) of the wild perennial *Glycine.* You will also see soybean dancing, lab research staff, research projects, references to published papers from the lab (about 240), former graduate students, post docs, visiting scholars, academic professionals, wild perennial references, links to cytogenetics, etc. There are no full-text papers (or photos of Ted) on the site.

DuPont and Monsanto are taking completely different approaches to soybean biotechnology. Monsanto is interested in selling Roundup herbicides. DuPont is interested in the value of the crop, and in adding new value. So DuPont (like other companies) is very interested in Ted's research on the wild perennial *Glycine.*

Ted enjoys tofu as a regular part of his diet; he uses it only in hearty soups–Eastern European-type soups (such as lentil soup, black bean soup, cream of potato soup) that he makes himself and that are a whole meal. He dices the tofu and adds it to the pot; it picks up the flavor of the soup and adds protein. He has always followed the kosher laws so he buys only kosher tofu. Muslims also buy kosher, because kosher products must not contain pork. Muslims and Jews have the same religious basis as far as foods are concerned. All Arabs claim descent from Esau and Jacob, and they say Ibraham (Abraham) is the father of their culture. Jews and Muslims follow very similar dietary rules. Indonesia is a Muslim country, but not an Arabic country. Muslims don't drink alcohol.

Ted's book on Samuel Bowen is more than half finished. All the research is done. The entire bibliography is in a computerized database. After the dissolution of his marriage, he hopes to sit down and finish writing it.

The proceedings of the World Soybean Research Conference V (held in Feb. 1994 Thailand) are now published; Ted has seen a copy–one large volume. Address: Prof. of Plant Genetics, Univ. of Illinois, Urbana, Illinois.

2873. Dechema e.v. 1997. Kurzfassungen: 15. Dechema-Jahrestagung der Biotechnologen [Abstracts: 15th Dechema anniversary of biotechnology]. Germany. Held 4-6 March 1997 at the Westfälische Wilhelms-Universität Münster. [Ger]

• ***Summary:*** The following abstracts are related to tempeh (p. 555-67): The tempeh project in branches of the "Biotechnology Indonesia-Germany" cooperation, by Prof. Dr. H.J. Rehm (Ger). Strategic role of tempeh in Indonesia, by Suyanto Pawiroharsono (Eng). Aspects of the production of vitamins during tempeh fermentation, by B. Bisping, et al. (Ger; 6 ref). Occurrence and metabolism of soy isoflavones in tempeh fermentation, by F. Hein and W. Barz (Ger). Physiological-chemical effect of tempeh constituents and their derivatives, by H.C. Jha, et al. (Ger). Microbial ecology and process control in tempe manufacturing, by M.J.R. Nout (Eng; 6 ref). Accumulation of amino acids during the tempeh fermentation, by U. Baumann, et al. (Ger; 1 ref). Proteases, glycohydrolysates and phytases from making tempeh using various Rhizopus molds, by W. Barz, et al. (Ger). Address: Germany.

2874. Adisarwanto, T.; Santoso, B.S.; Sumarno, -. 1997. Technology and package for soybean production after wetland rice in Indonesia. In: Napompeth, Banpot, ed. 1997. World Soybean Research Conference V: Proceedings. Soybean Feeds the World. Bangkok, Thailand: Kasetsart University Press. xxiv + 581 p. See p. 498-99. Held at Chiang Mai, Thailand, 21-27 Feb. 1994. [3 ref]

• ***Summary:*** In Indonesia, of the 1.2 million hectares of soybeans harvested, 60% is harvested from wetland areas after rice. Soybean cultivation on wetland rice areas faces problems of excess water, weed infestation, and poor crop stand establishment. Through adoption of improved production practices, yield can be increased by 2.0 to 2.5 tonnes per ha, compared with 1.0 tonnes per ha at farmer

levels. The improved practices consist of timely planting, use of the improved soybean variety Wilis, proper soil drainage, use of rice straw as mulch, plant spacing of 40 cm x 10 cm, weeding twice, and proper pest control through 3 insecticide applications. Address: Malang Research Inst. for Food Crops, P.O. Box 66, Malang 65101, Indonesia.

2875. Benjasil, V.; Pothan, N.; Kaveeta, L. 1997. Soybean research in Thailand. In: Napompeth, Banpot, ed. 1997. World Soybean Research Conference V: Proceedings. Soybean Feeds the World. Bangkok, Thailand: Kasetsart University Press. xxiv + 581 p. See p. 549-51. Held at Chiang Mai, Thailand, 21-27 Feb. 1994.
• ***Summary:*** Contents: Introduction. Area and planting season of soybean. Research organization. Production constraints. Research directions: Varietal improvement, agronomy, pest management, mechanization. Research highlights: Varietal improvement (incl. vegetable soybean). Physiological and cultural management. Crop protection. Mechanization and technology transfer. Address: Dep. of Agriculture, Bangkok 10900, Thailand.

2876. Berg, Elizabeth. 1997. Indonesia. Milwaukee, Wisconsin: Gareth Stevens. 32 p. Illust. (color). Map. 26 cm. Series: Festivals of the world. *
• ***Summary:*** One chapter is titled "Make fried tempeh." For elementary and junior high school. Elizabeth Berg was born in 1953.

2877. Boonkerd, N.; Rerkasem, B. 1997. Soybean: Environmentally friendly. In: Napompeth, Banpot, ed. 1997. World Soybean Research Conference V: Proceedings. Soybean Feeds the World. Bangkok, Thailand: Kasetsart University Press. xxiv + 581 p. See p. 513-16. Held at Chiang Mai, Thailand, 21-27 Feb. 1994. [18 ref]
• ***Summary:*** Contents: Abstract. Introduction. Effect of mineral nitrogen. Strains of *Bradyrhizobium japonicum* (some strains are much better than others for certain environments). Factors affection nitrogen fixation. Nitrogen fixation by soybean in cropping systems: Seasons and genotypes, soybean after rice, saturated soil culture (saturated with the right bacteria). Contribution of fixed nitrogen to the following crops.

The soybean is environmentally friendly in part because it is a legume that can obtain much of its own nitrogen requirements, and in part because it can share some of the nitrogen it bas fixed in the soil with subsequent crops of other species. Address: 1. School of Biotechnology, Inst. of Agricultural Technology, Suranaree Univ. of Technology, Nakhon Ratchasima; 2. Agronomy Dep., Faculty of Agriculture, Chiang Mai Univ., Chiang Mai. All: Thailand.

2878. Chainuvati, C.; Kasivivat, A.; Uthayopas, A.; Sewatasai, R.; Chanaseni, C. 1997. Soybean production technology in Thailand. In: Napompeth, Banpot, ed. 1997. World Soybean Research Conference V: Proceedings. Soybean Feeds the World. Bangkok, Thailand: Kasetsart University Press. xxiv + 581 p. See p. 503-06. Held at Chiang Mai, Thailand, 21-27 Feb. 1994. [14 ref]
• ***Summary:*** Thailand has recommended a package of soybean practices which include high-yielding varieties, use of rhizobium inoculant, good quality seeds, plant spacing of 50 x 20 cm, 2-3 plants per mound, and 200,000 to 300,000 plants per hectare. Application of NPK chemical fertilizer with the following in kg/ha: N = 18.75, $P_2$OÃ5Ò = 56.25. And $K_2$0 = 37.5. The land should be weeded once or twice at 15 and 30 days after planting. Chemical pest and insect control should be done 1-2 times before flowering and podding. The seeds should be harvested at maturity after 90-110 days. During the rainy season of the crop year 1990-1991 these recommended practices were communicated / transferred to Thai farmers; 90-98% accepted the high-yielding seeds, 45% of them inoculated the seeds by mixing them with rhizobium bacteria before planting, 50% applied fertilizers as recommended, 80-90% applied pesticides, and 92% used threshing machines.

About 70% of Thailand's total soybean producing land is in the northern part of the country; the second largest area is in the northeast (20% of the total). In crop year 1991-92 some 348,076 ha were planted to soybeans. The cost of production was $287 per ha of $0.23 per kg while the price obtained by the farmers was about $0.31 per kg. Three crops of soybeans a year can be grown in Thailand. Address: Dep. of Agricultural Extension, Bangkok 10900, Thailand.

2879. Charoenphol, C.; Boonyasirikool, P.; Suanpan, S. 1997. Formulation and acceptability of high protein and calcium extruded snackfood from fish powder and full fat soy flour. In: Napompeth, Banpot, ed. 1997. World Soybean Research Conference V: Proceedings. Soybean Feeds the World. Bangkok, Thailand: Kasetsart University Press. xxiv + 581 p. See p. 431-36. Held at Chiang Mai, Thailand, 21-27 Feb. 1994. [11 ref]
• ***Summary:*** Today many snackfoods sold in Thailand consist of "empty calories"–they supply calories but few other nutrients. A corn-based extruded snackfood was supplemented with fish powder at levels of 11.0 and 13.6% of total weight and full-fat soy flour at levels of 5.0% and 10.0% of total weight. Each of the products was seasoned with two different flavors. All were well accepted by 40 adults, and could be beneficial to better health. Address: 1. Food and Drug Administration, Ministry of Public Health; 2. Inst. of Food Research and Product Development, Kasetsart Univ.; 3. Dep. of Health, Ministry of Public Health. All: Bangkok, Thailand.

2880. Dalodom, Ananta. 1997. Extension of soybean in Thailand. In: Napompeth, Banpot, ed. 1997. World Soybean Research Conference V: Proceedings. Soybean Feeds the World. Bangkok, Thailand: Kasetsart University Press. xxiv + 581 p. See p. 507-10. Held at Chiang Mai, Thailand, 21-27 Feb. 1994.

• ***Summary:*** Contents: Abstract. Introduction. Soybean production. Soybean problems: Production, marketing. Soybean production extension. Promotion of vegetable soybean production (starting in late 1990). Soybean production extension guidelines. Conclusion.

Tables show: (1) Thailand's imports and exports of soybeans, soybean meal and oil, 1981/82 to 191/92. Imports and exports of soybeans have been small (except for imports of 33,377 tons in 1988/89). Imports of soybean meal have been large and increasing (to 428,245 tons in 1991/92). Imports of oil have been small and decreasing.

(2) Soybean production and major uses, 1981/82 to 1991/92. Thailand's total soybean production has jumped from 132,000 tons in 1981/82 to a record 672,368 tons in 1989/90. The amount of soybean used for oil extraction has increased dramatically. Total meal production has also increased dramatically, as has use for seeds.

(3) Soybean production targets, for crop years 1992/93 to 1996/97. For each year is given the target for area, production, yield, and cost. The target area increases only slightly, from 433,600 ha the first year to 444,800 ha the last year. Yet production and yields are targeted to increase somewhat more and costs are targeted to decrease.

The Thai government has a policy to accelerate domestic soybean production and to use these soybeans to replace some imported soybeans. Extension is the process of communicating new agricultural research discoveries to farmers. Thailand's Department of Agricultural Extension has promoted grain soybean production throughout the past decade. High yielding seeds have been exchanged for traditional seeds with the farmers in a 1 to 1 ratio. "A five-year soybean production and marketing project (1992-1996) has also been set up. About 10,000 tons of low-cost high-yielding seeds and rhizobium have been provided to the farmers. In recent years the department has also promoted vegetable soybean production to supplement the farmers' income." Address: Dep. of Agricultural Extension, Bangkok 10900, Thailand.

2881. Food and Agricultural Organization of the United Nations. 1997. Soybeans: Area harvested, yield, and production. *FAO Yearbook–Production (Rome, Italy)* 51:102-03.

• ***Summary:*** The 1997 Production Yearbook, under "Soybeans" (p. 102-03, in English, French, and Spanish) gives area harvested (1,000 ha), yield (kg/ha), and production (1,000 MT), each for the years 1989-91, 1995, 1996, 1997, for the following places: World. Africa: Benin, Burkina Faso, Burundi, Congo–Democratic Republic, Cote d'Ivoire, Egypt, Ethiopia PDR, Ethiopia, Gabon, Liberia, Morocco, Nigeria, Rwanda, South Africa, Tanzania, Uganda, Zambia, Zimbabwe.

North and Central America: Canada, El Salvador, Guatemala, Honduras, Nicaragua, USA.

South America: Argentina, Bolivia, Brazil, Colombia, Ecuador, Paraguay, Peru, Uruguay, Venezuela.

Asia (fmr = former). Asia: Azerbaijan, Bhutan, Cambodia, China, India, Indonesia, Iran, Iraq, Japan, Kazakhstan, Korea–Democratic People's Republic of (north), Korea–Republic of (south), Laos, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Syria, Thailand, Turkey, Viet Nam (Vietnam).

Europe (former). Europe. Albania, Austria, Bosnia Herzegovina, Bulgaria, Croatia, Czechoslovakia, Czech Republic, France, Germany, Greece, Hungary, Italy, Latvia, Moldova Republic, Romania, Russian Federation, Slovakia, Spain, Switzerland, Ukraine, Yugoslav SFR, Yugoslavia.

Oceania. Australia.

USSR.

2882. Hicks, P.A. 1997. Soybean industry applications in Asia. In: Napompeth, Banpot, ed. 1997. World Soybean Research Conference V: Proceedings. Soybean Feeds the World. Bangkok, Thailand: Kasetsart University Press. xxiv + 581 p. See p. 437-40. Held at Chiang Mai, Thailand, 21-27 Feb. 1994.

• ***Summary:*** RAPA stands for "Regional Office for Asia and the Pacific."

Table 2 (p. 438) shows the area of soybeans harvested (in 1,000 ha) in 27 developing and 3 developed Asian countries, in the following years: 1982, 1989, 1990, 1991, and 1991. The last columns shows the average annual growth rate in soybean area from 1982 to 1992. The countries, their 1992 area, and their growth rates are (NL = no values listed; F = FAO estimate):

Developing countries (Bangladesh NL. Bhutan 2.0F, -5.4%. Cambodia, 8.8, 20.1%. China 7,203.5, -0.8%. Cook Islands NL. North Korea 310.07, 0.5%. Fiji NL. India 2,500.0, 12.8%. Indonesia 1,667.0, 9.4%. Iran 60.0F, 1.5%. Laos 6.1, 1.5%. Malaysia NL. Maldives NL. Mongolia NL. Myanmar 34.8, 2.7%. Nepal 22.0F, 9.4%. Pakistan 1.4F, -11.4%. Papua New Guinea NL. Philippines 10.0F, -1.7%. Rep. of Korea 120.0, 3.9%. Samoa, Western NL. Solomon Islands NL. Sri Lanka 1.4, -20.8%. Thailand 380.0, 14.4%. Tonga NL. Vanuatu NL. Vietnam 113.0F, 1.5%. Sub-total 12,440.0, 2.2%).

Developed countries (Australia 30.0, -2.2%. Japan 141.0, 0.3%. New Zealand NL. Sub-total 171.0, -0.2%).

Asia-Pacific Total 12,611.0, 2.2%.

Rest of world 41,979.7, 0.6%.

World 54590.7, 0.9%. Address: FAO Regional Agricultural Engineering and Agro-Industries Officer, FAO,

RAPA, Bangkok, Thailand.

2883. Lançon, F. 1997. Farmers' constraints to soybean yield improvement in Indonesia. In: Napompeth, Banpot, ed. 1997. World Soybean Research Conference V: Proceedings. Soybean Feeds the World. Bangkok, Thailand: Kasetsart University Press. xxiv + 581 p. See p. 559-62. Held at Chiang Mai, Thailand, 21-27 Feb. 1994. [4 ref]
• ***Summary:*** ESCAP stands for "Economic and Social Commission for Asia and the Pacific." CGPRT stands for "Coarse Grains, Pulses, Roots and Tuber." Address: ESCAP CGPRT Center, 145 Jl Merdeka, Bogor 1611, Indonesia.

2884. McDermott, Nancie. 1997. Real vegetarian Thai. San Francisco, California: Chronicle Books. 256 p. Illust. Map. 23 cm. *

2885. Na Lampang, A. 1997. Soybean in the rice based cropping system: A case in Thailand. In: Napompeth, Banpot, ed. 1997. World Soybean Research Conference V: Proceedings. Soybean Feeds the World. Bangkok, Thailand: Kasetsart University Press. xxiv + 581 p. See p. 538-41. Held at Chiang Mai, Thailand, 21-27 Feb. 1994.
• ***Summary:*** Contents: Abstract. Introduction. Early development (from 1931). Achievements. Recent approach. Conclusion.

In ancient times, soybean was apparently introduced into Thailand from China by inland traders and nomadic tribe. "It is occasionally found that numerous hill tribes, long living in those areas, still grow soybeans for their own consumption." It is used as a protein source in the staple rice diet of the people of that region.

Soybean used in the rice-based system falls into cropping patterns. "In the first and more popular pattern soybean is planted in the dry season after the main rice harvest with supplementary irrigation." In the 2nd model, soybeans are grown in the early rainy season on the middle terrace and are followed by rainfed rice in the mid season.

"In 1931, the governor of Chiang Mai launched a campaign to grow soybean after rice in the hope to generate supplementary income for the farmers in the dry season. Soybean, at that time, was considered a marginal crop." Even with minimal land preparation and yields of less than 1 ton per hectare, farmers "appreciated growing soybean because they noticed better growth and yield of rice in the following season."

In 1932 some farmers observed early-maturing soybean varieties in their fields. Seeds from those plants were saved. At the next planting these soybeans matured before the water supply was depleted. The new trait spread throughout Thailand's northern valleys.

During World War II, early maturing soybeans were intercropped with cotton. Later, the discovery of earliness and daylength neutral ecotypes enabled the soybean to be grown all year round.

Before 1970, the main use of soybean in Thailand was for food. After that year it was increasingly crushed to make oil and meal, and the meal for livestock feeds, Address: Dep. of Agricultural Extension, Bangkok 10900, Thailand.

2886. Napompeth, Banpot. ed. 1997. World Soybean Research Conference V: Proceedings. Soybean feeds the world. Bangkok, Thailand: Kasetsart University Press. xxiv + 581 p. Held at Chiang Mai, Thailand, 21-27 Feb. 1994. Illust. Author index. 30 cm. [1159 ref]
• ***Summary:*** The book contains the following major divisions: Foreword. Preface. WSRC Continuing Committees. WSRC V National Organizing Committee. Opening addresses (4). Genetic improvement (31 papers). Crop protection (24). Crop science (35). Technology utilization (foods–13). Technology adoption (10). Plenary sessions (3). Special symposium: Soybean in tropical agriculture (10). Constitution for World Soybean Research Conference. Address: National Biological Control Research Center, Kasetsart Univ., Bangkok, Thailand.

2887. Nguyen, Vong. 1997. Development of green soybean vegetable for the domestic and Japanese markets. Gordon, NSW, Australia: Horticultural Research & Development Corporation. 122 p. 30 cm. Series: Final report / Horticultural Research & Development Corporation (HRDC), No. VG130. *
Address: New South Wales, Australia.

2888. Passmore, Jacki. 1997. The vegetarian table: Thailand. San Francisco, California: Chronicle Books. 160 p. Illust. (color photos). Index. 24 cm.
• ***Summary:*** The author dedicates this book to Isobel, her daughter, friend and critic, "who can't pass a day without tofu."

The Introduction notes that Thailand has a strong and living Buddhist tradition. Since Nature provides plenty of food, Thai cuisine has evolved with a moderate use of red meat, following "the Buddhist precepts on the slaughter of animals." But many Thais make an exception for seafood, with this charming rationale: "If a fish is stupid enough to swim into a trap and die, then we may as well eat it!"

This book relies heavily on tofu as a meat alternative. The index has 28 entries at "Tofu," so we will list only a few representative examples below. Contains a wealth of full-page color photos. In place of widely used fermented shrimp and fish pastes, this book uses various salt-fermented soy products such as yellow bean sauce, Chinese bean pastes, fermented tofu in brine, and tempeh (p. 11).

The Glossary defines the following that contain soy: Chili bean paste, fermented tofu, Hoisin sauce, kecap manis, soy sauce (3 types), tempeh, tofu (tao hoo in Thailand);

"The soybean is singularly one of the most important food plants in the world." Few other food products can match the versatility and goodness of tofu. Incl. firm tofu, soft tofu, fried tofu and "bean curd sheets" or sticks [yuba], yellow bean sauce.

Soy-related recipes include: Classic Thai rice soup (with 6 oz. firm tofu, p. 74). Sweet and sour pomelo salad (with ¼ cup {3 oz.} cubed tempeh, p. 78). Green vegetable chu chee curry (with tofu or tempeh, p. 97). Vegetarian jungle curry (with fried tofu, p. 102). Tofu and beans with red curry paste (with fried tofu, p. 105). Clay pot of fried tofu and vegetables in brown sauce (p. 107). Stir-fried tempeh with garlic and pepper (p. 108). Stir fry of wheat gluten or tofu with straw mushrooms (p. 109). Tofu & tomato stir fry (p. 131). Thai fried rice with tofu and egg (p. 135). Pineapple fried rice (with firm tofu or tempeh, p. 136). Glutinous rice with peanuts and mushrooms (with diced fried tofu or tempeh, p. 141).

2889. Rivera, Fermina Talens. 1997. Binhi ng Buhay Village soybean processing and marketing for sustainable development in the Philippines. In: Napompeth, Banpot, ed. 1997. World Soybean Research Conference V: Proceedings. Soybean Feeds the World. Bangkok, Thailand: Kasetsart University Press. xxiv + 581 p. See p. 473-77. Held at Chiang Mai, Thailand, 21-27 Feb. 1994.

• ***Summary:*** Binhi ng Buhay means "seed of life." The BnB Project "of the Philippines is a postharvest technology utilization strategy along the total food farming system, and within a social class gender perspective." Address: Prof. VI and Project Leader, BnB Village Soybean and Other Product Processing and Marketing Project Chairperson, Center for Environment Management and Sustainable Agriculture Central Luzon State Univ. (CLSU), Muñoz, Nueva Ecija, Philippines.

2890. Shanmugasundaram, S.; Tsou, S.C.S.; Hong, T.L. 1997. Vegetable soybeans production and research. In: Napompeth, Banpot, ed. 1997. World Soybean Research Conference V: Proceedings. Soybean Feeds the World. Bangkok, Thailand: Kasetsart University Press. xxiv + 581 p. See p. 529-32. Held at Chiang Mai, Thailand, 21-27 Feb. 1994. [21 ref]

• ***Summary:*** Contents: Introduction. Production. Emerging vegetable soybean producers. Vegetable soybean and sustainable agriculture. Quality of vegetable soybean. Diversified products from Vegetable soybean. Future research issues.

Vegetable soybeans are specialty soybeans harvested between the R6 and R7 growth stages (Fehr 1971) and used green. Japan has long been and still is the major producer and consumer of vegetable soybean; since 1980 the area planted has remained at about 140,000 ha. The Tohoku and Kanto districts are the major producing areas. The annual demand is about 150,000 tonnes (metric tons). Of this, about 42,000 tonnes (27%) is supplied by Taiwan. During the past 5 years, China, Thailand, the Philippines, and Indonesia have been exploring the potential of vegetable soybeans for export and for the domestic market. The crop is also grown and consumed in Nepal. Address: Asian Vegetable Research and Development Center (AVRDC), P.O. Box 42, Shanhua, Tainan 741, Taiwan, Republic of China.

2891. Shanmugasundaram, S.; Tsou, S.C.S.; Hong, T.L. 1997. Potential role of Brazilian germplasm in Southeast Asia. In: Napompeth, Banpot, ed. 1997. World Soybean Research Conference V: Proceedings. Soybean Feeds the World. Bangkok, Thailand: Kasetsart University Press. xxiv + 581 p. See p. 533-37. Held at Chiang Mai, Thailand, 21-27 Feb. 1994. [10 ref]

• ***Summary:*** CSIRO stands for "Commonwealth Scientific and Industrial Research Organization." Address: 1. CSIRO, St. Lucia, Australia; 2. Dep. of Agriculture, Bangkok, Thailand; 3. Khon Kaen Univ., Khon Kaen, Thailand; 4. Kasetsart Univ., Bangkok, Thailand; 5. CNPSo [National Center for Soybean Research, EMBRAPA], Londrina, Brazil.

2892. Sinchaisri, Prateungsri; Leelasrichai, Suwanee. 1997. Lecithin production from soybean gum. In: Napompeth, Banpot, ed. 1997. World Soybean Research Conference V: Proceedings. Soybean Feeds the World. Bangkok, Thailand: Kasetsart University Press. xxiv + 581 p. See p. 455-58. Held at Chiang Mai, Tbailand, 21-27 Feb. 1994. [11 ref]

• ***Summary:*** A novel process for the production of lecithins from soybean gum has been developed. Crude soybean oil was degummed to recover the phosphatides, then the process was continued to produce "soybean lecithins."

The world demand for lecithins is estimated at 100,000 tons per year. Of this, more than 40,000 tons are used in the USA and 30,000 tons in Western Europe. Address: Agricultural Chemistry Div., Dep. of Agriculture, Bangkok 10900, Thailand.

2893. Srisawat, Pinyo; Jonglertjesdawong, Yingsak. 1997. The vegetarian taste of Thailand: Vegetable, tofu & seafood dishes from Cha Am restaurant. Berkeley, California: SLG Books. 224 p. Illust. Index. 28 cm.

• ***Summary:*** Cha Am is a popular Thai restaurant which opened in Berkeley, California in 1985. This is a very beautiful and strange book. Beautiful because on every other page is a spectacular full-page color photo, showing the prepared recipes, ingredients, and many lovely scenes from Thailand. Strange because the word "vegetarian" is in the title, yet a large number of recipes call for fish or seafoods (which have never been eaten by vegetarians) as the main ingredient.

Soy-related recipes include: Tau hoo neng: Steamed bean curd (p. 21). Tao hoo nam daeng: Bean curd stew (p. 27). Tao hoo op moor din: Clay pot bean curd (p. 33). Hoi jor name jim boi: "Seafood" rolls with plum sauce (p. 43; the filling is rolled in "bean curd sheets" [probably pressed tofu sheets, but possibly yuba], each 8 inches square). Tom som Tauhoo: Spicy bean curd soup (p. 63). Tao jiao lon: Spicy fermented soy bean dip (p. 185). On pages 212-13 are full-page color photos of various Thai soybeans and soyfoods.

The section titled "Gluten" (p. 214-17) describes this product and shows how to make it at home. Gluten is also used in recipes throughout the book.

The interesting glossary (p. 221-24) includes descriptions of: Bean curd *(tau hoo* is soft tofu; *tao kwa* is firm tofu, used for stir-frying, deep-frying, and braising). Bean curd, fermented *(tau hoo yee;* the two most common types are red and white. The red variety is cured in a brine with fermented red rice flavored with annatto seeds and rice wine). Bean curd, spongy (deep-frying gives tofu a spongy texture, so it can absorb the flavors of any sauce in which it is cooked a second time). Bean sauce (a seasoning made from fermented soybeans, flour, and salt. There are four popular types: yellow bean sauce, brown bean sauce, black bean sauce, and hot bean sauce. The preferred sauce is made from whole soybeans. The ground varieties are often quite salty). Beans, black fermented (also known as salted black beans, these are small black soybeans fermented with salt and spices. They are delicious when combined with garlic, fresh ginger, or chilies. Note: Fermented white soybeans are called *tao jiao).* Soy sauce *(si iu;* These recipes call for the Chinese rather than the Japanese type. The three most widely used soy sauces are light soy sauce *{si iu khao},* dark soy sauce *{si iu dam},* and mushroom soy sauce).

Note: This is the earliest English-language document seen (Feb. 2004) that uses the word "tauhoo" to refer to tofu. Address: Bangkok, Thailand.

2894. Sunarlim, N.; Anwarhan, H. 1997. A synthesis of agronomic results of SYGAP II in Indonesia. In: Napompeth, Banpot, ed. 1997. World Soybean Research Conference V: Proceedings. Soybean Feeds the World. Bangkok, Thailand: Kasetsart University Press. xxiv + 581 p. See p. 500-02. Held at Chiang Mai, Thailand, 21-27 Feb. 1994. [5 ref]

• ***Summary:*** SYGAP is the soybean yield gap analysis; it was conducted in three locations in Indonesia. The objectives were to identify and alleviate yield constraints and to develop a package of improved practices–which is described.

In Indonesia, about 70% of the soybeans are used for human consumption, mainly in the forms of tempeh, tofu, soy sauce, and tauco (fermented whole soybeans). Address: Bogor Research Inst. for Food Crops, Tentara Pelajar 3A, Bogor, Indonesia.

2895. Tanphaichitr, R.; Pakpeankitvatana, R.; Leelahagul, P. 1997. Soybean oil and dyslipidemia. In: Napompeth, Banpot, ed. 1997. World Soybean Research Conference V: Proceedings. Soybean Feeds the World. Bangkok, Thailand: Kasetsart University Press. xxiv + 581 p. See p. 419-21. Held at Chiang Mai, Thailand, 21-27 Feb. 1994. [9 ref]

• ***Summary:*** Consumption of soybean oil supplying 10% or 20% of total calories can lower serum total cholesterol (TC) and low density lipoprotein-cholesterol (LDL-C) levels, but this effect depends on the amount of cholesterol intake. Address: Div. of Nutrition and Biochemical Medicine, Dep. of Medicine and Research Center, Faculty of Medicine, Ramathibodi Hospital, Mahidol Univ., Rama VI Road, Bangkok 10400, Thailand.

2896. Tuitemwong, P.; Erickson, L.E.; Fung, D.Y.C. 1997. Development of value-added soybean food products. In: Napompeth, Banpot, ed. 1997. World Soybean Research Conference V: Proceedings. Soybean Feeds the World. Bangkok, Thailand: Kasetsart University Press. xxiv + 581 p. See p. 415-18. Held at Chiang Mai, Thailand, 21-27 Feb. 1994. [10 ref]

• ***Summary:*** A cultured soy yogurt and a flavored frozen soy yogurt, made using a rapid hydration hydrothermal cooking (RHHTC) process have been developed in the laboratory. The frozen soy yogurt received higher taste panel scores than the soy yogurt from both Asian and American consumers. Address: 1. King Mongkut's Inst. of Technology–Thonburi, Bangkok, Thailand; 2. Dep. of Chemical Engineering; 3. Dep. of Animal Science & Industry. Last two: Kansas State Univ., Manhattan, KS 66506.

2897. Vavilov, Nicolay Ivanovich. 1997. Five continents. Translated from the Russian by Doris Löve. Rome, Italy: International Plant Genetic Resources Inst. xliii + 198 p. Illust. No index. 24 cm. [10 ref. Eng]

• ***Summary:*** This book, about the life and work of N.I. Vavilov (1887-1943), was published long after his death as a political prisoner. Unfortunately, the book has no index. The excellent introductory chapter titled "The Russian scientist Nicolay Vavilov," by Seymon Reznik and Yuri Vavilov (p. xvii-xxix) is a frank biography, including details of his conflict with arch-enemy Trofim Lysenko, his fall into disgrace by 1935, his arrest by the KGB on 7 Aug. 1940, and his death in prison in 1943.

In "The basic principle behind the expeditions" (p. 1-4) Vavilov notes that the seven basic geographical centers of origin, which cover only about 7% of the world's land area, are: (1) The tropical centre, in tropical India, IndoChina, and southern China. (2) The East Asiatic Centre, includes

the central and western parts of China, Korea, Japan, and the major portion of Taiwan. (3) The Southwest Asiatic Centre. (4) The Mediterranean Centre, along the coast of the Mediterranean. (5) The Abyssinian Centre. (6) The Central American Centre, and (7) The Andean Centre. Maps show Vavilov's travels in each center. These centers were first outlined in his book *Centres of Origin of Cultivated Plants* (1926, Leningrad).

In the chapter titled "Expedition to Japan" (p. 58-61) he expresses his surprise at "the endless variety of plant types" including the "various preparations of soya beans and 'adzuki' beans *(Vigna angularis* [Willd. Ohwi & H. Obashi])." "There is perhaps no other country where the love of trees and flowers is so strongly expressed as in Japan. The care of flowers and plants has become a national characteristic of this country." "There is not a single weed in the fields or in vegetable gardens." In Japan he found "a multitude of dishes made of soyabeans (substituting for fat and including a cheese called 'tofu,' a soya product)..." He was impressed by the work of Ekiken Kaihara [Kaibara; 1630-1714]. A philosopher, man of letters, physician, geographer, historian, agronomist and naturalist, he wrote 270 volumes on 60 different themes, including a 5-volume work on garden plants and a 3-volume work on vegetable plants. In 1638 two gardens of pharmaceutical plants were established in Edo (Tokyo) and in 1720 another one in Komada.

In the chapter titled "Expedition in Korea" (p. 69-71) he again mentioned soyabeans and 'adzuki beans,' and noted: "Dozens of different foods are made from soyabeans, including the special cheese, tofu. Sprouts of soyabeans are rich in vitamins and are available in large amounts in all markets in Japan. Soya is used for seasoning meat and rice and of course, it produces an excellent oil, used for making margarine and for technical purposes. Although it is a crop exceptionally well suited to a monsoon climate, the soyabean has become the most important technical crop worldwide during the last couple of decades. Owing to the effect of European and American demands an enormous area has become planted to soyabeans. During the past two decades the plantations of soya in Manchuria have reached 7 millions hectares and the world-wide area has exceeded 15 million hectares. It is difficult to imagine a more flexible plant in respect of the variation of both biological and other characteristics. The varieties of soyabeans can be counted by the thousands. The present American industry has introduced even more variety."

In Seoul, Vavilov unexpectedly met two colleagues, P.H. Dorsett and William Morse, known to him from Washington, DC. "Dr. Morse is the co-author of a well-known monograph on soyabeans, written by him and Dr. Charles Piper, another plant introducer from Vancouver, Canada. Morse was fanatically devoted to soyabeans throughout his life. In the course of some years, Piper studied in China, Korea, Manchuria and Japan on behalf of the U.S. Department of Agriculture, investigating crops of soyabeans, collecting seed material and forwarding it to the USA." Also discusses the agricultural explorations of Frank Meyer and Mark Carleton. Swingle "organized an extensive utilization of Chinese research, including the building up of a valuable library of Chinese literature and a whole staff of translators, who revealed the treasures of ancient Chinese agronomical science. The results of this endeavour have become obvious during the past couple of years. The similarity between the conditions of extensive parts of the territories of the USA and China make possible a wide utilization of soyabean crops, which during the last couple of years have amounted to as much as 1.5 million hectares."

"Quietly and modestly, Morse, who traveled with his family, wife and daughter, went from one city to another while staying in the best hotels."

Note: Soyfoods Center has a copy of the "Translator's Foreword" (p. xxx-xxxvi) which was typeset but later deleted from the book. Only the last two paragraphs were used. It tells the real story of Vavilov's work, his downfall at the hands of Trofim Denisovich Lysenko, several moving petitions by Vavilov asking that he be able to finish writing unfinished books, and details of his case history and death. Address: Head, All-Union Inst. of Plant Industry (VIR), Russian SSR.

2898. Ota, Eileen. 1998. Update on Ota Family Tofu in Portland, Oregon. (Interview). *SoyaScan Notes.* Jan. 28. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Ota Family Tofu has tofu making equipment that Eileen would like to sell; it has hardly been used. In about 1981 the company moved to a new location, 812 S.E. Stark St.; it had more than twice as many square feet as their previous location. When they moved Ko went to a soy conference and met Eddie Okita, who was selling tofu manufacturing equipment. Ko decided to buy new equipment. Eileen objected at the time, suggesting that he try it before he buys it–to be sure you get the product that you want. Ko said "No." He just wanted to buy it. Coincidentally, at the same time, a competitor (Dae Han Tofu) began making tofu in Portland. Before that, there was a small tofu makers in Salem that didn't last very long. Dae Han was planning to deliver their tofu, which Ota had never had to do before. So Ota lost a large portion of the Portland tofu market to Dae Han.

Ko used the new equipment for a while, but then it became apparent that the tofu and the agé were not coming out the same. He had less control over the more automated equipment. Their customers noticed the difference and did not like the change. Moreover, Ota no longer had the volume to support the new equipment. So they went back to their old machines.

One of the early tofu-makers was Saizo Ohta (not Seizo), but he was not one of the founders. Two brothers apparently started the company. At the time of the "Spanish flu" epidemic in 1918-19, one or both of them became ill and the business went to Saizo Ota, Matsuno Ota's father. Matsuno was an only child, and in those days there was the tradition of sending Japanese children in America back to Japan for education. So when she was 4-5 years old she went to Japan. She did not return to America until after World War II. During the war her father, Saizo, had died. Matsuno returned to the USA in the early 1950s. The Grandmother, Shina, had a stroke after they arrived in Portland. At that point, in about 1956-57, Ko's father (Matsuno's husband) took over the tofu business. Ko's father was trained as a medical technician in Japan, but he couldn't get a job in the USA because his certification didn't transfer. So he worked for a while as a janitor and then spent a lot of time helping the grandmother, Shina.

After Ota Tofu moved to its present location, there was a huge influx of Vietnamese people who wanted soymilk, so the company started making it.

Shurtleff tells Eileen of an early listing for Ota Tofu in Portland in a 1922 Japanese-language directory of Japanese in the United States.

2899. Jones, Jacob. 1998. Three archival collections of David Fairchild's papers (Interview). *SoyaScan Notes.* Feb. 4. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** David Fairchild was a remarkable and very influential man. In 1898 he founded the Section of Foreign Seed and Plant Introduction within the U.S. Department of Agriculture in order to centralize introduction activities. A visionary and a leader, he conducted many plant exploration trips and wrote extensively and lucidly, with an excellent historical sense. The biggest repository of his papers is in the Fairchild Tropical Garden in Coral Gables (southwest of southern Miami, just a few miles inland from Biscayne Bay), Florida, where there is a good archivist. Contact: Fairchild Tropical Garden, Research Center, Attn: Bertram Zuckerman (part-time volunteer historian), 11935 Old Cutler Road, Miami, Florida 33156. Phone: (305) 665-2844. Fairchild's papers are stored in five file cabinets, each 4-5 drawers. They have no inventory. About 4 miles away is Fairchild's former home, named The Kampong, in Coconut Grove. It is now a private residence but fully preserved, with a regular staff and a horticulturist. The original plant collections are still growing there. It is part of the National Tropical Botanical Garden Society headquartered in Kauai, Hawaii, and can be visited by special appointment. Talk with Bertram Zuckerman. 1998. Feb. 24. In one thin file is a short letter to Fairchild from Dr. A.A. Horvath, dated 1939. Horvath was a chemist at the Delaware Agricultural Experiment Station in Newark. He wrote that he was sending Fairchild a copy of his book, he had read Fairchild's book, and he was a friend of P.H. Dorsett.

The second biggest Fairchild collection is in Nova Scotia at Alexander Graham Bell's summer home. Fairchild married Bell's daughter. Contact: Aynsley McFarlane, Site Manager, Alexander Graham Bell National Historic Site, P.O. Box 159, Baddeck, Nova Scotia, Canada B0E 1B0. Phone: (902) 295-2069.

The third major repository is in the records of the Bureau of Plant Industry, recently relocated to the National Agricultural Library in Beltsville, Maryland.

Jacob adds: Fairchild started as a plant pathologist, which meant that he also had to study plant physiology. He studied in Europe, then later went to Java. In the late 1800s, the Americans were the leaders in plant pathology, while the Germans were the leaders in plant physiology. Address: Graduate student, Purdue Univ., P.O. Box 132, Lafayette, Indiana. Phone: 765-742-8530.

2900. Franke, Adrian A.; Custer, L.J.; Wang, W.; Shi, C.Y. 1998. HPLC analysis of isoflavonoids and other phenolic agents from foods and from human fluids. *Proceedings of the Society for Experimental Biology and Medicine [PSEBM]* 217(3):263-73. March. [58 ref]
• ***Summary:*** Discusses: Soybeans (raw, dry, Singapore), soybeans (roasted), soybeans (toasted), green soybean pods, soy protein, soybean sprouts, tofu (raw), tofu (fermented, Singapore), curd (fermented), soy milk, soy cheese, Foo Jook (skimmed, dry supernatant, raw, Singapore), Foo Jook (cooked), Tau Kwa, raw (pressed tofu, raw, Singapore), Tau Pok, raw (fried Tau Kwa, Singapore), bean curd (fried). Daidzein, genistein, glycitein. Address: 1-2. Cancer Research Center of Hawaii, 1236 Lauhala St., Honolulu, Hawaii 96813; 3-4. Dep. of Community, Occupational, and Family Medicine, National Univ. of Singapore, Singapore 0511, Republic of Singapore.

2901. Ralston Purina Company. 1998. Agribrands International, Inc. St. Louis, Missouri. 95 p. April 1. 28 cm.
• ***Summary:*** Ralston Purina Co. has decided to create a new company, Agribrands, by spinning off its international animal feeds and agricultural products operations. The company, whose stock symbol will be AGX, will be traded on the New York Stock Exchange. Shareholders of record of Ralston stock as of 1 April 1998 will receive one share of Agribrands Stock for every ten shares of Ralston stock they own. The spinoff will occur on April 1.

The production and sale of animal feed was the primary business of Ralston when it was established in 1894. Animal feeds and agricultural products continued to be the dominant business until the 1950s. "The development at that time of a new extruded dry dog food by Ralston revolutionized the pet food industry and transformed Ralston into primarily a consumer products company. Since

then, the pet food business has continued to grow in importance to Ralston while the relative contribution of the animal feeds and agricultural products business declined. In the 1980's, Ralston's focus became increasingly directed away from the animal feeds and agricultural products business as Ralston acquired Continental Baking Company, the nation's largest wholesale baker, in 1984, and the worldwide Eveready battery business in 1986. The intention of Ralston's management to focus on consumer packaged goods and its stable of leading brands culminated in the sale of its U.S. animal feeds and agricultural products business to a subsidiary of British Petroleum in 1986. British Petroleum did not acquire Ralston's international animal feeds and agricultural products business, which became a non-core business, having limited synergies with Ralston's other international businesses."

"In 1994, Ralston spun-of Ralcorp Holdings, Inc., a subsidiary to which Ralston had contributed its breakfast cereal, baby food, cracker and cookie, coupon redemption and all-seasons resort businesses. In 1995, Ralston sold all of the capital stock of Continental Baking Company. In 1996, Ralston sold its assets associated with its cereal business in the Asia Pacific region (which it had retained in the Ralcorp spin-off), and terminated its European cereal operations. In 1977, Ralston sold its international soy protein technologies business. In line with this focus on its core businesses, Ralston attempted to sell its international animal feeds and agricultural products business to PM Holdings Corporation in 1994, but negotiations broke off as the parties were unable to agree on key terms of the transaction."

Agribrands' principal properties are its animal feed manufacturing facilities and property, which are located in the following countries: Brazil (7 plants), Canada (7), Colombia (6), France (7), Guatemala (1), Hungary (2), Italy (5), Korea (3), Mexico (8), People's Republic of China (4, incl. 3 joint ventures), Peru (3), Philippines (2), Portugal (2), Spain (7), Turkey (2), Venezuela (4, plus a hatchery) (p. 41-43; notes which are leased, joint venture, under construction, or to be divested). Address: Checkerboard Square, St. Louis, Missouri 63164.

2902. *New York Times.*1998. Queens welcomes big eaters: Good eating. May 3. p. CY32.

• ***Summary:*** Contains summaries of previous reviews of the Penang Cuisine Malaysia and the Taipei Wall Sea Street Taiwanese Restaurant, described in detail by Ruth Reichl in the 24 Feb. 1995 issue of this newspaper (p. C24). Mentions "fermented bean curd," tofu, and "fermented black beans."

2903. Kikkoman Corporation. 1998. Annual report 1997. 339 Noda, Noda-shi, Chiba 278, Japan. 26 p. 28 cm. [Eng]

• ***Summary:*** The information in this English-language annual report is current as of April 1998. Contents: Financial highlights. Profile. A message from the president (Yuzaburo Mogi): The year in review, foundation, growth, and opportunity, serving a global market, toward the new century. A strong global operating presence: The Americas, Europe, Asia and Oceania, Japan. Operational review. Financial review. Financial section: Consolidated balance sheets, etc. Corporate history (chronology from April 1925 to October 1997). Global network (directory of Kikkoman names, addresses, and phone numbers worldwide). Board of directors and officers. Corporate data.

During fiscal 1997, ended 31 December 1997, consolidated net sales worldwide rose 4.0% over the previous fiscal year to 214.3 billion yen, breaking the record of 211.7 billion yen set in 1992. Yet income decreased by 21.6% to 5.711 billion yen.

Overseas sales expanded 10.6% in 1997 to 60.1 billion yen, and accounted for 28.0% of consolidated net sales.

The Americas: "In June 1998, Kikkoman Foods, Inc., the centerpiece of Kikkoman's expansion in North America, will celebrate 25 years of operations. The number of items produced at the plant has risen to more than 100, and the plant's production has expanded more than 10-fold."

"On April 17, 1998, Kikkoman commenced operations at its second U.S. plant, in Folsom, California. Built at a cost of US $46 million, the plant covers an area of approximately 210,000 square meters and has an initial annual production capacity of 10,000 kiloliters of soy sauce. In autumn 1998, the Company will begin delivering soy sauce produced at its second U.S. plant, in Folsom, California."

"Kikkoman's English-language Internet home page, opened in April 1997, receives approximately 100,000 hits a month, mainly from people in the United States. In particular, the recipes listed on the home page have attracted a great deal of interest, with site visitors frequently requesting further recipe information."

Europe: In Oct. 1997 Kikkoman Foods Europe B.V. began operation of its plant in the Netherlands.

Letter from Keiji Yamazaki of Kikkoman, San Francisco. 1998. Aug. 7. Kikkoman's annual reports are published in mid-June each year. Address: Noda, Japan.

2904. Miles, Carol A. 1998. Re: Vegetable soybeans. Letter (e-mail) to Dana Jacobi in New York City, July 14. 1 p. [2 ref]

• ***Summary:*** Dana Jacobi sent Carol the rough draft of an article she is writing on green vegetable soybeans. Carol responded that she has been conducting vegetable soybean variety trials in southwest Washington state for the past 3 years. She has also been developing new vegetable soybean varieties which should be ready for release in several years. She has been working with Mark Musik [the farm advisor for the Pike Place Market] and Hmong farmers [rhymes with "mung." They are hill people from Laos] for the past

year, and it looks like their work together next year will be ever better.

"I think it is important to state clearly that vegetable soybeans, although the same genus and species as field soybeans *(Glycine max)*, are special varieties and they differ biochemically from field soybeans. Vegetable soybeans have different biochemical components which allow them to be eaten after boiling for only 5 minutes. If a person were to harvest field soybeans at the green stage and boil them for 5 minutes and eat them, they would get stomach cramps due to the indigestibility of the beans."

She has heard the SunRich did not pay close enough attention to this point and used field soybeans when developing their Sweet Beans. The company later got lots of complaints about the indigestibility of Sweet Beans.

Carol has a web page at http://agsyst.wsu.edu on which are several research-type papers that she has written about edamame. The information about biochemical differences between edamame and field soybeans is in these papers.

Talk with Carol Miles, PhD. 1998. Aug. 26. She got her PhD from Cornell University (Ithaca, New York) in vegetable crops, with a minor and dissertation in breeding sweet corn. Now she is working on edamame with Tom Lumpkin, who is at Washington State Univ. She has been there growing edamame for 4 years. She and her co-workers like edamame very much, as do her two young kids. Her information on biochemical differences between vegetable-type soybeans and field soybeans comes from a paper by Tom Lumpkin. They have a lower content of trypsin inhibitors and of indigestible oligosaccharides, and more vitamins. She has written some research reports on edamame, but no refereed journal articles. The Pike Place Market is the largest farmers' market in the Pacific Northwest. It is located in downtown Seattle on Pike Street. A farmer's market, by definition (largely for insurance purposes), is one in which at least 50% of the products must be produce sold by the people/farmers who grew it. The other 50% can be crafts, produce sold by people who did not grow it, etc. There is not yet a measurable acreage of green vegetable soybeans in Washington state; this is a new crop that is still in the development stage. Carol has a variety testing program in western Washington and down into Oregon where the climate is mild and the precipitation high. Most of this seed is imported from Japan and costs about $17/pound, which is prohibitive. So there is a big need for her program to have its own seed production and its own varieties. Therefore, she also has a variety development program, where she is plant breeder using conventional methods. Tom is trying to develop pod-shatter resistance. The major constraint to developing varieties is pod shatter during harvesting. Dr. Sundar Shanmugasundaram at AVRDC in Taiwan has found that pod-shattering is linked to one of the soybean's oils. He is trying to isolate these oils in vegetable-type soybeans. Carol was in Taiwan working with him in November and December of 1997. Another constraint is lack of good harvesting equipment; she has been trying for several years to get the vegetable processing industry interested in this problem since they have the equipment. She is aware that work has been done on this in Illinois and Colorado; Taiwan uses an FMC green bean harvester.

Carol believes that edamame must be adapted to American culture by serving it as a good, wholesome green vegetable, served on the table like green peas or used as an ingredient in other dishes such as a stir-fry–rather than as a snack food with beer as it is served in Japan. So she would sell edamame shelled, rather than in the pods. She heard a rumor that last year SunRich did not use vegetable-type soybeans for their Sweet Beans; they used field-type soybeans and they had some major consumer problems, as with indigestion.

The Hmong farmers comprise the largest single group of farmers selling through the Pike Place Market. Traditionally a roaming tribal, patriarchal group from Laos, they collaborated with the USA as "jungle guides" during the Vietnam war and so our country brought them here as refugees after the war about 15 years ago. A large community of Hmongs lives in the Seattle area. Few of the adults speak English, but the children are being raised in the American system. They traditionally grew green vegetable soybeans in Laos, but their seed, which was suited to a tropical climate, would not flower in the Seattle area, which has a cooler climate and a longer day-length. Carol has supplied the Hmong farmers with seed. She works mostly with seed companies from Japan, but she knows of two U.S. seed companies that sell vegetable-type soybeans: Johnny's Selected Seeds in Maine and Nichols Garden Nursery in Oregon. Nichols (located at 1190 North Pacific Highway, Albany, OR 97321-4580. Phone: 541-928-9280) started in 1997 to sell Buker's Favorite Soybean–a breeding line Carol has worked on. Dr. Robert J. Buker is a plant breeder who worked in Illinois, then overseas for 20 years. Now he works in Vancouver, Washington, which is just across the river from Portland, Oregon. He received his material from AVRDC several years before Carol got hers. Address: PhD, Washington State Univ., Extension Agricultural Systems, 360 NW North Street, Chehalis, Washington 98532. Phone: 360-740-1295.

2905. *Soya & Oilseed Bluebook.* 1998—. Serial/periodical. Bar Harbor, Maine: Soyatech, Inc. Peter Golbitz, publisher and editor. Frequency: Annual.

• ***Summary:*** Preceded by Soya Bluebook Plus. A directory and information book for the soybean processing and production industries. The first issue (shipped Sept. 1998) is subtitled "The annual directory of the world oilseed industry." On the cover, below a map of the world is printed the date "1999" in large letters, followed by "A Soyatech

Publication." Crops featured on the front cover and inside are "soya, corn, cottonseed, canola, rapeseed, sunflowerseed, palm kernel, palm, coconut, and peanut."

Contents (the four main sections are marked with a fold-out tab): Translations of oilseed terminology (English, German, French, Spanish, and Portuguese). Organizations and government agencies: Complete listings by country. Oilseeds and oilseed products: White pages (Index, individual crops), catalog pages, yellow pages (complete company listing by country). Equipment supplies and services. Oilseed statistics. Oilseed reference: Oilseed glossary, standards and specifications, oilseed technical charts and tables. Indexes: Comprehensive index, internet address index, brand name index, advertiser index.

Soy-related terms appearing in the translation section (p. 9-15) are: (1) Oilseeds and products: dairy analogs, lecithin–edible, lecithin industrial, meat analogs, miso, organic soy products, soy distillate, soy fiber, soy flakes–defatted–edible, soy flakes–full fat, soy flour–defatted, soy flour–enzyme active, soy flour–full fat, soy flour–low fat, soy flour–roasted, soy flour–textured, soy grits, soy isoflavones, soy livestock feed, soy oil margarine, soy oil shortening, soy oil–crude, soy oil–edible, soy oil–hydrogenated, soy oil–industrial, soy oil–refined, soy oil-based fuel, soy protein concentrate, soy protein isolate, soy protein–hydrolyzed, soy protein–industrial, soy sauce, soy sterols & tocopherols, soy-based foods–other, soybean fatty acids, soybean hulls, soybean meal, soybean meal–full fat, soybean seed breeder, soybean seed (for planting), soybean soapstock, soybeans–food grade, soybeans genetically modified, soybeans–green vegetable, soybeans–identity preserved, soybeans–non-gmo, soybeans–organic, soybeans, whole dry, soymilk beverages, soymilk powder, soynuts, tempeh, tempeh starter cultures, textured vegetable protein, tofu & tofu products, tofu powder. (2) Equipment & services: Coagulants for tofu, soymilk & tofu processing equipment, sprouting equipment. Address: 318 Main St., P.O. Box 84, Bar Harbor, Maine 04609. Phone: 207-288-4969.

2906. Lang, David L. 1998. Work with edamamé at the University of Nebraska (Interview). *SoyaScan Notes.* Oct. 5. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** David used to work with the University of Nebraska, Food Processing Center, HC Filley Hall, Lincoln, Nebraska 68588. He was involved with the marketing of this new product, and he saw Japan as the primary market. Before he retired from the University several years ago, he worked with organic farming and with new crops. He lived in Japan for about 4 years working in communications, and he still speaks a little Japanese. It was only after he joined the University that he got farm experience. He really got interested in edamamé. His group actually grew about 40 acres of commercial edamamé about 3 years ago. With financial help from a Japanese company, they sent one container to Japan for comparison and testing. There was very little difference between the American-grown edamamé and others consumed in Japan except the Americans did have the capability to put it in the kind of pretty package the Japanese wanted. But the flavor and appearance were excellent. David's group bought 1,000 pounds of seed one year from Daiei, who bought it from a Japanese seed company; they also used vegetable-type soybean seed that researchers at the University of Nebraska had developed. He has the varietal names in papers he wrote while at the university.

Mr. Okada had been a major marketer for Daiei corporation for 20 years or so before he came to America. He did work with edamamé in Thailand and Taiwan. A specialist in edamamé, he could look at and taste new varieties grown in new places and tell whether or not they could be sold in Japan. After he enrolled at the University of Nebraska, he was assigned to David's department to assist Nebraska companies in marketing their products in Japan. He is a very good friend of David's, and even stayed at David's house many times. David saw him in Japan last February. He's a wonderful guy.

David has written quite a bit about edamamé, and he sent much of that to Ewell Culbertson, who grows edamamé in Colorado. David wanted to visit him this year so he might work with him during the next growing season.

David believes edamamé have a very bright future in America. In part because of this, the whole experience in Nebraska was quite frustrating. His group was unable to find a processor who could handle the actual blanching and freezing process–without taking down a line of some company that was processing some other food. No company was willing to invest enough money to build even a small plant that could have made the product successful. David had no trouble selling the edamamé–"Everybody loved 'em. About three years ago we took edamamé to bars and taverns, county fairs and state fairs, everywhere. People thought they were just wonderful." He went to a small town north of Lincoln, Nebraska, and got together with several businesses that pitched in about $20,000 to David's project on about 3 farms outside their area. They wanted to do this very much, but they couldn't get together enough money to make it work.

Another group of soybean growers in southeast Iowa (not Iowa State University) has marketed 10-12 containers each season. He has names and addresses in his files. Address: 331 Hudkins, Malcolm, Nebraska 68402.

2907. Cowley, Geoffrey; Underwood, Anne; Springen, Karen; Davis, Alisha. 1998. Cancer & diet: Can you eat to beat malignancy? A controversial diet book is just one sign of the revolutionary new thinking about food and health. *Newsweek.* Nov. 30. p. 60-66. [3 ref]

• ***Summary:*** This cover story discusses the many phytochemicals in foods which may reduce risk of various cancers. On the cover is a huge fork piercing a piece of broccoli. The cover text reads: "Eating to beat the odds: What you need to know." On the top half of page 60 is a large color photo of a "low-risk dinner," ready to serve on a table. One of the three portions on the plate is a mixture of beans and tofu cubes. An arrow points to this portion; the caption reads: "The fiber in beans fights colon cancer. And the genistein in tofu appears to pack a disease-preventing wallop." On the facing page (61) is a "high-risk dinner" with advice to omit the grilled steak, french fries, cheesecake, soda, butter on white bread, and salad dressing. The article overstates the health benefits of soy and gives no scientific references for its many glowing assertions.

By 1986 laboratory researchers were already discovering many new chemicals in foods; in test tubes these obscure compounds were showing remarkable ability to disrupt the formation of tumors. Some expert oncologists believe that the future of cancer prevention is food. Yet the cancer death rate in America is roughly the same today as it was in 1970. Americans die of breast, colon, and prostate cancer at five to 30 times the rate of people in many parts of the world. Take breast cancer: The death rate in Thailand and Sri Lanka is 2-5 per 100,000 women; in the USA it is 30-40 per 100,000.

A comprehensive analysis published last year by leading cancer researchers concluded that "poor eating habits account for a third of all cancer–roughly the same proportion attributed to smoking." A spate of brash new books, some by physicians, argue that anyone can eat to reduce cancer risk. They offer specific advice, "from eating the right fats to upping your intake of soy." The best selling of these how-to books is *The Breast Cancer Prevention Diet*, by Dr. Bob Arnot, a nonpracticing physician who covers health and medicine for NBC. It now tops the *New York Times* best-seller list. But Fran Visco of the National Breast Cancer Coalition calls it "incredibly irresponsible." All these new books offer medical advice that is not backed by solid scientific evidence.–And so does this Newsweek article! But interesting questions arise: "Should we live on cheeseburgers until the case for soy burgers is seamless?" Most experts answer "no." If people who eat in accordance with what we know today, cancer rates would definitely drop.

A sidebar titled "Eating to beat the Big Four" gives three statistics on each of America's four leading malignancies: Estimated number of U.S. cases this year, percentage of Americans diagnosed during their lifetime, and potential reduction through diet and lifestyle. Prostate cancer: 184,500 / 17% / 10-20%. Breast cancer: 180,300 / 14% / 33-50%. Lung cancer: 171,500 / 7% / 90-95%. Colon/rectal cancer: 95,600 / 6% / 66-75%. "Breast cancer risk may be lowered by eating soy foods." "Weapons against colon cancer include calcium and fiber."

Tumors arise through a three-step process: initiation, promotion, and progression. Preliminary evidence suggests that compounds found in particular foods can interfere with each of these steps. A two-page sidebar shows each step graphically. (1) Initiation occurs when something alters a cell's genetic makeup, causing it to divide more than it should. The most common cause of such DNA damage is oxygen, from highly reactive oxygen molecules called free radicals. They steal electrons from other molecules, setting off a chain reaction that can damage DNA. Food tips: Antioxidants help neutralize free radicals. Garlic contains allyl sulfides which help limit the production of cancer-causing phase I enzymes, which are produced in the liver and break down procarcinogens. Cruciferous vegetables (such as broccoli) boost production of protective phase II enzymes that cart away chemical debris. (2) Promotion occurs when the damaged cell (a precancerous lesion) multiplies out of control to create a tumor. It soon sends out a network of blood vessels to deliver nutrients and oxygen necessary for further growth. Food tips: Tumor cells seem to grow less aggressively on low-fat diets than on high-fat. But Many experts now agree that, for cancer, the type of fat is as important as the amount. Some types of polyunsaturated fats are protective, others probably harmful. Omega-3 (alpha-linolenic) fatty acids may thwart tumor growth, whereas omega-6 (linoleic) fatty acids may promote it. "Trans fats: Artificially processed polyunsaturates, they are the worst for heart disease, and one study linked them to increased breast-cancer risk. Found in packaged snacks" [and many margarines]. "Soy products contain... isoflavones, which act as weak estrogens, and leave less room for strong ones. One color photo shows cubes of tofu, with the caption "Soy may protect reproductive tissues." Another shows estrogen receptors on the surface of a cell. (3) Progression occurs when the tumor (a mass of rapidly dividing cells) builds itself a blood supply and starts to invade surrounding tissues. The body's own estrogen promotes fast growth of breast cells in women. "Tumor cells release growth factors that promote the development of new blood vessels a process known as angiogenesis."

A sidebar shows four cancer survivors and their diets: Any Grove of Intel, a prostate cancer survivor, has a daily glass of orange juice with green-tea extract and soy protein. Mike Milken is also a prostate cancer survivor. "A soy fanatic, he eats tofu dogs, 'not-meat' loaf, and soy cheese," plus smoothies spiked with vitamins. Christine Pirello, hostess of PBS's 'Christina Cooks,' was diagnosed with leukemia in 1983. She went macrobiotic, loading up on brown rice, cabbage, tofu, and beans, with no dairy or animal products, except for fish.

On page 66 is a long section of text on soy: "Soy foods are another good bet, especially if you're worried about

breast or prostate cancer. One of the strongest promoters of reproductive tumors is estrogen. Women exposed to high levels of the hormone–through early menstruation, late childbearing, late menopause, or obesity–suffer far more than their share of breast cancer. Soy contains weak estrogens, or isoflavones, which compete with the full-strength hormone for access to cells. Isoflavones bind with cell receptors that would normally attract the body's own estrogen, but the growth signal they deliver is only one thousandth as strong. That means less cell division and, presumably, less risk that a small lesion will become cancerous. No one has tested that assumption in a controlled clinical trial, but population studies suggest that tofu, tempeh, and soy milk could have some of the same benefits as the prescription drug tamoxifen, without the side effects. Chinese women on high-soy diets had only half the breast cancer incidence of women on low-soy diets." Soy also contains "compounds known as Cox-2 inhibitors, which can impede the growth of new blood vessels." At least in a test tube, tumor cells doused with Cox-2 inhibitors stop producing growth factors that trigger growth of blood vessels.

This is another article about "magic bullets." But the big, new message from Newsweek seems to be their realization that low-fat plant-based diets can reduce one's risk of cancer–as well as heart disease, stroke, and obesity. The article ends: "The real gamble is to stick with fast food [or a standard American diet] and assume you'll be all right."

Note: This is the earliest (and only) English-language document seen (April 2003) that uses the term "soy fanatic."

2908. Astuti, Mary. 1998. Soy and heart disease–Effects independent of cholesterol reduction: The role of tempe on liquid profile and lipid peroxidation (Abstract). *American J. of Clinical Nutrition* 68(6S):1522S-23S. Dec. Supplement.
• ***Summary:*** As well as being a good source of protein and vitamin B-12, tempe is also a source of iron, antioxidant isoflavonoids, and the enzyme superoxide dismutase (SOD). In vitro studies show that tempe is able to inhibit lipid peroxidation.

The effect of tempe on lipid profile and peroxide of 21 male anemic rats was also studied in vivo, by feeding 1/3 of them with tempe, unfermented soybeans, or casein diets for 11 days. Then the lipid profile, SOD enzyme, and malondialdehyde (MDA) were analyzed. In the blood serum rats fed with tempe and unfermented soybeans, the total cholesterol and triglyceride concentrations were lower than in the rats fed a casein diet. Thus tempe and unfermented soybeans both had a hypolipidemic effect. The lowest concentration of MDA was found in the rats fed tempe, and low concentration of MDA was correlated with greater activity of SOD enzyme.

The relation of tempe diets and iron to lipid profile and peroxidation was investigated using 36 rats of the Wistar strain. Diets were formulated to have high, normal, and low levels of iron. In these diets, the protein sources were tempe, casein, and a mixture of tempe and casein. After 1 month, lipid profile, iron, and MDA levels in the rats were analyzed. "The results showed that total cholesterol, triglyceride, and MDA levels decreased with the increasing amount of tempe in the diets. These studies indicate that tempe may contain substances that inhibit lipid peroxidation." Address: Faculty of Agricultural Technology, Gadjah Mada Univ., Bulaksumur, Yogyakarta, Indonesia.

2909. *Palawija News (Bogor, Indonesia).* 1998. The Third International Soybean Processing and Utilization Conference (ISPUC-III): Tsukuba, Ibaraki, Japan. October 15-20, 2000. 15(4):17. Dec.
• ***Summary:*** The first such conference was held in the People's Republic of China in 1990, and the second in Thailand in 1996. For further information, contact: Secretariat for ISPUC-III. c/o Congress Corporation. 7th Akiyama Bldg., 5-3 Kojimachi, Chiyoda-ku. Tokyo 102-0083, Japan. Telephone: 03-3263-5896. Fax: 03-3263-4032. E-mail: ispuc3@congre.co.jp. URL: http://www.nfri.affrc.go.jp/gyoji/soybean.html.

2910. Quak, Seng Hock; Tan, Siew Pin. 1998. Use of soy-protein formulas and soyfood for feeding infants and children in Asia. *American J. of Clinical Nutrition* 68(6S):1444S-46S. Dec. Supplement. [16 ref]
• ***Summary:*** Table 1 shows the "Percentage of mothers breast-feeding infants at various ages in Singapore." The percentage has decreased, from 85% at birth in 1951, to 73% at birth in 1960, down to only 28% at birth in 1971 and only 4% at 3 months in 1971.

Whether breast- or bottle fed, infants in Singapore are weaned to solid foods from about 4 months of age onward. Soft rice cereal is the first solid food most Asian infants are fed. Tofu is commonly introduced at about the same time. "Many Asian mothers choose tofu for weaning because it is freely available at low cost. The soft consistency is also an important factor. Tofu can easily be mashed into a paste or gruel and mixed with rice cereal for feeding to babies. Asian infants accept tofu readily because it is highly palatable." The nutritional value of tofu is well established and it is highly recommended by dietitians for weaning as a good source of protein and calcium.

There are two main types of lactose intolerance: primary, late-onset intolerance and secondary lactose intolerance. "Lactose intolerance is a clinical syndrome characterized by abdominal distention, pain, flatulence, and explosive watery diarrhea after ingestion of lactose-containing products. It is due to a deficiency of the digestive enzyme lactase..."

Soy formulas (or soy protein) are better than cow's-milk formulas for infants and children with lactose intolerance (as shown by a bout of infantile gastroenteritis) and are recommended by family physicians and pediatricians. Asian children generally develop lactose intolerance after 2-5 years of age, and incidence generally increases with age. By age 10 about 80% of Asian children are lactose intolerant.

Figure 1 (a bar chart) shows "Percentage of healthy Asian children in Singapore who consume soymilk as their primary beverage." The percentage is about 5% from 1-5 years, then increases to 17% at 6 years, 42% at 7 years, and a peak of 56% at 8 years, falling slightly to 53% at 10 years. Thus (remarkably) about half of all children in Singapore consume soymilk as their primary beverage from age 8 to age 10.

"The incidence of intolerance to cow-milk protein has decreased over the years and intolerance is no longer a common cause of prolonged diarrhea." Address: 1. National University Hospital, Dep. of Pediatrics, Lower Kent Ridge Road, Singapore.

2911. Sulistiyani, -; Tumbelaka, L.; Sutanto, J.; Sajuthi, D. 1998. Soy and heart disease–Hypocholesterolemic effects of soy–Potential mechanisms: The lack of effect of isoflavone on plasma lipid concentrations in ovariectomized cynomolgus monkeys and LDL susceptibility to oxidation (Abstract). *American J. of Clinical Nutrition* 68(6S):1521S-22S. Dec. Supplement.
Address: Primate Research Center, Bogor Agricultural Univ., Bogor, Indonesia.

2912. Ungerer, T.; Lelana, R.P.A.; Sajuthi, D.; Soeparto, I.; Lelana, I.D. 1998. Soy and heart disease: Hypocholesterolemic effects of soy–Treatment of hypercholesterolemia in children by diet by using soy protein (Abstract). *American J. of Clinical Nutrition* 68(6S):1520S. Dec. Supplement.
Address: Primate Research Center, Inst. Pertanian Bogor, Bogor, Indonesia.

2913. Wu, Anna H.; Ziegler, R.G.; Nomura, A.M.; West, D.W.; Kolonel, L.N.; Horn-Ross, P.L.; Hoover, R.N.; Pike, M.C. 1998. Soy intake and risk of breast cancer in Asians and Asian Americans. *American J. of Clinical Nutrition* 68(6S):1437S-43S. Supplement. Dec. [46 ref]
• ***Summary:*** The risk of breast cancer varies significantly throughout the world. Rates are highest among whites in the USA and Europe, and lowest among native Japanese and Chinese and other Asians in their homelands. The risk among the first group (whites) has historically been about 6 times as high as that of the risk among Asians. Migration studies have proved that this large difference in risk is not caused by genetic differences. Evidence from case-control studies suggests, but not entirely consistently, that soy intake may protect against breast cancer.

Two of three epidemiologic studies published before the 1990s suggested that intake of soy may protect against breast cancer (See: Nomura et al. 1978; Hirayama 1986). Since 1990, four case-control studies have evaluated the association between self-reported soy intake and breast cancer: See Lee et al. 1991, and 1992 (Conducted among Chinese in Singapore); Yuan et al. 1995 (Chinese in Shanghai and Tianjin, China); Hirose et al. 1995 (Japanese in Nagoya, Japan); Wu et al. 1996 (Asian-Americans {Chinese-, Japanese-, and Filipino Americans} residing in the San Francisco-Oakland metropolitan statistical area, Los Angeles County, and Oahu, Hawaii). This article compares those studies very carefully.

In groups consuming similar amounts of tofu, the tofu was more protective in Asians who migrated to the USA, than to Asians born in the USA. Address: Dep. of Preventive Medicine, Univ. of Southern California, Los Angeles; Environmental Epidemiology Branch, Div. of Cancer Etiology, National Cancer Inst., Bethesda, Maryland; Epidemiology Program, Cancer Research Center of Hawaii, Univ. of Hawaii, Honolulu; Northern California Cancer Center, Union City.

2914. Astuti, Mary. 1998. Wanita dalam mata rantai perdagangan dan industri tempe: Laporan penelitian [Women in tempeh's commercial and industrial link (in Indonesia): Research report]. Yogyakarta, Indonesia: Lembaga Penelitian, Universitas Gadjah Mada, Departemen Pendidikan dan Kebudayaan. vii + 41 leaves. Illust. 29 cm. [Ind; eng]*
• ***Summary:*** Mary Astuti was born in 1948. Includes bibliographic references (leaf 41).

2915. Balinska, Marta Aleksandra. 1998. For the good of humanity: Ludwik Rajchman, medical statesman. Translated by Rebecca Howell and revised by the author. Budapest, Hungary: Central European University Press. xvii + 293 p. Illust. Index. 24 cm. [990 endnotes]
• ***Summary:*** Li Yu-ying is mentioned in two places. Pages 127-28 (with endnote): "Shortly after Oct. 1937, Rajchman was officially delegated by the Chinese to speak with the French about renewed collaboration. Rajchman went to Paris in May 1938; there he met with General Georges. "Before returning to Geneva, Rajchman suggested that the question could be usefully pursued with Li Yu-ying, with whom both he and Soong worked closely.

"Li, whom Rajchman described to Georges as an 'important person,' was president of the *Union franco-chinoise* in Peking and Shanghai, and has gone down in history as one of the four most senior members of the Kuomintang who surrounded Sun Yat-sen after 1905. As a student, he had spent several years in France, following,

like Rajchman, the *Cours supérieur de microbiologie* at the Pasteur Institute. His research on soya had led him to set up, in 1909, a factory to produce products derived from the plant. Known as the 'Casei Sojaine' it was located in Colombes, a suburb of Paris and employed only students who financed their education by working there. He was already known at the Quai d'Orsay [French Ministry of Foreign Affairs] as a staunch defender of France, invariably backing French interests in China, and, thus, cold be 'very useful' in the future.'

"Rajchman's conversation with General Georges was rapidly followed by a visit from Li, who was passing through Paris. He explained to the General that the aid proposed by Rajchman could take the more specific form of assembling French airplanes in Indochina for delivery to China, developing air routes between the French colony and China, producing munitions in Indochina for both countries and dispatching a French military mission to Nanking... He confirmed that he was authorizing Rajchman to continue the negotiations in his absence, specifying that he himself had been empowered by Chiang Kai-shek and H.H. Kung 'to initiate discussions [with the French government] regarding... a series of agreements to which T.V. Soong was to put the finishing touches and his signature."

Pages 131-31 [Concerning World War II]: Georges Bonnet rejected the plan proposed by Rajchman and Li. Mandel "promised to send a French military division to Chunking to 'infiltrate' and 'train' Chinese troops in case of war [against Japan]. This agreement, according to the Asia-Oceania Department, was the fruit of Li Yu-ying's conversations with General Georges a year earlier. The Department was not mistaken. It was definitely at the insistent request of Li (whom Buhrer described as a 'very cultivated Asian..., Admirably informed about world politics')..."

About this book: "Born in Poland in 1881, Ludwik Rajchman was an exponent of humanitarian intervention and a defender of colonized people, as adept in secret diplomacy as in organizing vast antiepidemic campaigns. A true hero of our times, he inspired the creation of WHO and UNICEF, of which he was the first chairman. As the story of this remarkable life unfolds, the author–who is the great-granddaughter of Rajchman–provides behind-the-scenes glimpses of the major events that shaped the twentieth century. Using family archives and documentary sources, she brilliantly recreates the career of a man who was not only the first medecin sans frontieres, but also an intellectual with an exceptional sense of the universal." Address: Great-granddaughter of Ludwik Rajchman.

2916. Ruiz, Hipólito. 1998. The journals of Hipólito Ruiz: Spanish botanist in Peru and Chile 1777–1788. Translated by Richard Evans Schultes and María José Nemry von Thenen de Jaramillo-Arango. Transcribed from the original manuscripts by Jaime Jaramillo-Arango. Portland, Oregon: Timber Press. 357 p. See p. 192. Illust. Index. 27 cm. [Eng]

• ***Summary:*** In Chapter 31, titled "Description of the village of Sayán," states that the valley of Huara stretches from Huara to Sayán. (Note: A modern map of Peru shows that Huara is a town on the seacoast about 80 miles northeast of Lima (the capital) and Callao, and just north of the seaport city of Huacho; Huara is about 30 miles inland, directly east.) In about Sept. 1781, the Spanish botanists and artists traveled a little southward along the coast to the province of Chancay. Note: Today the town of Chancay is on the coast about midway between Huara and Callao/Lima. In this province they collected and dried many plant specimens. For each, the author gives the scientific name (genus and species), local Spanish name; the translator adds the English name (if known). One of the plants collected (p. 192) is "*Dolichos soja?*, frijolillos (little beans); the seeds are eaten cooked and are very tasty. It is a cultivated plant. I have never seen it growing wild." Note 1. The question mark after "soja" probably means that Ruiz was unsure of the plant's identity. Note that two other plants mentioned on p. 192 also have a question mark after their scientific names. This question mark also appears after *Dolichos soja* in the index of this book (see p. 347). Why did the translator not give the English name?

Note 2. If Ruiz correctly identified *Dolichos soja*, an early scientific name for the soybean, this would be by far the earliest document seen concerning soybeans in Peru or South America or all of Latin America. And this document would contain the earliest date seen for soybeans in Peru, or South America, or South America.

Talk with Juan del Campo, historian at the Peruvian Embassy in Washington, DC. 2000. March 16. In 1777 Peru was a colony of Spain ruled by a Viceroy who represented the king of Spain–so more precisely it was the viceroyalty of Peru–which was established by Spain in 1542. But the phrase "Kingdoms of Peru and Chile" was widely used by the Spanish at the time.

During the 1600s and 1700s, Peru and Mexico were the two main Spanish dominions in the New World. Up until the 18th century, the viceroyalty of Peru included Panama and all of Spanish South America except Venezuela. The region now corresponding approximately to Bolivia was named "Upper Peru." In 1717 New Granada (now Colombia), and in 1776 Buenos Aires (La Plata; now Argentina) were made separate viceroyalties.

There was a very large seaport at Callao. Founded in 1537 and incorporated as a town in 1671, it is presently the chief port of Peru, on Callao Bay, 8 miles (13 km) west of Lima. The Spanish even built a large fort at Callao to fight against the English pirates Francis Drake (1543-1596) and John Hawkins (1532-1595). The Manila Galleons that went from the Philippines to Acapulco, Mexico, usually went next to Callao to trade. At the time, the Philippines (called

Capitania General) was ruled by Spain from Mexico. During its peak of trade with Asia, for more than a century from about 1650 to 1760, Callao was the biggest port of the Spanish dominions in the Americas–much bigger even than Acapulco in its volume of trade. So anything (such as soybeans plants or seeds) that went on a Manila Galleon to Acapulco might very well have also gone to Callao.

The first Asian immigrants to Peru came from China in the early 1850s to work in agriculture and on the railroads. They continued to arrive until the 1880s. The first wave of Japanese immigration to Peru started in the late 1890s. In the Quechua language, the language of the indigenous Peruvians, several similarities have been found between Quechua words and Japanese words–which is amazing, and of great interest to linguistic researchers. One theory says there was trade with East Asia during the Incan empire, which ruled Peru from ca. 1230-1533, when it was conquered by Spanish explorer Francisco and fellow Spanish soldier Diego de Almagro.

Talk with Prof. Ted Hymowitz, Prof. of Plant Genetics, Univ. of Illinois. 2000. March 28. Richard Schultes started the field of ethnobotany; he is now approximately in bis 80s. Ted thinks the plant that Ruiz was describing was probably the lima bean. Linnaeus first gave the name *Dolichos soja* to the soybean in 1753 (*Species plantarum.* Vol. II., p. 727). Ruiz had probably never seen a soybean but he may have had Linnaeus' manuscript or book with him.

Contains numerous interesting and early color maps, including one of Lima, Peru, and the coast, including Callao (facing p. 176) based on a survey conducted in May 1771. Address: Spain.

2917. Sinclair, Charles Gordon. comp. 1998. International dictionary of food and cooking. Chicago: Fitzroy Dearborn. 594 p. See p. 234. 24 cm. *

• ***Summary:*** Vietnamese: dau hu: Bean curd. dau hu chien: Fried bean curd. dau hu chung: Bean curd. dau hu ki: Dried [sic, pressed] bean curd.

"*gochujang* (Korean): A chilli paste similar to sambal olek" (p. 234).

2918. Solomon, Charmaine; Solomon, Nina. 1998. Charmaine Solomon's encyclopedia of Asian food. Boston, Massachusetts: Periplus Editions xiv + 480 p. Color illust. ([28] p. of plates). 29 cm. [67* ref]

• ***Summary:*** An outstanding book; the color illustrations of many ingredients are spectacular and very informative. The author has an insatiable curiosity.

Contents: List of illustrations. Introduction. How to use the *Encyclopedia of Asian Food.* Acknowledgements. A-Z of Asian Food. Bibliography. Illustrated index of selective ingredients. Index of recipes. Index of alternative words and main entries.

Soy related entries: Bean curd (p. 26-28, incl, all the different types, yuba, deep-fried tofu types, fermented tofu incl. ch'ou doufu: "Despite its overpowering aroma, slimy texture, unappetizing color and the unfortunate odor it leaves on the breath, those brave enough to partake of it consider it a delicacy").

Bean paste, sweet (p. 29. The three colors and types are red {from adzuki beans}, yellow {from mung beans, husked and split}, or black {from black soy beans}. "The pastes are usually available ready-made sweetened in cans. It is possible to make your own, starting out with dried beans." Name in Chinese: dow sa, tau sa {sweet bean paste}).

Bean paste, yellow (p. 29. Despite what the label says, this thick, salty condiment is brown, not yellow, in color).

Bean sauces (p. 29. "Made from fermented soy beans," they range in color from yellow to brown to black [sweet black bean paste]. Their consistency is more like a pastes that must be spooned from the jar than pourable tomato ketchup).

Beans, salted yellow (p. 31. Canned yellow soybeans which have been salted and fermented).

Beef (p. 31-37 incl. Teriyaki steak, Sukiyaki, Beef with black bean sauce, incl. "2 tablespoons canned salted black beans [soy nuggets]").

Black bean (p. 43-44. Black soy beans which are fermented and salted. "Some are sold in cans in a salty liquid, others in plastic bags, covered with salt crystals." Also called "preserved black beans").

Flours & starches (p. 157-61). Incl. soy flour, which is "used mostly in Japan [where it is called kinako] and China. In Korea roasted soy bean flour and fermented soy bean flour are used to make a variety of bean pastes."

Legumes & pulses (p. 206-18). A long and interesting section. All entries have a scientific name. Many have an illustration. Those found in many Asian countries (e.g., green bean, green pea) have the name in each country. Includes: Introduction, adzuki bean, asparagus bean (see winged bean), asparagus pea, black-eyed pea (a variety of cowpea), black gram, blue pea, broad bean, butter bean (see lima bean), chick pea, cowpea (see yard-long bean), fenugreek, green bean, green pea, hyacinth bean (see lablab bean), lablab bean, lentil, lima bean, long bean (see yard-long bean), moong bean (see mung bean), moth bean, mung bean, parkia, peanut, pigeon pea, red bean (see adzuki bean), red kidney bean, rice bean, sataw bean (see parkia), snow pea, soy bean (short entry), sugar snap pea, tamarind, white gram (see black gram), winged bean (China: su-ling dou; India: Goa bean; Indonesia: kecipir; Japan: shikakumame; Malaysia: kacang botor; Philippines: sigarilyas; Sri Lanka: dara-dhambala. Thailand: thua pu). Yard-long bean (this is the fresh bean known by a host of names). Recipes: Adzuki bean soup.

Master sauce (p. 232). "Also known as 'flavour pot' or 'lu,' this sauce has a base of soy sauce, water, sugar and

Chinese wine or sherry, with a few variable additions..." Cooking with it is similar to 'red-cooking.'

Miso (see soy bean products). Mushrooms & fungi (p. 237-40, incl. recipe for Braised bean curd, cloud ear and vegetables, and Braised soy mushrooms). Natto (see soy bean products).

Oils (p. 258-59, incl. coconut oil, gingelly oil, mustard oil, palm oil, palm kernel oil, peanut oil, perilla oil, sesame oil). Note: Soy oil is not mentioned here! Okara (see soy bean products). Salads, incl. recipe for Indonesian vegetable salad (gado-gado), that calls for 4 oz. fried bean curd. Shoyu (see soy sauce).

Soy bean, dried (349). China: da dau, wong dau, hak dau, tai dau. Indonesia: kacang kedelai. Japan: daizu. Korea: jaa jang. Malaysia: kedelai. Philippines: utaw. Thailand: thua lueang.

Soy bean, fresh. China: mao dau. Indonesia: kacang soja. Japan: edamame. Malaysia: kacang soja. Recipe: Fresh soy beans with bean curd.

Soy bean products (p. 350): Miso (incl. recipe for miso soup). Natto. Soy bean paste (go). Soy milk. Tahuri (Philippine fermented tofu). Tokwa (tokwan; very firm square tofu).

Soy bean sprouts, with recipe for soy bean sprout salad. China: dai dau nga choi. India: bhat. Indonesia: kacang kedele, taugeh. Japan: daizu no moyashi. Korea: Kong namul. Malaysia: kacang soja, taugeh. Philippines: utaw. Thailand: thua-lueang.

Soy sauce (p. 351-52). Chinese soy sauce: Dark soy sauce. Light soy sauce ("Usually labeled 'superior soy'"). Mushroom soy sauce (Dark soy sauce that has been flavored with straw mushrooms). Japanese soy sauces: Koikuchi (regular shoyu), tamari, usukuchi. Korean soy sauce ("About the same colour as Chinese light soy sauce, but not as fiercely salty and with a sweet malted aroma"). Thick and flavoured soy sauces: Kecap asin ("A dark, salty soy sauce, from Indonesia, a little thicker than the dark soy of China"). Kecap manis (A thick, sweet soy sauce from Java, Indonesia). Kicap cair: "The Malaysian equivalent of light soy sauce." Kicap pekat: "The Malaysian equivalent of dark soy sauce, though thicker than the Chinese version, but not as thick as kecap manis." Ponzu shoyu. Toyo mansi (p. 352): "A soy sauce used in the Philippines soured with kalamansi juice."

Tempeh (p. 386). Incl. recipes for Savoury Tempeh and Thai style tempeh. Tofu (see bean curd).

Also discusses: Adzuki bean, agar-agar (incl. almond bean curd, awayuki), almond, amaranth, cowpea, crab in black bean sauce (recipe at crab), daikon, millet, monosodium glutamate ("I would strongly recommend omitting it"), Nonya (pronounced 'Nyonya.' The unique cookery found in Malaysia and Singapore resulting from the fusion of Malay and Chinese cuisine during the last century), peanut, peanut sauce, sago (this palm flowers only once in its life, at about age 15. Just before flowering, it builds up a large reserve of starch in the pith. The tree is felled, the pith scooped out, ground and washed to make sago starch), seaweed (incl. agar-agar, hijiki, kombu / konbu, mozuku, nori / laver, wakame), sesame paste, sesame seed, vegetarian meals ("By far the most important vegetarian food in the Far East... is bean curd"). Address: Australia.

2919. Bidwell, Carol. 1999. Goodbye meat, hello tofu: Healthful soybean product deserves a closer look. *Daily News (Los Angeles, California).* Jan. Food section.
• ***Summary:*** Tina Ivie, program director of the Cardiac Fitness Center at Glendale Memorial Hospital, and a native of Vietnam, is a "lifelong tofu lover." Her first project was to convince the hospital staff. Her goal is to teach her cardiac patients to switch from meat to tofu, and to learn how to cook with tofu to make tasty recipes. Address: Daily News Staff Writer.

2920. Warmuth, Manfred. 1999. Experiments using *Neurospora intermedia* instead of *Rhizopus* mold for making tempeh (Interview). *SoyaScan Notes.* March 14. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Manfred was born and grew up on a farm in Germany. He is interested in fermented foods and has managed to get some *Neurospora* culture from a friend who uses it for genetic experiments. He found that Americans generally like the taste of tempeh made with *Neurospora* better than that made with the typical *Rhizopus*–because the tempeh has a nutty, more bland flavor. Americans like bland tastes; that is why they import mostly bland European cheeses (which Europeans call "green" cheeses) rather than the more strongly flavored, ripe European cheeses. Manfred believes that most U.S. tempeh is sold "green" to get around the stronger taste, Moreover, there is not much orange sporulation on *Neurospora* tempeh; sporulation generally occurs only under adverse conditions–when the fermentation undergoes stress. *Neurospora* also has another advantage: it prefers to grow at a lower temperature (30ºC) than *Rhizopus* (34ºC). Manfred found that tempeh made with a mixture of *Neurospora* and *Rhizopus* is also very nice; if allowed to sporulate, it becomes orange rather than black.

Why don't Indonesians make tempeh with *Neurospora?* Perhaps because they like the stronger flavor produced by *Rhizopus.*

Manfred found that it is very hard to obtain *Neurospora,* perhaps because of the belief (which Manfred thinks is an "old wives' tale") that it is potent contaminant, and that once it gets started in a laboratory or business, it is almost impossible to eradicate.

Note: *The Old Wives' Tale* is the title of a novel by Enoch Arnold Bennett, published in 1908.

Update: Talk with Manfred. 1999. April 10. He has just finished experiments growing *Rhizopus* and *Neurospora* molds on peanuts. Neither mold would grow well on whole peanuts. So he sliced the peanuts. *Rhizopus* grew well and fast on the thin peanut slices. *Neurospora* grew more slowly but Manfred found the final taste to be better. However, the big problem for someone wanting to make a commercial product is that peanuts, even when purchased in bulk, are about twice as expensive as soybeans. Address: Professor, Computer Sciences, 111 Overlook Dr., Santa Cruz, California 95060. Phone: 831-425-0461 or manfred@cs.ucsc.edu.

2921. Liu, KeShun. 1999. Oriental soyfoods. In: C.Y.W. Ang, K. Liu, and Y-W. Huang, eds. 1999. Asian Foods: Science & Technology. Lancaster, Pennsylvania: Technomic Publishing Co., Inc. 546 p. See p. 139-99. Chap. 6. March. [60 ref]

• ***Summary:*** Contents: Introduction. Soymilk. Tofu. Soymilk film (yuba). Soybean sprouts. Green vegetable soybeans. Other non-fermented soyfoods: Okara, roasted soy powder. Fermented soy paste (Jiang and miso). Soy sauce (Jiangyou or shoyu). Japanese natto. Indonesian tempeh. Soy nuggets (Douchi or Hamanatto). For a biography of Liu see p. 544. Address: PhD, Soyfoods Lab., Hartz Seed, A Unit of Monsanto, Stuttgart, Arkansas.

2922. Newman, Jacqueline M. 1999. Cultural aspects of Asian dietary habits. In: C.Y.W. Ang, K. Liu, and Y-W. Huang, eds. 1999. Asian Foods: Science & Technology. Lancaster, Pennsylvania: Technomic Publishing Co., Inc. 546 p. See p. 453-85. Chap. 15. [104 ref]

• ***Summary:*** Contents: Introduction. Foods of Bangladesh. Cambodian foods. Chinese foods: Food selection, eating behaviors, intracultural differences, feasts, holidays and special foods. Indian foods. Indonesian foods. Japanese foods. Korean foods. Laotian foods. Malaysian foods. Nepalese foods. Foods of Pakistan. Philippine foods. Thai foods. Vietnamese foods.

In each country and culture, the role and practice of vegetarianism is discussed.

Soyfoods are mentioned as follows: China (p. 458): "For breakfast, Northerners prefer warm soymilk and fried wheat-dough crullers." Vegetarians from both north and south get an important part of their protein "from a sophisticated cuisine based upon considerable use of gluten and tofu," made to look and taste like animal products.

Indonesia (p. 463): "... foods are preferred sweet; even the local soy sauce, kecap manis, is fermented sweetened."

Japan (p. 465): Mentions shoyu and tofu.

Korea (p. 468-69): Mentions tofu.

Malaysia (p. 472): Discusses Chinese who married Malay women (called Nonyas); "their families are called Peranakan or Straits Chinese and their cooking is called Nonya Cuisine. Straits Chinese live mostly in Penang, Malacca, and Singapore; practice Buddhism; and cook their Chinese food with a Malay influence. Their Nonya cuisine is eaten communally; all dishes are served at once,..."

Nepal (p. 473): "During Janai Purnima, a soup called *quantee* is essential; it is made from sprouted soy, chick pea, black beans,..."

Pakistan (p. 476): Pad Thai, a popular lunch dish, is made with tofu. Note: Pad Thai, based on rice noodles, is one of Thailand's national dishes. Address: PhD, R.D., Prof., the Dep. of Family, Nutrition and Exercise Sciences, Queens College-CUNY, Flushing, New York.

2923. Tibbott, Seth. 1999. Adventures in tempehland: American tempeh maker visits the motherland [Indonesia]. *Vegetarian Journal* 18(3):8-9. May/June.

• ***Summary:*** Seth, who has been making tempeh professionally for 18 years, was invited to present a paper on the American tempeh market at a recent International Tempe Symposium in Bali. He traveled there with his wife, Sue, and 5-year-old son, Luke. The symposium was held at the Five-star Kartika Plaza Hotel on Kuta Beach, Bali. He learned that one-sixth of the world's languages are spoken in Indonesia, the world's fifth most populous country. Two factors distinguish Bali from the rest of Indonesia: (1) It's cultural roots are Hindu, whereas the rest of Indonesia is predominantly Muslim. (2) The impact of tourism is greater.

In the conference keynote address, Mr. Joop Ave, the Indonesian Minister of Telecommunications and Tourism, tried to create a new image for tempe "He told of a recent movement to 'Indonesianize' the presidential palace and proudly serve tempe to heads of state as an example of Indonesian ethnic food. He fervently extolled the virtues of eating tempe and tahu (tofu)."

While in Indonesia, Seth visited three different sized tempe shops. The smallest, in Ubud, Bali, makes about 100 lb/day of tempe. The middle-sized shop, Tempe Murni, in Denpassar, Bali, makes 1,650 lb/week (about 275 lb/day). The largest, Pak Pedro Sudjono's factory in Yogyakarta, Java, makes 5,000 lb/day in a 1,500 square foot area. Seth gives details on each shop he visited, and on the Pasar Bedang market in central Denpassar. He found that, on a per ounce basis, relative to average per capita income, tempe in Indonesia is about four times as expensive as it is in the USA.

At the symposium, Seth learned that Yogyakarta has the highest per capita consumption of tempe of any city in Indonesia–200 gm/week compared with only 75 gm/week on Bali. He found the local market in Yogyakarta to be "totally inundated" with a large variety of tempe products, but uncooked cakes of tempe and prepared tempe in various sauces. The main supplier of these products is Pedro Sudjono, a local actor and politician, as well as the owner of the most innovative tempe factory Seth visited. A unique

barter system exists here. The main business is run by a paid staff of 24 people, but the filling of inoculated soybeans into small plastic bags is almost all done by local women who sit on the floor as they fill, then seal the bags–sometimes over an open flame. The women then load the packages onto their bicycles, pedal home, incubate them for several days, then take the finished tempe to market and sell it! Address: CEO, Turtle Island Foods [Hood River, Oregon].

2924. *SoyaScan Notes.* 1999. The rise and fall of Soyalac soy-based infant formulas (Overview). June 25. Compiled by William Shurtleff of Soyfoods Center.

• ***Summary:*** Dr. Harry W. Miller, M.D., a student of Dr. John Harvey Kellogg, went to China in 1903 (with his wife) as a Seventh-day Adventist medical missionary. In 1926 in Shanghai he began to focus his attention on developing a better soymilk. In January 1928 the Shanghai Sanitarium and Hospital opened, with Dr. Miller in charge. In 1932 he established the Vetose Nutritional Laboratory to further his research. For two years (1936-1937) he fed soymilk he had formulated to several hundred children (mostly infants) at the Shanghai Clinic, running control tests witb fresb cow's milk and various American and European prepared baby foods. The study turned out well and he and C.J. Wen wrote an article which was published in the April 1936 issue of the English-language *Chinese Medical Journal.* "Our experimental work on infant feeding has been carried on over a period of more than two years, mostly in the Shanghai Sanitarium Clinic." In 1936 in Shanghai he started one of the first commercial soy dairies in China. One of its products was Vetose Soya Milk Powder with claims of nutritive value the equivalent of other prepared powdered milk food for infants.

In 1937, when the Japanese began bombing Shanghai, Dr. Miller returned to the United States. In Mt. Vernon, Ohio, he and his sons built a soymilk factory and established a new company named International Nutrition Laboratories. In 1940 this company introduced SoyaLac, a powdered infant formula based on soymilk. Several experiments on Soyalac were conducted by leading pediatricians and child specialists on large groups of babies over a long period of time in America, Japan, the Philippines, and China. Finally, by July 1951 Soyalac was accepted as a hypoallergenic food by the American Medical Association's Council on Foods. Soyalac then began to be prescribed by physicians for allergic infants, and soon started to sell quite well.

In early 1951 (following the death of his wife), Dr. Miller sold (at book value–a very low price) his factory, land, and various soymilk products to Loma Linda Foods (owned by the Seventh-day Adventist Church) of Riverside, California. Loma Linda renamed the product Loma Linda Soyalac Infant Powder and continued to make it at Dr. Miller's plant in Mt. Vernon, Ohio.

In Jan. 1951 Loma Linda Foods added a second soy-based infant formula product to its line, Loma Linda Soyalac Infant Concentrate. In about 1960 they added Loma Linda Soyagen Infant Powder, in 1977 Granolac Infant Soya Milk (sold by Granose Foods in the UK), and in 1979 i-Soyalac, a non-dairy infant formula based on soy protein isolates. In 1979 Loma Linda was making 2.24 million gallons of ready-to-use Soyalac infant formula.

In an interview in March 1990, Eric Fehlberg, director of the Seventh-day Adventist international food operations, said that the church wanted to sell off the infant formula part of Loma Linda Foods because of the high cost of liability insurance. The FDA are really down on infant formula foods. If anything goes wrong, there is no end to the strife. LLF had one small recall due to a small shortage of vitamin A–from dissipation. It was very expensive. In 1989 Loma Linda sold the infant formula part of its business to Nutricia, a Netherlands-based manufacturer of infant formulas, and the second largest manufacturer of such formulas in Europe after Nestle. In the Netherlands, Nutricia had 90% of the dairy-based infant formula market. They had never made soy-based infant formula before they acquired Loma Linda, nor had they ever made infant formula in the United States. Nutricia began making infant formula using new equipment in Riverside, California; they also kept the plant operating in Ohio. Just as they were getting the new plant running, disaster struck, and they had to do a recall. So in late 1990 Nutricia shut down the plant in Riverside, spent more than $12 million revamping the plant in Ohio, then used it to start making various forms of i-Soyalac (from soy protein isolates) and Soyalac (from whole soybeans). The plant in Riverside went up for sale although Nutricia's sales and marketing departments remained in the office. In mid-1993 Nutricia decided to close their offices at the Riverside and move the rest of the company's operations to Mt. Vernon, Ohio. But later in 1993 Nutricia had another recall–and another disaster, which even drove down the stock price of Nutricia in the Netherlands. Nutricia's management at headquarters in the Netherlands probably said "This American company is too dangerous for us. We'd better sell it"–which they did in 1994 to Nestle/Carnation. The Soyalac brand disappeared from the market–forever. Nutricia is a good company, but they quickly learned that regulation (by the FDA) is much stricter in the USA than in Europe.

2925. *Canadian Soybean Bulletin (OSGMB, Chatham, Ontario, Canada).* 1999. Canadian soybean exports. 13(1):4. June.

• ***Summary:*** A large table shows statistics on tonnes (metric tons) of soybeans exported to various countries, and regions, each year from 1994/95 to 1997/98. The countries are: In Asia–China, Hong Kong, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, and

Thailand. In Western Europe–Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Portugal, and Spain. By continent–Africa, Central America, Eastern Europe, Middle East, Oceania, South America, and United States.

In 1997/98 the countries to which the largest amount of Canadian soybean exports went were (in tonnes): Norway 159,000, United States 134,706, Japan 62,931, Portugal 58,465, Spain 34,759, Hong Kong 23,210, Belgium 20,687, and Malaysia 20,539.

2926. Kikkoman Corporation. 1999. Annual report 1998. 339 Noda, Noda-shi, Chiba 278, Japan. 30 p. 28 cm. [Eng]
• ***Summary:*** The information in this English-language annual report is current as of April 1999. Contents: Financial highlights. A message from the president (Yuzaburo Mogi): The year in review, dining pleasure and convenience, serving a global market, a source of variety, seeking new growth opportunities, promoting food culture. Global operations: The Americas, Europe, Asia and Oceania, Japan. Review of operations: Soy sauce, soy sauce derivative products, Del Monte, sake and wine. Research & development. Financial section: Consolidated balance sheets, etc. Corporate history (chronology from April 1925 to October 1998). Global network (directory of Kikkoman names, addresses, and phone numbers worldwide). Board of directors and officers. Corporate data.

Net sales were up slightly (7.1%), but net income was down for the second year in a row. Overseas sales (excluding exports from Japan) grew 15.8%, and have grown dramatically each year since 1994 (p. 16). In 1994 overseas sales accounted for about 15% of consolidated net sales; in 1998 about 28%. And operating income generated overseas accounted for 51% of Kikkoman's consolidated operating income.

In 1998 Kikkoman released *Akadare-to-Kurodare*, a steak dipping sauce based on a blend of their popular Akadare (miso based) and Kurodare (soy sauce based) dipping sauces.

"Serving a global market: In June 1998, Kikkoman Foods, Inc., our first overseas plant, celebrated 25 years of operation, thus marking a major milestone for our international activities. Over the past quarter century, the production capacity of the Kikkoman Foods plant–located in Wisconsin–has expanded more than tenfold. To further augment capacity, in October we commenced operations at our second plant in the United States, in Folsom, California, which is conveniently located near large markets on the West Coast. Similarly, in Europe, we raised the annual production capacity of our plant in the Netherlands to 5,000 kiloliters. Following these additions, total production of soy sauce and its derivative products at our overseas plants surpassed 100,000 kiloliters in 1998. This is approximately the same as the production capacity of the second largest soy sauce manufacturer in Japan."

Kikkoman's share of the soy sauce market in Japan is almost 3 times as large as that of its nearest competitor.

The Americas: On 6 Oct. 1998 Kikkoman had the formal opening of its second U.S. soy sauce manufacturing plant in Folsom, California. The 210,000 square meter facility was built at a cost of US$46 million and has an initial soy sauce production capacity of 10,000 liters per year. The plant began operating in April 1998 and shipments of soy sauce started in October. The Kikkoman plant in Walworth, Wisconsin, is now approaching its annual soy sauce production capacity of 80,000 kiloliters.

Color photos show: Yuzaburo Mogi (president and CEO). The opening ceremony and an outside view of the plant in Folsom, California. Most of the company's products (p. 8-13). Address: Noda, Japan.

2927. Bittman, Mark. 1999. Authentic Asian fare in L.A. [Los Angeles], with or without Formica. *New York Times.* Aug. 15. p. TR6.
• ***Summary:*** At Takao, a Japanese restaurant, he was served "dreamy tofu made with sesame paste" [often called "sesame tofu," or in Japanese, *goma-dofu]*. For a higher price, the sesame tofu was served with a sauce of sea urchin roe. Also: A raw spring roll of noodles, miso, shiso, crab, and vegetables. A dark miso soup that put the standard dish to shame.

At the Thai restaurant Talésai he enjoyed a plate of eggplant with black bean sauce, and fried tofu with a peanut dipping sauce.

The Chinese Islamic Restaurant served a tofu dish.

At the Empress Pavilion, a Chinese restaurant, he enjoyed "braised bean curd."

2928. Hymowitz, Ted. 1999. Impressions of the Global Soy Forum in Chicago (Interview). *SoyaScan Notes.* Aug. 16. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Almost 2,000 people from some 70 countries attended one of the four tracks. But there were no attendees from Indonesia or North Korea. It was a "three ring circus," a "mixed bag." There were lots of farmers this year for the first time–many came to see the sights of Chicago–and quite a few traders–who came to the see the Chicago Board of Trade.

Since the WSRC VI was in the USA, much of the focus was on genetics and hi-tech subjects.

One of the subjects of greatest interest to Ted was that the Chinese and others reported screening their germplasm collections for soybean rust resistance and finding none. Some of Ted's wild perennial Glycine species are immune to soybean rust (a disease).

Dr. Gai Junyi from Nanjing Agricultural College has done research on the origin of the soybean; it seems to

indicate that the earliest wild soybean came from Laos, Cambodia, and China–in other words from the southern part of China. This reopens the question as to where the soybean was first domesticated. It was probably either in the Yellow River basin of northern China or in the Yangtze River Basin of southern China. Ted heard recently that the Shen Nung myth came from southern China–so he is trying to find out if that is true.

Dr. Gai also believes that there are no more soybean landraces (old domesticated types) in China. Part of the definition of a domesticated plant is that it cannot survive without human intervention. If you plant an acre of soybeans and leave them alone, a few plants will come up the next year, but only one or less the third year. Then they will disappear. Address: Prof. of Plant Genetics, Dep. of Crop Sciences, Univ. of Illinois, Urbana, Illinois.

2929. *NSRL Bulletin (National Soybean Research Laboratory, Urbana, Illinois).*1999. U of I program seeks to expand use of soybeans around the world. 6(3):6. Oct.
• ***Summary:*** INTSOY Director Weingartner talks about work to assist the private sector in developing countries to process and use soybeans–with financial aid from USAID. In Bulgaria an entrepreneur is processing soybeans into meal for poultry feed. A businessman from Biolink Technologies Ltd. in Bangladesh is manufacturing and selling a high-protein biscuit made from soy flour; the company currently employs 60 people and soon plans to open a second plant. INTSOY has helped a large soymilk company in Thailand to improve its product. "According to Weingartner, the most important element in the success of all these efforts has been the cooperation of American agribusiness."

2930. Astuti, Mary. 1999. History of the development of tempeh. In: Sapuan, Noer Sutrisno, and Jonathan Agranoff, compilers and translator. 1999. The Complete Handbook of Tempe: The Unique Fermented Soyfood of Indonesia. Singapore: American Soybean Association. xiv + 186 p. See p. 2-15. [17 ref. Eng]
• ***Summary:*** Contents: Introduction. The origin of soybeans in Indonesia. The origin of tempe. Origin of the tempe inoculum. Consumers and producers of tempe. The development of tempe processing technology. Development of tempe inoculum: Leaf inoculum, semi-pure powdered tempe inoculum, pure strain *Rhizopus oligosporus.* Conclusion.

The origin of soybeans in Indonesia: "The modern Indonesian name for soybean is *kedelai,* but according to Winstedt's (1960) dictionary, *kedelai* comes from the Tamil language in southern India. Similarly Wilkinson's (1955) dictionary cites *kedelai,* to mean soybean or mung bean (Tamil)."

"In Javanese literature, the word *kedelai,* (written as *kadele* in Javanese), was first recorded in the Serat Sri Tanjung manuscript, believed to have been written in the 12th or 13th centuries. The manuscript describes the story of Sri Tanjung, wife of Ki Sidapaksa. In the story, Sri Tanjung was accused of committing adultery and, to prove her innocence, she threw herself into the river, from whence rose a beautiful fragrance, proving her innocence. As a reminder, the place where Sri Tanjung lived was given the name Banyuwangi, which means 'fragrant water.' The Sri Tanjung Manuscript *(Serat Sri Tanjung)* represents a legend of the town of Banuwangi, and includes the mention of soybeans as illustrated in the excerpt below (in ancient Javanese):" A 3-line excerpt, which includes the word *"kadele,"* is given.

"A rough translation of the above is as follows: "The dwelling place of the teachers and the hermits was very beautiful, as were the gardens that were planted with peanuts, taro and sugarcane, soybeans and beans. There were tubers and ivory bananas beside them and 'cintamani' sugarcane as well as 'gunting' bananas that were also laid out in rows."

The word for "soybeans" is also found "in the Serat Centhini manuscript. This manuscript tells the story of Tambangraras, daughter of the king of Giri (a region of East Java near Surabaya), who fled with her brother from Giri when it was threatened by the armies of Mataram under Sultan Agung Anyakraksuma in the 16th century. They traveled with their servant, Centhini, throughout Java. Tambangraras told stories of their experiences and observations on the philosophy and culture of the Javanese which were recorded by Centhini. These stories, or Serat Centhini are also known as Suluk Tambangraras (after the daughter of Sunan Giri) and contain highly detailed analyses of the Javanese people, now regarded as reference works for the basis of Javanese knowledge and culture. In these accounts, they describe not only the regional cultures they came across in different parts of Java, but also the wide range of different foods that they were presented with. Although very little information was documented about how these foods were prepared, the ingredients are described in detail. As skills are largely handed down from generation to generation in Javanese society rather than being formally written down, it would not have been usual for a detailed recipe to be described. The original manuscripts were transcribed by Ronggo Sutrasno of the Palace of Surakarta by the order of Sultan Amengkunagara III. It was quite common at the time for such stories to be recorded by royal families in different areas and this one was also transcribed into verse in the Javanese calendar year 1724, (1814 AD).

"The word for soybeans appears first in section two of the Serat Centhini. This section describes the travels of Cebolang, son of Seh Akadiyat, from Purbalingga to Mataram, stopping at the home of Ki Amongtrustha. Here

he was served dinner that consisted of a selection of foods including soybean porridge. In Mataram, Cebolang also obtained information about a special offering that was prepared by parents about to marry off a child. One such ceremony, witnessed by Sriyanto was about the *kacar-kucur*. Kacar-kucur contained kawak beans and mature soybeans, yellow rice, aromatic flowers and shiny metal coins. According to this well preserved ceremony, soybeans had been used in the kacar-kucur for traditional ceremonial purposes for a long time. It also reveals that the savory rice dish *nasi udeg* cooked with coconut for serving with chicken, was also served with fried black soybeans. Black soybeans evidently have a deep significance in Javanese culture."

"Etymology may also hold a clue for us." In Chinese (Cantonese), beans are called *tau* or *tao*. Therefore, in Indonesia, many foods made from beans have names with the prefix *tau* (or *ta*) such as: (1) *tauci / taosi / tau-dji* (modern and former spellings) (salted black soybeans). (2) *tauco / taucho / tautjo* (Indonesian-style miso). (3) *taugé* (bean sprouts). (4) *taujiong / tau-jiong* (soybean jiang). (5) *tahu* (tofu, by shortening *tau-hu*). (6) *tahua* (a by-product of tofu similar to yogurt in consistency). (7) *takua* (firm spiced tofu). Another fermented Indonesian soybean product is *kecap / ketjap*, which is *ke tsiap* in its native China. Notice that tempe, whose name is not derived from Chinese, does not start with the prefix *tau / tao*.

"The origin of tempe: The earliest written record of the word *tempe* comes from the Serat Centhini manuscript, Chapter 3. The excerpt of the manuscript describes the journey of Mas Cebolang when he traveled between Prambanan temple and Pajang, via Tembayat in Klaten regency (in Central Java). Here, Cebolang was served a hefty lunch by the prince of Bayat, which is described in its entirety, to include: *jae santen tempe*, a dish of tempe in coconut cream, and *asem sambel lethokan*, the main ingredient of which is over-fermented *tempe lethokan*. *Sambel lethok*, also known as sambel *tumpang* is nowadays still frequently made by the Javanese.

"Tempe made from soybeans was again mentioned in the Serat Centhini in chapter 12, which describes the journey of Jayengresmi and his group at Bustam village. Here they were hosted by Ki Arsengbudi, who served them a banquet which included *Kadhele tempe srundengan*.

"From the descriptions of the travels through Java of the Giri children and Cebolang, plus the numerous banquets served by their hosts, it can be seen that soybeans and tempe only appeared in Central Java. This was in the region of Mataram which includes the villages of Mataram, Mbayat and Bustam. In West Java (Bogor) fish was largely served as it was also in Surabaya (East Java)."

Origin of tempe inoculum: "The method of making ragi tempe was first described by Widagdo in a local magazine called *Guru Desa* (The Village Teacher), published in 1915, from Kulon Progo. According to Widagdo, making ragi tempe was easier than making ragi tape, and that one had to use pre-existing ragi tempe to make more ragi tempe. How the first ragi tempeh came to be is still a mystery..."
Address: Gadjah Mada Univ., Faculty of Agricultural Technology, Jalan Socio Yusticia, Bulaksumur, Jogjakarta, Indonesia.

2931. Astuti, Mary. 1999. Iron availability of tempe and its uses in iron deficiency anemia. In: Sapuan, Noer Sutrisno, and Jonathan Agranoff, compilers and translator. 1999. The Complete Handbook of Tempe: The Unique Fermented Soyfood of Indonesia. Singapore: American Soybean Association. xiv + 186 p. See p. 41-45. [10 ref. Eng]
Address: Indonesia.

2932. Astuti, Mary. 1999. Antioxidant properties of tempe: Prospects for prevention of degenerative diseases. In: Sapuan, Noer Sutrisno, and Jonathan Agranoff, compilers and translator. 1999. The Complete Handbook of Tempe: The Unique Fermented Soyfood of Indonesia. Singapore: American Soybean Association. xiv + 186 p. See p. 71-78. [16 ref. Eng]
Address: Indonesia.

2933. Brata-Arbai, Arsiniati M. 1999. Cholesterol lowering effect of tempe. In: Sapuan, Noer Sutrisno, and Jonathan Agranoff, compilers and translator. 1999. The Complete Handbook of Tempe: The Unique Fermented Soyfood of Indonesia. Singapore: American Soybean Association. xiv + 186 p. See p. 51-70. [44 ref. Eng]
Address: Nutrition Lab., Universitas Airlangga, Indonesia.

2934. Davidson, Alan. 1999. The Oxford companion to food. New York, NY and Oxford, England: Oxford University Press. xviii + 892 p. Illust. by Soun Vannithone. Index. 29 cm. [1500+* ref]
• ***Summary:*** The 2,650 alphabetical entries in this excellent encyclopedia and cornucopia represent 20 years of Davidson's work. The 175 illustrations by Laotian artist Soun Vannithone are superb. There are 39 longer entries about staple foods such as rice, noodles, and apples. A comprehensive bibliography provides access to further information. The book does not contain recipes.

Soy-related entries include: Bean sprouts (p. 64). Black beans, fermented *(chi*, p. 79). Kecap (Indonesian soy sauce, made "basically from soya beans and palm sugar only." "The word 'kecap' has passed into the English language as catchup or catsup and then as Ketchup, which now means something quite different." p. 429). Ketchup ("probably via the Malay word *kechap,* now spelled *kecap,* which means soy sauce. The word was brought back to Europe by Dutch traders who also brought the oriental sauce itself. The sauce has changed far more than has the word, although the name

has appeared in a large number of variations such as catchup and catsup." Discusses tomato ketchup, mushroom ketchup, and ketchup made from oysters, mussels, walnuts, etc., p. 430-31). Koji (p. 435). Lecithin (p. 447). Miso (p. 509). Natto (p. 530). Soybean (p. 739). Soy milk (p. 739-40). Soy sauce (p. 740). Tempe (or tempeh, p. 788). Tofu (p. 798-99). Yuba (p. 860-61).

Also discusses: Alfalfa (p. 10). Almond (p. 12-13, incl. "almond milk"). Amaranth (p. 13). American cookbooks, history (p. 15-17). Azuki beans (p. 44-45). Barley, barley breads, and barley sugar (p. 58-60). Beef–BSE (mad cow disease, p. 68). Chia (p. 166). Cowpea (p. 230-31). Chufa (p. 185). English cookery books, history (p. 276-80). Five grains of China (p. 305). Gluten (p. 341). Groundnuts (or peanuts, p. 356-57). Hemp (p. 377-78). Hydrogenation (p. 391). Japanese culinary terms (p. 415-17). Kudzu (p. 437). Linseed (p. 454-55). Lupin (p. 463). Margarine (p. 478-79). Mung bean (p. 518). Nori (p. 534). Noodles of China (p. 537, incl. "Gan si {soya bean noodles}" and "Fen si {also fen-szu} {mung bean vermicelli})." Oncom (p. 553-54). Quark (p. 644). Quinoa (p. 645). Seaweeds (incl. hijiki, kombu/konbu, nori, wakame, etc., p. 712). Sesame (p. 713). Shortening (p. 721-22). Sprouts (no listing). Tahini (p. 779). Toast (p. 797, incl. Melba toast). Ume and umeboshi (p. 817). Winged bean (p. 849). A brief biography and nice portrait photo of Alan Davidson, a man of extraordinary knowledge in the world of food, appear on the rear dust jacket.

Note: The paperback edition of this book (2002) is titled *The Penguin companion to food.* Address: World's End, Chelsea, London, England.

2935. Djanuwardi, Bambang; Silitonga, Chrisman. 1999. Patterns of tempe consumption. In: Sapuan, Noer Sutrisno, and Jonathan Agranoff, compilers and translator. 1999. The Complete Handbook of Tempe: The Unique Fermented Soyfood of Indonesia. Singapore: American Soybean Association. xiv + 186 p. See p. 117-33. [6 ref. Eng]
Address: Ministry of Food Affairs, Jakarta, Indonesia.

2936. Hermana, -; Mahmud, M.; Karyadi, D. 1999. Composition and nutritional value of tempe: Its role in the improvement of the nutritional value of food. In: Sapuan, Noer Sutrisno, and Jonathan Agranoff, compilers and translator. 1999. The Complete Handbook of Tempe: The Unique Fermented Soyfood of Indonesia. Singapore: American Soybean Association. xiv + 186 p. See p. 27-32. [7 ref. Eng]
Address: Indonesia.

2937. Hermana, -; Karmini, Mien. 1999. The development of tempe technology. In: Sapuan, Noer Sutrisno, and Jonathan Agranoff, compilers and translator. 1999. The Complete Handbook of Tempe: The Unique Fermented Soyfood of Indonesia. Singapore: American Soybean Association. xiv + 186 p. See p. 80-92. [4 ref. Eng]
Address: Indonesia.

2938. Karmini, Mien. 1999. Tempe and infection. In: Sapuan, Noer Sutrisno, and Jonathan Agranoff, compilers and translator. 1999. The Complete Handbook of Tempe: The Unique Fermented Soyfood of Indonesia. Singapore: American Soybean Association. xiv + 186 p. See p. 46-50. [8 ref. Eng]
Address: Indonesia.

2939. Karyadi, Darwin. 1999. The development of tempe across five continents. In: Sapuan, Noer Sutrisno, and Jonathan Agranoff, compilers and translator. 1999. The Complete Handbook of Tempe: The Unique Fermented Soyfood of Indonesia. Singapore: American Soybean Association. xiv + 186 p. See p. 21-25. [24 ref. Eng]
• ***Summary:*** Research on and interest in tempeh in the United States and Europe has helped to improve the image of tempeh in Indonesia. Address: Indonesia.

2940. Kodiran, -. 1999. Socio-cultural aspects of tempe in Indonesia. In: Sapuan, Noer Sutrisno, and Jonathan Agranoff, compilers and translator. 1999. The Complete Handbook of Tempe: The Unique Fermented Soyfood of Indonesia. Singapore: American Soybean Association. xiv + 186 p. See p. 16-20. [8 ref. Eng]
• ***Summary:*** "Tempe is extremely popular in rural areas, were it is served as a complementary food in the daily menu, as well as throughout Java's cities, especially in Central Java. Both village and urban tempe consumers share several well known recipes. Tempe may be boiled, for *tempe bacem,* cooked with vegetables *(oseng-oseng tempe),* fried to dryness *(kering tempe)* and even left to become over-ripe before it is cooked *(tempe bosok).* In addition, it may be served as an accompaniment to the main meal *(luwah)* or served as a snack *(nyamikan).* The most popular dish in an area depends on the taste and preference of the particular social group concerned and what learned behaviour they have acquired. In rural areas, tempe has already spread into all sectors of society and is eaten by everyone, from the highest socio-economic classes to the very lowest. In towns and cities, things are a little different and here more tempe is consumed among the middle and lower classes.

"In rural society, although tempe is readily eaten as an addition to the daily menu, it is nevertheless regarded as a food of low status and may lower one's position or social standing. For example, a member of a particular community may put down the social status of a group who do not have status symbols or prestige, by calling them 'the tempe group.' Similarly, if a rich family were to serve tempe at a

family wedding for instance, it would be seen as highly inappropriate to their social and economic status.

"As in rural areas, urban societies also have their own views. Here, tempe is not consumed equally by all social groups, but is generally served as a variation to the menu of middle and lower class families. As in rural areas, it is almost unheard of to serve tempe at formal receptions and dinners among the middle and upper classes, who instead prefer to serve European or American style food, the same as Europeans or Americans might serve 'exotic' Indonesian food in the same circumstances.

"In urban areas, particularly in central Java, the word 'tempe' was used in the past to refer to things of low or trivial value, as well as being an insult to put down something as inferior. Over the years, expressions have appeared like 'tempe nation,' 'tempe mentality,' and 'tempe class' to refer to something of lower prestige or of lower quality as it implies being only as cheap as tempe.

"Among all the foods available in a society, there are some that have important significance and symbolism (Koentjaraningkrat, 1987). Tempe is one such food. A food's social value is linked to socio-economic factors, whereas the ritual, or cultural significance of a food relates to its use in religious ceremonies, festivals and life events. All of these aspects influence people's attitudes and perceptions of tempe and in some areas it is held as a food of great socio-cultural significance. In certain rural areas, especially around Cilacap and Poerwokerto in Central Java, and Bantul and Wonosari in Yogyakarta province, tempe is served at an important feast, or *selamatan* known locally as *kenduri* as well as at a ceremony where offerings are made *(punjungan)*. This is a type of Thanksgiving ceremony for the cycle of life and is represented by tempe made into sacred offerings according to local beliefs. A *selamatan* may be held for a birth or in coastal areas, as an offering to the spirits of the sea.

"In the last few years, the position of tempe in society has improved dramatically and more people, particularly in towns and cities as well as those abroad already enjoy eating tempe. This move has been brought about largely through increased knowledge and awareness about food and nutrition. Many academic institutions, universities and nutrition authorities, both governmental and independent, within Indonesia and abroad, have publicized their findings on tempeh via scientific journals, lectures, and the press." The main nutritional benefits of tempeh are listed. Address: Gajah Mada Univ., Yogyakarta, Indonesia.

2941. Mowe, Rosalind. ed. 1999. Southeast Asian specialties: A culinary journey through Singapore, Malaysia, and Indonesia. Cologne, Germany: Culinaria Koenemann. 319 p. Illust. (color photos by Günter Beer). Index. 26 x 22 cm.

• ***Summary:*** Translated from the German. Includes headings in Chinese. This books is a feast for the eyes, printed on glossy paper with informative color photos on almost ever page. The structure and content and also creative and very interesting; it has caught the heart and spirit and nuances of the culture. The name of most recipes and ingredients in their native languages. A 2-page map of Southeast Asia appears near the front. The basic structure: Singapore (p. 12-109). Malaysia (p. 110-215). Indonesia (p. 216-301). Glossary (p. 302-04). Introduction to Chinese nutritional theory, by Andrea Fülling (p. 305-06): Introduction, yin and yang, the three warmers, the warming effect of foods (the five energy states are hot, warm, neutral, refreshing, and cold), the five elements. Acknowledgements. Photo credits. Index.

The contents includes: Healing herbs (p. 26-29). Soup as medicine (p. 30-33). Soybean (in Singapore, p. 40-47): Introduction (familiar forms are sprouts, soy sauce, beancurd, tempeh; new disguises are "vegetable protein," emulsifier," "lecithin," "vegetable oil" which are found in dairy products, canned fish, candies, desserts, and much more), in the West soybeans are "often grown as monocultures, with the disadvantages that this entails, such as the use of chemical fertilizers and pesticides," and genetically engineered soybeans, great nutritional value yet rarely used as whole dry soybeans, most of the harvest in SE Asia is processed into beancurd and tempeh, importance of fermentation, soy milk resembles cow's milk and is an excellent substitute, soy sauce is used throughout this cuisine. Photo of green soybean plants with green pods.

Soybean sprouts: "Black soybeans are imported from Thailand and Myanmar (Burma)." After washing, the beans are spread out in deep baskets and kept in the dark for 6 days. "Before the baskets of sprouts can be sold, the top layer if green leaves is trimmed off. They are used as feed for chickens and ducks. One basket yields 154 lb (70 kg) and the output of a medium-sized business is 60 baskets a day." Soybean "sprouts should never be eaten raw, nor should they be cooked for too long." Mung bean sprouts are better know than soy sprouts, but both can be bought fresh.

Dou ban jiang ("Salted soya bean sauce." Photo of jar and Sinsin label). Dou chi ("Black bean sauce." Photo of jar and Sinsin label). Note: Typically Dou chi are named "Salted black beans." Photo of five glasses showing how dry soybeans are transformed into soymilk, then curds.

Tofu: Meat from the fields (p. 42-44). The best tofu is made from special types of soybeans that are different from those that are crushed to make oil and meal. Most of the tofu in Singapore is made from soybeans imported from Canada. Describes the basic process for making commercial pressed tofu or soft tofu, with 7 photos showing the steps. Implies that making yuba is part of the process for making tofu; it "is eventually sold as dried beancurd sticks *(fu chok)*.

Soy milk products: Fu pei–dried tofu skin [yuba]. Fu chok–dried tofu sticks [dried bamboo yuba]. Tim chok–sweet tofu pieces [sic, sweet yuba / ama-yuba]. Tofu fa–soft tofu as a dessert [tofu curds]; a little tapioca flour may be added. "Served warm or cold with a syrup flavored with almond extract." Color photo shows yellow yuba atop hot soymilk, and a woman removing a slab pressed tofu from its mold.

Tofu recipes for every taste (p. 44-45): "Tofu on its own is rather bland in taste, but this is precisely its strength, since when it is combined with different ingredients and condiments it tastes new and different every time. Recipes: Niang dou fu (Fried beancurd pockets). Xia ren dou fu (Stir-fried beancurd with jumbo shrimp). Hong shao dou fu (Braised beancurd). Sui rou zheng dou fu (Steamed soft beancurd with ground pork). Dou hua (Sweet beancurd dessert). Zha fu pi juan (fried beancurd skin [yuba] roll). Color photos show the 2nd and last recipes.

Soy sauce (p. 46-47): A naturally fermented product made with mold cultures of *Aspergillus oryzae*. Describes the process for both light and dark; the koji is made in shallow round trays, ready after 4 days. It is "then transferred into fiberglass tanks [or earthenware jars], covered with brine, and left to ferment for 3 months," after which the 1st extraction of crude soy sauce takes place [but not through pressure]. More brine is added and a second extraction takes place 1 month later; this process is repeated for the third extraction. "At this point, the paths of the different soy sauces diverge." The saltier, light-colored soy sauce is mixed with a preservative, pasteurized, "and stored in tanks to clarify before bottling." The dark soy sauce is mixed with both a preservative and caramel coloring, is allowed to mature for an additional 4 weeks, then is pasteurized and bottled. Note: What happens to the 2nd and third extractions? Color photos show five steps in the process, but a traditional earthenware vat is shown instead of the fiberglass tanks. Dark soy sauce is thicker than light. Recipes: Jiang you ji (Chicken in soy sauce, with marinade). Hong shao niu nan (Braised shoulder of beef).

Oyster sauce (contains no soy). Sesame oil (p. 49, with 7 photos).

Condiments (p. 50-51): Color photos show the front and label of 15 separate jars and bottles with a substantial description under each. Those containing soy are: Hoisin sauce. Dou chi (Fermented bean dried). Dou ban jiang (Tou cheong). Fu ru (Beancurd preserved). Jang qing (light soy sauce). Hei jiang you (Dark soy sauce). Tian jiang (Sweet sauce).

Peking duck (p. 62-65; soybean paste and Hoisin sauce are ingredients in the sauce). One key is the crisp skin. It is served in thin Mandarin pancakes.

Suckling pig (p. 86-87): Piglets are bred in Hunan province. Slaughtered at the age of 3-4 months. After a dead piglet has been patted dry, it is brushed with soy sauce, then coated with a marinade that includes fermented red bean curd and light soy sauce. As with Peking Duck, suckling pig is prized for its crisp, tasty skin. Six photos show the skewered baby pig.

Symbolic foods (p. 98-101): One of these is Moon Cakes from the mid-autumn festival (15th day of the 8th lunar month). "Traditional fillings include sweet black bean or lotus paste." Is the sweet black bean filling made from soy beans?

Instant cup noodles [instant ramen] (p. 48): Note: Wikipedia says at Momofuku Ando: Launched on 25 Aug. 1958. Momofuku Ando, ORS [Order of the Rising Sun], (lived March 5, 1910–Jan. 5, 2007) was the Taiwanese-Japanese businessman who founded Nissin Food Products Co., Ltd. He is famed as the inventor of instant noodles and cup noodles, which he launched on 25 Aug. 1958 (at age 48) under the name Chikin Ramen–after months of trial and error experimentation to perfect his flash-frying method. On 18 Sept. 1981 he launched his most famous product, Cup Noodle.

Beansprouts (p. 154-57): With a long introduction, a description of the process, beautiful pbotos, and recipes: Taugeh goreng kucai (Fried beansprouts with chives). Taugeh masak kerang (Fried beansprouts with baby clams). Tahu goreng (Fried tofu with beansprouts). Bihun goreng (Fried rice noodles). Urap taugeh (Fried beansprouts with grated coconut).

Nasi tumpeng (rice cone) (p. 220). Served with sambal goreng tempe (crisp-fried marinated strips of tempeh). Gudeg (rice with green jackfruit cooked in a sweet sauce, p. 221) is served with a side dish of tahu goreng bacem (tofu coked with spices, then fried).

Tempeh (p. 228-29), soybeans fermented with *Rhizopus oligosporus* mold. Indonesians consume more tempeh than tofu. The process is described, with 4 color photos: Recipe: Tempe goreng (fried tempeh).

Glossary (p. 302-04) includes: Fermentation. Soy sauce ("Probably the best-known Asian seasoning agent,..."). Sticky rice (also known as glutinous rice). Tahu (Indonesian; tofu). Tempeh. Tofu (beancurd, incl. hard, soft, and smoked).

2942. Murti, Tri Hesti; Nasution, Haris. 1999. KOPTI: The tempe and tofu co-operative. In: Sapuan, Noer Sutrisno, and Jonathan Agranoff, compilers and translator. 1999. The Complete Handbook of Tempe: The Unique Fermented Soyfood of Indonesia. Singapore: American Soybean Association. xiv + 186 p. See p. 144-55. [Eng]
Address: Director of PT Soya Briket Niagatama, Indonesia.

2943. Okura Boeki-cho (Ministry of Finance, Division of Trade). 1999. Miso yûshutsu tsûkan jisseki–Heisei 10 nen [Japan miso exports worldwide in 1998]. Tokyo, Japan. 1 p. [1 ref. Jap]

• ***Summary:*** This 1-page table, written in Japanese, gives the exports of miso to various countries, in calendar year 1998, by region. We will list them here in descending order of volume by region–in kilograms. Asia: Taiwan 349,591. Hong Kong 332,325. Korea 232,115. Singapore 120,681. Thailand 100,459. Philippines 44,605. Malaysia 40,129. Indonesia 26,585. China 23,024.

Middle East: United Arab Emirates *(Arabu)* 9,895. Israel 4,887. Kuwait 1,256.

Europe (Western and Eastern): Netherlands 115,703. Germany 102,724. England 74,231. France 45,971 Sweden 40,170. Italy 20,283. Belgium 17,932. Austria 13,370. Spain 6,118. Denmark 4,090. Canary Islands (Spain) 2,000. Russia 1,715. Finland 1,310. Switzerland 450.

North America: United States: 2,297,893. Canada 242,240.

Latin America: Argentina 12,589. Brazil 12,338. Costa Rica 400.

Africa: South Africa 2,678.

Oceania: Australia 164,601. Guam 31,553. New Zealand 27,621. Mariana Islands 6,578 (of which the largest is Guam). Palau Islands 650.

Note: This is the earliest document seen (March 2010) concerning soybean products (miso) in Palau; soybeans as such have not yet been reported.

Total exports. 4,531,300 kg. Total amount of miso made in Japan in 1998: 548,750,000 kg. Percent of miso made that is exported: 0.82%. Address: Japan.

2944. Pawiroharsono, Suyanto. 1999. Microbiological aspects of tempe. In: Sapuan, Noer Sutrisno, and Jonathan Agranoff, compilers and translator. 1999. The Complete Handbook of Tempe: The Unique Fermented Soyfood of Indonesia. Singapore: American Soybean Association. xiv + 186 p. See p. 93-115. [35 ref. Eng]
Address: Director of Industrial Process Technologies, BPPT, Jakarta,Indonesia.

2945. Sapuan, -; Sutrisno, Noer; Agranoff, Jonathan. comp. and trans. 1999. The complete handbook of tempe: The unique fermented soyfood of Indonesia. Translated and edited by Jonathan Agranoff. Singapore: American Soybean Association. xiv + 186 p. No index. 24 cm. [208 ref. Eng]
• ***Summary:*** The title page states: Compiled by Dr. Sapuan and Dr. Noer Sutrisno. In collaboration with The Indonesian Tempe Foundation *(Yayasan Tempe Indonesia,* Jakarta). The copyright page states: Copyright of English edition: 1997. Limited edition printed and distributed by American Soybean Association. Note: This is an English-language translation of an Indonesian-language book by the same authors titled *Bunga Rampai Tempe Indonesia,* published in 1996 in Jakarta, Indonesia, by Yayasan Tempe Indonesia.

Contents: Preface by the Indonesian Tempe Foundation. Preface by the American Soybean Association, Southeast Asia Regional Office. Foreword, by Dr. Jonathan Agranoff. Introduction and summary: Sapuan and Agus Saifullah.

Chapter One: Historical and cultural. 1. History of the development of tempe, by Mary Astuti. 2. Socio-cultural aspects of tempe in Indonesia, by Kodiran. 3. The development of tempe across five continents.

Chapter Two: Nutrition and health aspects. 4. Composition and nutritional value of tempe, its uses in the improvement of the nutritional value of food. 5. Tempe in the treatment of infant diarrhea in Indonesia. 6. Iron availability of tempe and its uses in anemia. 7 Tempe and infection. 8. Cholesterol lowering effect of tempe. 9. Antioxidant properties of tempe.

Chapter Three: Technology and microbiology. 10. The development of tempe technology. 11. Microbiological aspects of tempe.

Chapter Four: The tempe economy. 12. Tempe consumption patterns. 13. The scale of the Indonesian tempe business. 14. KOPTI, the tempe and tofu co-operative. 15. Making tempe in Indonesia. 16. The politics of developing a national tempe industry.

Chapter Five: Conclusions. 17. Conclusions. List of contributors. Address: Indonesia.

2946. Sapuan, -; Saifullah, Agus. 1999. Conclusions. In: Sapuan, Noer Sutrisno, and Jonathan Agranoff, compilers and translator. 1999. The Complete Handbook of Tempe: The Unique Fermented Soyfood of Indonesia. Singapore: American Soybean Association. xiv + 186 p. See p. 176-79. [Eng]
Address: Secretary to the Minister and Chairman, Indonesian Tempe Foundation.

2947. Sudigbia, I. 1999. Tempe in the management of infant diarrhea in Indonesia. In: Sapuan, Noer Sutrisno, and Jonathan Agranoff, compilers and translator. 1999. The Complete Handbook of Tempe: The Unique Fermented Soyfood of Indonesia. Singapore: American Soybean Association. xiv + 186 p. See p. 33-40. [20 ref. Eng]
Address: Indonesia.

2948. Sulaeman, Suhendar. 1999. The scale of the Indonesian tempe business. In: Sapuan, Noer Sutrisno, and Jonathan Agranoff, compilers and translator. 1999. The Complete Handbook of Tempe: The Unique Fermented Soyfood of Indonesia. Singapore: American Soybean Association. xiv + 186 p. See p. 134-43. [5 ref. Eng]
Address: Indonesia.

2949. Sutrisno, Noer; Muharto, -. 1999. Marketing tempe in Indonesia. In: Sapuan, Noer Sutrisno, and Jonathan Agranoff, compilers and translator. 1999. The Complete Handbook of Tempe: The Unique Fermented Soyfood of

Indonesia. Singapore: American Soybean Association. xiv + 186 p. See p. 156-65. [1 ref. Eng]
Address: Indonesia.

2950. Sutrisno, Noer. 1999. The politics of developing a national tempe industry. In: Sapuan, Noer Sutrisno, and Jonathan Agranoff, compilers and translator. 1999. The Complete Handbook of Tempe: The Unique Fermented Soyfood of Indonesia. Singapore: American Soybean Association. xiv + 186 p. See p. 166-75. [3 ref. Eng]
Address: Indonesia.

2951. Yasa Boga. 1999. Tempe & tahu [Tempeh & tofu]. Jakarta, Indonesia: Gramedia Pustaka Utama. 24 p. Series: Seri resep praktis. [Ind]*

2952. **Product Name:** Regular Tofu, Savory Tofu, Almond Tofu, Mushroom Onion Tofu, Lemon Grass Tofu, Sweet Ginger Tofu, Soy Noodles, Soymilk [Unsweetened, or Sweetened], and Tofu Skins.
**Manufacturer's Name:** Ahimsa Gourmet.
**Manufacturer's Address:** 1520 International Marketplace, San Pablo, California 94806. Phone: 510-235-8343.
**Date of Introduction:** 2000. February.
**New Product–Documentation:** Talk with George Weissmann, founder of Veat Gourmet. 2000. April 12. About two months ago his partner, Van Thi Dang, who is Vietnamese, started a small business named Ahimsa Gourmet in San Pablo, California, where they make tofu, soymilk, and many other soyfood products.

Talk with Van Thi Dang. 2000. April 12. She and her business partner, Tony Tieu (who is Chinese-Vietnamese), founded this business in mid-Feb. of this year. Tony makes all of the soy products. Even though she and Tony are Vietnamese, they produce their soyfoods for everyone, without targeting any particular ethnic group.

2953. Gardner, Gary; Halweil, Brian. 2000. Underfed and overfed: The global epidemic of malnutrition. *Worldwatch Paper* No. 150. 68 p. March. No index. 22 cm. [120* ref]
• ***Summary:*** Contents: Introduction. The malnourished world. The roots of hunger. The nutrition transition. Promoting overeating. How diet shapes health. Societal costs of poor diet. Nutrition first. Notes.

Table 1 shows that there are three types of malnutrition: (1) Hunger, a deficiency of calories and protein, affects at least 1.2 billion people worldwide. (2) Micronutrient deficiency, a deficiency of vitamins and minerals, affects 2.0 to 3.5 billion people. (3) Overconsumption, excess of calories often accompanied by deficiency of vitamins and minerals, at least 1.2 billion. Thus today more than half of all human beings suffer from one of these forms of malnutrition.

Using underweight among children, it is clear that hunger in the developing world has fallen over the past two decades (since 1980)–but it has increased in Africa (see p. 12). A table (p. 11) shows the six countries with the highest percentage of children who are underweight: Bangladesh (56%), India (53%), Ethiopia (48%), Vietnam (40%), Nigeria (39%), and Indonesia (34%). Address: Worldwatch Inst., 1776 Massachusetts Ave. N.W., Washington, DC 20036. Phone: 202-452-1999.

2954. Weissman, George. 2000. Founding Veat Gourmet (Interview). *SoyaScan Notes.* April 12. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** George founded this company in 1998; he was the sole founder. He came across the Taiwanese technology to make this very unique textured soy protein because his partner (Van Thi Dang) is Vietnamese, and she brought it home from a Chinese grocery store. He ran across something similar, but gluten-based in a Chinese monastery, where he was doing a Chan [Chinese Zen] Buddhist retreat. He is a practicing Buddhist. He was in academia at the time; he as a physicist having earned his PhD degree from Cal Berkeley. He worked on the foundations of quantum theory/ paradigm. He started a group at the Lawrence Berkeley Lab in 1974 to discuss physics and spirituality. Fritjof Capra (Austrian by birth) was a member of the group, as was Gary Zukoff. After that he went to the Swiss Polytechnical University where he did a post-doctorate program. George is a vegetarian and is also very interested in issues related to world water usage and water as a limiting resource in food production.

About two months ago his partner, Van, started a small business named Ahimsa Gourmet in San Pablo, California, where they make tofu, soymilk, and many other soyfood products. Address: 4690 East 2nd St. #9, Benicia, California 94510. Phone: 1-888-321-8328 (toll free).

2955. Thi Dang, Van. 2000. Green vegetable soybeans in Vietnam (Interview). *SoyaScan Notes.* June 22. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Van was born in Vietnam and lived there until she was about age 30. She is now co-owner and operator of a tofu shop in California. She says that in Vietnam soybeans are called *dao-nanh* and there is no separate term for "green vegetable soybeans." They are rarely served in Vietnam. She never saw or tasted them there. Address: Ahimsa Gourmet, 1520 International Marketplace, San Pablo, California 94806.

2956. Shimizu, Shogo. 2000. Re: Answers to questions about edamame in China. Letter to "Tak" Kimura, food broker, Concord, California, June 30. 1 p. Typed. [Jap]
• ***Summary:*** Here are the five questions asked by Tak Kimura, edamame pioneer in the USA, and the answers by

Mr. Shimizu. (Q1) Is edamame as popular in China as it is in Japan? Is it as much a part of Chinese culture as it is of Japanese? Ans: Edamame varieties cultivated in China are mainly from Japan, or sometimes via Taiwan. It did not exist in China. China did not have the custom of eating edamame as in Japan. In China it is now at a level where well-to-do people have begun to enjoy Edamame from the east coast to the Shanghai area.

(Q2) Is edamame grown entirely differently from regular soybeans? Ans: Yes, edamame is grown entirely differently from regular soybean varieties.

(Q3) Which is more popular in China, unshelled or shelled edamame? Ans: I've seen both in China. I am not certain which is more popular. It was brought to China as part of Japanese culture, let's say like enjoying edamame as a side dish for beer which we in China do not do. Shelled edamame are apparently not consumed at home but I assume it is served at upper-scale restaurants. (Q4) which requires more water during cultivation, soybeans or edamame? Ans: Edamame needs a lot more water than do soybeans.

(Q5) What is the Vietnamese name for edamame? Ans: Sorry I have no idea nor do we have access to a Vietnamese speaking person. Address: Asia Foods, China.

2957. Global Food Industries, Inc. 2000. Company profile (Portfolio). Townville, South Carolina. Ten inserts. 28 cm.
• ***Summary:*** Inserts: (1) Cover letter: The company "has been in business since 1982, as one of the leaders in manufacturing soy-based dehydrated entrees." Four sales U.S. offices: Mid-Atlantic, Southeast (Florida), West Coast (California), Armed Forces. (2) Food processing: They have U.S. manufacturing plants in Illinois (Ashcomb), Mississippi, and Iowa. Sales offices in Florida, California, Mexico City, San Salvador (El Salvador), and La Paz (Bolivia). R&D office: Champaign, Illinois. Manufacturing plants in USA and 21 countries. (3) Letter from the president, Neal Pfeiffer.

(4) International organizational chart: Ramlakhan Boodram is in charge of equipment and product development. Paulette Harary is in charge of International development. (5) Five main reasons for using our low cost, high protein entrees: Tastes great, nutrition, alternative diets (vegetarian, kosher, halal), quick, easy, consistent preparation, convenient (light weight, shelf life of 2 years, 1 cubic foot holds 500 servings). (6) Menu description: Ala King, "Chicken" style dinner in sauce, Chili, Chunky "beef" style stew, Chunky "chicken" style stew, Country breakfast, Goulash (New!), Picadillo (New Mexican meal!), Butterscotch, chocolate & vanilla puddings, Salsa verde (Mexican meal–coming soon!), Seafood chowder (Coming soon!), Sloppy joe, Spaghetti, Stroganoff, Sweet and sour, Tinga (Mexican meal–coming soon!), Vegetable "beef" style soup (Coming soon!), Other products, Beverages. (7) Countries with operations: Vegetable oil extraction facilities are in: Ibadan, Nigeria; Roseau, Dominica; St. Paul, Minnesota, USA; Mayaro, Trinidad. Essential oil distillation facility is in: St. Georges, Grenada. Soymilk production lines are in: Roseau, Dominica; Kingston, Jamaica; Mexico City, Mexico; Lagos, Nigeria; Rome, Italy. Extruded products facilities are in: Cairo, Egypt; Giza, Egypt; Ho Chi Min City, Vietnam. Health supplement packaging line is in: Port-of-Spain, Trinidad. Powdered products canning line is in: St. Louis, Missouri, USA. (8) Easy and creative recipes using Global Food as a starter (title page). (9) Potato tart. (10) Nutrition information (sample) (Title page). (11) Nutrition facts–Ala King. Address: P.O. Box 489, Townville, South Carolina 29689. Phone: 1-800-225-4152 or 864-287-1212.

2958. Botschaft der Republik Indonesien [Indonesian Embassy]. 2000. Tempeh [Tempeh]. Bonn, Germany: Botschaft der Republik Indonesien Bildungs- und Kulturabteilung [Indonesian Embassy]. 27 p. July 1. Illust. 21 cm. [10 ref. Ger]
• ***Summary:*** This booklet, which has a gray cover, was published in conjunction with Tempeh Promotion Day, held on July 1 at the Indonesian Embassy in Bonn, Germany. The rear cover shows that the booklet (and event) were sponsored by Garuda Airways of Indonesia, Viana, and Haus Java restaurant. On the cover is a color photocopy collage of two cakes of tempeh, three tempeh dishes, and a line drawing of an Indonesian woman from *The Book of Tempeh.* The cover price is 5 German marks.

Contents: Greetings from the Indonesian Ambassador. Tempeh. Tempeh–A food that helps promote good health. How to make tempeh at home. Tempeh as a raw material for making tempeh milk and tempeh sausage. Tempeh recipes. Tempeh links on the World Wide Web. Small bibliography. Directory of manufacturers and other sources of tempeh. Address: Bonn, Indonesia.

2959. International tempe symposium [International tempeh symposium]. 2000. Bonn, Germany. 27 p. Held Saturday, 1 July 2000 at the Indonesian Embassy, Bernkasteler Str. 2–Bonn, Bad Godesberg. [10 ref. Ger]
• ***Summary:*** Contents: Recipes. Greetings from the Indonesian Ambassador, by Izar Ibrahim (p. 2-6). Tempeh: A blessing for vegans and vegetarians (p. 7-10). Tempeh–food that promotes good health (summary of lectures by Dr. Hem Chandra Jha, Bonn Univ, p. 11-12). The significance of tempeh in Indonesia (summary of lectures by Dr. Suyanto Pawiroharsono, BPPT, Jakarta, p. 13-14). How to make tempeh at home, by Dr. Suyanto Pawiroharsono (p. 15). Tempeh as a raw material for the production of tempeh milk and tempeh sausage, by a research project of Brawijaya Univ. in Malang, East Java (p. 16-17). Tempeh recipes (p. 18-23). Tempeh links on the Web (p. 24). Small

bibliography (p. 25). Sources of tempeh in Europe (p. 26). Publication and edition of this booklet. Nutritional composition of tempeh and 14 related foods. Address: Bonn, Germany.

2960. Tempeh promotion day: Samstag, 01 Juli 2000 09:00–18:00 Uhr [Tempeh promotion day: Saturday, 1 July 2000, 9 a.m. 6 p.m. (Leaflet)]. 2000. Bonn, Germany. 6 panels. Held at the Indonesian Embassy, Bernkasteler Str. 2–Bonn, Bad Godesberg. [Ger]

• ***Summary:*** Contents: A vegetarian food. The program. A food with many benefits. Nutritional composition. Illustration. Contact information. Address: Bonn, Germany.

2961. Yap, Bwee Hwa Flora. 2000. Re: Tempeh Promotion Day in Germany. Good tempeh now sold in Germany at a reasonable price. Letter to William Shurtleff at Soyfoods Center, Aug. 7. 1 p. Typed, with signature.

• ***Summary:*** This year Tempeh Promotion Day was held on July 1, in Bonn, in the Indonesian Embassy, sponsored by Garuda Airways. The day was successful, with about 150 people in attendance, thanks to Miss Birgit Steffan of the cultural department of the embassy. Lectures about tempeh were given by Dr. Soyanto (Director of Bioindustrial Technology, Agency for the Assessment and Application of Technology, Jakarta) and Dr. Jha (a cancer researcher at the Univ. of Bonn). On the walls were pictures of the different stages of tempeh making. The lunch, consisting of tempeh dishes, was served outdoors in tents by the Java Restaurant (of Koeln). After lunch there were more lectures and a show of Indonesian dances.

Dr. Suyanto will come to Germany again this August or September. Flora plans to go with him to Maldegem, Belgium, where there is a very modern tempeh factory–previously owned by De Hobbit.

In Germany, very nice frozen white tempeh, made in Holland, is now sold in Asian Shops for DM2.50 for 250 grams–a very reasonable price. The tempeh sold in natural food stores retails for about DM6.00 is made by Viana (owned by Bernd Drosihn). Bernd plans to move his factory to the Eifel.

A second letter, dated Aug. 15, accompanies two new books on tempeh. Flora adds: "It is a pity that German people still have not learned to appreciate tempe. Tofu is sold in supermarkets, also soymilk and desserts." Spreads for bread made of soy, are found mostly in natural food shops (Naturkost Laden). One of the reasons that tempe is not made in households is that the starter is difficult to buy in Germany. Address: P.O. Box 4132, D-66386 St. Ingebert, Germany. Phone: 6894-53609.

2962. Holland, Norman. 2000. Update on Northern Soy, Inc. (Interview). *SoyaScan Notes.* Aug. 18. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Northern Soy, still run by Norman and Andy Schecter, has outgrown its present plant in Rochester, New York. They recently purchased 6½ acres of land, where they hope to break ground with a new tofu manufacturing facility in late-September. Eventually the new plant is scheduled to be 85,000 square feet, but phase one will be about one-third of that area. They have hired an engineer (who has designed food plant for General Foods, Cadbury-Schweppes, etc.) to work with Norman and Andy to design the plant and equipment. They plan to have a state-of-the-art facility. Up until now Norman and Andy have done all of the equipment design–and they have "rigged up" a very original and efficient system. They are considering building their own tofu equipment (with local tool-and-die makers) to get to the next level; if they buy a tofu system like Nasoya has, they believe it would sacrifice the quality of their tofu.

They have survived as tofu manufacturers while many other pioneers have gone into marketing or out of business. They now make 1,200 lb/hour or 60,000 lb/week of tofu. But their old plant is bursting at the seams. The new plant will eventually able to make 5,000 lb/hour or 250,000 lb/week of tofu.

Northern Soy has survived and prospered in three areas: (1) By making private-label tofu–marketed by other companies. They make all or most of the tofu for Whole Foods Markets (East Coast, Midwest, Colorado), UNFI (United Natural Foods–Stow Mills label), Trader Joe's (East Coast), Tree of Life, etc. They also have their own SoyBoy label. (2) By making baked and flavored tofu–in four flavors: Italian, Caribbean, Tofulin (Oriental), and Baked-Seasoned-and-Smoked. They probably outsell White Wave 4 or 5 to 1 on these products east of the Mississippi River. And (3) by making tofu-filled ravioli. They just bought a new $90,000 ravioli machine. They hired a fellow who had been for 20 years the vice president at Rosetto Foods–the largest ravioli maker in the world. They are very committed to ravioli since tofu and ricotta cheese are almost identical–but tofu has better health benefits.

Northern Soy pays and treats all of its workers very well, and has a superb benefits package. The workforce is extremely diverse–Jamaicans, Vietnamese, Hispanics, etc.–and loyal. There is almost no turnover. They have always worked toward being a company where work is respected in every sense. One recent record was when the first Jamaican person in world history curded tofu at Northern Soy.

Norman is still a vegetarian and he continues to believe that tofu has immense "planetary benefits." These benefits show up in ways that people just can't understand. It's like what the Buddha said about karma–"Don't ask me to explain it; it just works." Norman and Andy haven't been involved with the Rochester Zen Center for about 10 years.

Rich Products of Buffalo, New York, has visited Northern Soy and is interested in working together.

Address: 545 West Ave., Rochester, New York 14611. Phone: 716-235-8970.

2963. KTV Kansai Fuji Television. 2000. "Excavation"–Aru aru daijiten #174 "Edamame" [Digging into our big, big dictionary #174–"Edamame"]. (Color videotape). Tokyo, Japan: Fuji Television. 50 minutes. Aired Aug. 6. [Jap]

• ***Summary:*** This color video discusses the history of edamame in Japan, the nutritional value of edamame, and how to best prepare edamame (in the pods) at home.

The strongest "team" is beer and edamame–natural products of Japan's summer. But what is edamame? Edamame are soybeans that are harvested three months before mature, dry soybeans, while they are still young and green. Eating premature soybeans is part of Japan's original food culture, according to Nagayama Hisao, food culture historian and commentator. Countries that currently enjoy edamame are China, Taiwan, Thailand, Vietnam, and a few other Asian countries. But the habit of eating edamame originated in Japan.

Edamame became part of Japanese food culture during the Edo period (1600-1868). According to documents from that time, edamame vendors, carrying edamame in pack on their back, entered various towns during the summer season. People were attracted as they called out "Edamame," according to one written record. Since the edamame were precooked, they were a ready-to-eat food–a snack that you could eat while walking–even though was considered bad manners at the time. In short, edamame was Japan's "original fast food." And during the Edo period that began to be eaten as a snack with beer.

There are several theories as to why Japanese started, long ago, to eat premature soybeans. One theory, based on documents in the National Diet Library, says that during the Nara Period (A.D. 710-784), when there were repeated famines, Japanese began to eat edamame as an emergency famine food. Note: Unfortunately, no reference is given for these ancient documents, nor are we told what the food was called at the time. A second theory, also based on documents in the National Diet Library, says that during the Heian period (794-1185), edamame was consumed by the aristocracy as a high-valued food that was only available for a short time during the summer months.

Now is the prime season to enjoy edamame's "hidden health power" to counterattack summer fatigue, overdrinking, and overworking. Both fresh and frozen edamame are available. There are now more than 30 different brands of frozen edamame according to the Japanese Frozen Food Association.

The program closes with tips for preparing the most delicious edamame at home.

Talk with Tak Kimura of Concord, California–who gave a copy of this video to Soyfoods Center. 2001. Aug. 3. This is the best video he has seen on edamame. Address: Tokyo Japan.

2964. Erwidodo, -; Hadi, Prajogo U. 2000. Effects of trade liberalization in Indonesia. *Palawija News (Bogor, Indonesia)* 17(3):1-10. Sept.

• ***Summary:*** The section titled "Soybean" notes that the decrease in the domestic wholesale price after the tariff removal would increase the demand for soybean by 35,500 tons or 1.61% higher than the base year level. At the same time, the supply of soybean would decrease by 1.6% or 32,300 tons in response to the drop in producer prices. Imports would increase by about 67,800 tons, from 533,600 tons to 601,400 tons. "The net welfare gain resulting from tariff removal on soybean imports is estimated around Rp 32.3 billion." But net revenue to soybean farms would drop by 4.6%.

These figures assume a reduction of the soybean grain import tariff from 5% to 0% and of soybean meal for 15-10% to 0%. Address: Center for Agro Socioeconomic Research, Agency for Agricultural Research and Development, Bogor, Indonesia.

2965. Kimura, Takuji "Tak." 2000. Mechanical harvesting of edamamé (green vegetable soybeans) (Interview). *SoyaScan Notes.* Oct. 17. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** In Taiwan, Tak saw a huge machine specially designed to harvest edamamé and separate the green pods from the stems and leaves. Thus, it might be called an "edamamé combine." It is about 13 feet long, 13 feet high, and 10 feet wide, and looks like a cotton-picker, a large pea-picker. Two large and adjacent horizontal brushes sweep the pods off the plants and up into the machine, then (inside the machine) separates the pods from the leaves and any accidental stems. It puts the pods gently in a huge container in the machine, and discharges the leaves and chaff back onto the field, where it serves as organic matter. When this container is full, the edamamé are dumped into a similar container in a truck alongside the harvester; this dumping inevitably causes some bruising of the edamamé.

The Taiwan Edamamé Association, located in central Taiwan, owns about 32 of these harvesters. The harvesting of edamamé in China and elsewhere in East Asia is done by hand. Of the edamamé grown in Taiwan, about 80% are sold to Japan, 10% to the USA, and 10% to Europe. The soil in Taiwan used to be quite polluted, but they have greatly improved it as by bringing in peat moss.

The pods are rushed to the packing plant, where most are dropped into lightly salted boiling water in a continuous process. After the water returns to a boil, they are boiled for about 6 minutes before being frozen. For customers (mostly in the USA) who want shelled green beans, the tender green beans are removed from the pods by hand–using human

labor; they have a machine to do this but it doesn't work very well.

The growing of edamamé is now spreading rapidly to Vietnam and Thailand, which are located in Southeast Asia, south of the southernmost part of China; there they can get four harvests a year. In Taiwan and southern China they can get only two harvests a year.

SunRich in Minnesota has a harvesting machine and a separate machine that carefully removes the tender beans from the pods. These may be similar to the machines that harvest and shell green peas. But Tak thinks that green peas are much easier to squeeze out of their pods than green soybeans.

Photocopies of color photos show a huge edamamé harvester at work in Taiwan: (1) Distant front view of harvester at work in a field of green soybeans. (2) Close-up view harvester, showing driver in clear-walled cabin at front left. A sign shows that this machine was made by FMC corporation; it may be an FMC green-bean harvester. (3) Rear view of harvester. (4) Close-up view of a row of soybean plants that have been harvested. Many stems are still standing upright and many leaves are lying on the ground. (5-6) Dumping a container of pods from the harvester into a truck waiting beside it. (7) Close-up view of the raised harvesting mechanism at the front of the harvester; the two adjacent cylindrical brushes are each about 14 inches in diameter and as wide as the harvester (10 feet). Beneath them is a sort of comb. Address: 3616 Delancey Lane, Concord, California 94519-2357. Phone: (925) 687-2422.

2966. Adie, M. Muchlish; Widowati, S.; Soedarjo, M. 2000. The characteristics of Indonesian soybean varieties, and its importance to the soybean processing. In: Kyoko Saio, ed. 2000. Proceedings–Third International Soybean Processing and Utilization Conference. Tokyo, Japan: Korin Publishing Co., Ltd. [xxiv] + 728 + 8 p. See p. 79-80. [6 ref]
• ***Summary:*** A survey by Indrasari (1991) showed that consumption of tempeh and tofu in Indonesia were 1,065 gm per capita per month, and 866 gm per capita per month, respectively. Address: 1,3. Research Inst. for Legume and Tuber Crops, PO Box 66 Malang, Indonesia; 2. Research Inst. for Food Crops Biotechnology, Jalan Tentara Pelajar 3A Bogor, Indonesia.

2967. Inglett, G.E.; Maneepun, S.; Boonpunt, T. 2000. Novel soybean functional constituents in multi-nutraceutical contributing compositions for increasing health benefits of functional foods. In: Kyoko Saio, ed. 2000. Proceedings–Third International Soybean Processing and Utilization Conference. Tokyo, Japan: Korin Publishing Co., Ltd. [xxiv] + 728 + 8 p. See p. 179-182. [7 ref]
• ***Summary:*** Soytrim-1 is a co-processed oat bran hydrocolloid (Nutrim 10) with soy flour (1:1 ratio) that was tested as a substitute for coconut milk at various percentage substitution levels. Address: 1. Biopolymer Research Unit, National Center for Agricultural Utilization Research, ARS, USDA, Peoria, Illinois 61604; 2-3. Inst. of Food Research and Product Development, Kasetsart Univ., Bangkok 10903, Thailand.

2968. Sumarno, -. 2000. Soybean grain sizes, tofu recovery and its quality. In: Kyoko Saio, ed. 2000. Proceedings–Third International Soybean Processing and Utilization Conference. Tokyo, Japan: Korin Publishing Co., Ltd. [xxiv] + 728 + 8 p. See p. 49-50. [3 ref]
Address: Former Director Central Research Inst. for Food Crops, Bogor, Indonesia.

2969. Takashi, Sanbuichi; Nagaaki, S.; Jamaluddin, M.; Susanto, -; Darman, M.A.; Muchlish, A. 2000. Soybean seed improvement for quality in Indonesia. In: Kyoko Saio, ed. 2000. Proceedings–Third International Soybean Processing and Utilization Conference. Tokyo, Japan: Korin Publishing Co., Ltd. [xxiv] + 728 + 8 p. See p. 33-34. [2 ref]
• ***Summary:*** A mass-pedigree selection and a pure-line selection for improvement of uniformity were applied to a high-yielding variety 'Wilis' and to an introduced variety 'Mansuria,' respectively. From 'Mansuria' a high quality variety 'Bromo' was selected and released in 1998. The blend of selected lines from 'Wilis' and the pure lines from 'Mansuria' show much better uniformity and quality in appearance, while maintaining high yields. The chemical composition and seed coat percentage were also investigated. Contains 2 tables. Address: 1-2. JICA Soybean Seed Project; 3. Central Foundation Seed Farm for Field Crops; 4. Seed Control and Certification Service; 5-6. Research Inst. for Legume and Tuber Crops.

2970. Thanh, V.C.; Thao, T.B.; Ky, H.; Hirata, Y. 2000. Variation of seed storage proteins in Vietnamese soybean genetic resources. In: Kyoko Saio, ed. 2000. Proceedings–Third International Soybean Processing and Utilization Conference. Tokyo, Japan: Korin Publishing Co., Ltd. [xxiv] + 728 + 8 p. See p. 161-162. [1 ref]
Address: 1,3. College of Agriculture, Cantho Univ., Vietnam; 2,4. Dep. of International Environmental and Agricultural Science, Graduate School of Agriculture, TUAT, Japan.

2971. Thao, Troung Ba; Thanh, V.C.; Hirata, Y. 2000. Variation of tropical soybean storage protein in Vietnam. In: Kyoko Saio, ed. 2000. Proceedings–Third International Soybean Processing and Utilization Conference. Tokyo, Japan: Korin Publishing Co., Ltd. [xxiv] + 728 + 8 p. See p. 121-122.

• ***Summary:*** "Abstract: 114 accessions were analyzed to find out genetic variations in soybean storage proteins such as lipoxygenase 7S and 11S." "The results showed that 5 introduced accessions [from Cantho University in Vietnam] lacked the A3B4 subunit, 22 local accessions lacked the A4B3 subunit, and one lacked the beta subunit." Address: 1-2. College of Agriculture, Cantho University, Vietnam; 3. Graduate School of International & Environmental Science, Tokyo University of Agriculture and Technology, Fechu, Tokyo 183-8509, Japan.

2972. Trongpanich, Kulvadee; Hiraga, C.; Hengsawadi, D.; Phawsungthong, U. 2000. Feasibility study on production of dietary fiber concentrate from soymilk residue. In: Kyoko Saio, ed. 2000. Proceedings–Third International Soybean Processing and Utilization Conference. Tokyo, Japan: Korin Publishing Co., Ltd. [xxiv] + 728 + 8 p. See p. 95-96. [2 ref]
Address: Inst. of Food Research and Product Development, P.O. Box 1043, Kasetsart Univ., Bangkok 10903, Thailand.

2973. Truong, Trong Ngon; Corbineau, F.; Come, D. 2000. Effects of temperature, oxygen and osmotic pressure on germination of soybean seeds. In: Kyoko Saio, ed. 2000. Proceedings–Third International Soybean Processing and Utilization Conference. Tokyo, Japan: Korin Publishing Co., Ltd. [xxiv] + 728 + 8 p. See p. 153-154. [13 ref]
Address: 1. Dep. of Genetics & Plant Breeding, College of Agriculture, Can Tho Univ., Vietnam; 2-3. Lab. of Plant Physiology Application, Univ. of Pierre & Marie Curie, France.

2974. *Canadian Soybean Bulletin (OSG, Chatham, Ontario, Canada).*2000. Canadian soybean exports. 14(2):3. Nov.
• ***Summary:*** A large table shows statistics in tonnes (metric tons) of soybeans exported to various countries, and regions, each year from 1996/97 to 1999/2000. The countries are: In Asia–China, Hong Kong, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, and Thailand. In Western Europe–Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Portugal, and Spain. By continent–Africa, Central America, Eastern Europe, Middle East, Oceania, South America, and United States.

In 1999/2000 the countries to which the largest amount of Canadian soybean exports went were (in tonnes): Japan 179,708, United States 121,860, Malaysia 99,919, Indonesia 64,426, Denmark 47,444, Germany 43,410, and Netherlands 36,392.

2975. Griffith, Dotty. 2000. Worldly appeal: Western influences meld with Asian fare at Edamame. *Dallas Morning News (Texas).* Dec. 8. p. 15.
• ***Summary:*** "Edamame" is the name of a Vietnamese restaurant on Lemmon Ave. in Dallas. In Japanese the word refers to fresh soybeans in the pods. The dish served here comes to the table steaming hot. "Sucking the pod to get to the edible morsels is a delightful chore." Address: Restaurant Critic.

2976. Cost, Bruce. 2000. Asian ingredients: A guide to foodstuffs of China, Japan, Korea, Thailand, and Vietnam. New York, NY: HarperCollins. xiv + 322 p. Illust. 24 cm. *
• ***Summary:*** The contents of this book is almost identical to that of the original 1988 edition. This is not a new edition.

2977. Kouwenhoven, Arlette; Forrer, Matthi. 2000. Siebold and Japan: His life and work. Leiden, Netherlands: Hotei Publishing. 111 p. Illust. (Incl. color). No index. 27 cm. [40* ref. Eng]
• ***Summary:*** An excellent biography of Philipp Franz von Siebold (1796-1866), a German physician and naturalist who was one of the first Europeans to live in Japan. In 1823 Siebold wrote a letter to the Governor of Batavia requesting professional help at Deshima. In 1825 two men were finally dispatched: (1) Dr. Heinrich Bürger (1804-1858), a scholar, who worked as a pharmacist in Batavia, and who was to assist with scientific research, chemistry and mineralogy; and (2) Carel Hubert von Villeneuve, an auditor and artist.

On 15 Feb. 1826, Siebold departed from Deshima, accompanying the court journey to Edo (today's Tokyo) of *Opperhoofd* Johan Willem de Sturler; Siebold was joined by Dr. Bürger in the role of secretary, although Bürger's true purpose was to assist Siebold in his scientific research. These were the only three Dutchmen allowed to make the long journey. Siebold and Burger were well prepared for the trip; they had gathered all sorts of equipment to take with them, including barometers, thermometers, hygrometers, sextants, chronometers, microscopes, crockery, furniture, silver, fine glassware, and even a piano. Some of these items were intended as gifts. En route, the inquisitive Siebold observed and wrote about practically everything. They arrived in Edo on 10 April 1826, about 2 months after leaving Nagasaki, a trip of about 1,400 km. On 1 May 1826 the three Dutchmen had an audience with the shogun. The delegation finally left Edo on 18 May 1826 and arrived at Deshima on July 7. Note: It was almost certainly on this trip that Siebold and Bürger observed soybeans and recorded their observations in the trip's log.

A 3-page chronology of Siebold (p. 100-02) includes: 1796 Feb. 17. Philipp Franz von Siebold born in Würzburg [in today's Germany]. 1815–Starts study of medicine at the University of Würzburg; subjects include chemistry, botany, and physics. 1820–Completes his studies in medicine, surgery, and anatomy, obtains his doctorate, and establishes himself as a physician in Heidingsfeld. 1822 June 21–Appointed Surgeon-Major in the Dutch East-Indies Army.

1823 Feb. 13–Arrives in Batavia. On April 18 he is appointed to the post of physician at the trading post on Deshima, near Nagasaki, Japan. He also receives instructions to conduct research into Japanese natural history, laws, and politics.

1823 Aug. 12. Arrives on Deshima and starts teaching almost immediately. That same year he "married" Kusumoto Sonogi, also known as Otaki (1807-1865); she is 11-12 years younger than he. 1824. Starts a botanical garden on Deshima at the request of the government in Batavia. Opens his school in Narutaki, just outside Nagasaki. 1825. Dr. Heinrich Burger arrives from Batavia to help Siebold with his geological research, accompanied by C.H. Villeneuve, the illustrator.

1826 Feb. 15 to July 7. He accompanies *Opperhoofd* De Sturler on the court journey to Edo. Bürger, Keiga and several of his Japanese students join the delegation. 1827. The government in Batavia requests his return there, with the possibility that he may have to return to Holland. Also in 1827 Von Siebold's daughter, Oine (1827-1903) is born.

1828 Sept. 18. A severe storm causes the ship, with 89 crates containing Siebold's collection, to run aground on the coast at Nagasaki. The discovery of forbidden objects leads to the detainment of Siebold, Takahashi, and many others. Siebold is placed under house arrest.

1829 Oct. 22. After being subjected to lengthy cross-examination, Siebold is banished from Japan. On Dec. 30 he leaves Japan.

1830 Jan. 18. Arrives in Batavia, then travels to Holland where he arrives on July 7. In Antwerp he meets Dr. Hoffmann, who is later to become the first professor at Leiden University.

Note: 1830. Siebold's first publication on Japanese plants appears (largely in Latin, but with many Japanese characters) in *Verhandelingen van het Bataviaasch Genootschap van Kunsten en Wetenschappen* 12:1-74. See p. 54-57, plus first table at end. He mentions two species of soybeans: *Sooja Japonica,* the cultivated soybean, and *Sooja nomame,* the wild soybean; he says he has seen a living plant specimen of the latter. Soybeans are used to make shoyu, miso, and tofu. A note at the end of table I states that he drafted it at Deshima in November 1827.

1831 April 20. King Willem I agrees to buy Siebold's ethnographic collection and to pay an advance of 12,000 guilders. 1832. Hires a house at 19 Rapenburg in Leiden, Netherlands, where he organises his collection and opens it to the public. He maintains contact with Burger, who still lives on Deshima. Travels to Germany in the autumn. 1833. Returns to The Netherlands in the summer. Presents the first copy of his opus *Nippon* to the Society of Dutch Letters on 26 Nov.

1835. Travels in Germany and Austria. Meets Zuccarini and others. 1836 Aug. 22. Buys the house at 19 Rapenburg. 1839. From now on he spends winters in Germany, where he meets his future wife, Helene von Gagern.

1840. Buys a piece of land at Leiderdorp, where he builds the villa, 'Nippon' and starts a nursery. 1842. Establishes the plant and seed company, Siebold & Co. with Blume and Rodbard. 1845 July 10. He marries the Lady Helene von Gagern (1820-1877) in Berlin; she is 24 years younger than he. Soon four children are born. 1859. Returns to Japan. Arrives in Nagasaki on Aug. 4. 1861 Oct. He is banished from Edo, and Japan itself. 1866 Oct. 18. Von Siebold dies in Munich, Germany; he is buried in the Alten Südlichen graveyard on the Thalkirchner Strasse.

2978. Rose, Robert. ed. 2000. Beans, lentil & tofu gourmet. Toronto, Ontario, Canada: Robert Rose, Inc. 192 p. Illust. Index. 26 cm.

• ***Summary:*** This is an unusual but attractive book, with no real author or publisher. It was written by "The editors of Robert Rose" and published by Robert Rose Inc., with financial support of the government of Canada. Basically, it is a collection of recipes from other cookbooks. Except in the chapter titled "Meatless" (p. 145-62), many recipes contain meat, poultry, fish, or seafood. The section titled "Contributing authors" lists eight authors, with photos and descriptions of their cookbooks, and statements such as "Recipes from this book are found on pages 23, 38, 69, and 180." The book contains 12 full-page color photos of dishes prepared from the recipes.

Contains 13 tofu recipes and one tempeh recipe: Malay vegetable-stuffed fried bean curd with spicy sweet-and-sour sauce. Bak choy noodle and tofu chicken soup. Curry-fried tofu soup with vegetables and udon noodles. Mixed vegetable herb broth with soft tofu. Chickpea tofu stew. Braised stuffed bean curd. Braised roasted pork with tofu and green onions. Steamed shrimp-stuffed tofu with broccoli. Hoisin stir-fried vegetables and tofu over rice noodles. Barbecued tempeh with basil, hyssop and ginger. Chickpea tofu burgers with coriander mayonnaise. Thai dry vegetable curry (with tofu, p. 162). Pea tops with pancetta and tofu. Soy-braised tofu, cabbage and ginger with cellophane noodles (with soya sauce, p. 172-73). Address: 120 Eglington Ave. E., Suite 1000, Toronto, ONT Canada. Phone: (416) 322-6522.

2979. Soekarno, Bonny Poernomo Wahyu. 2000. Samenbuertige Pilze an Sojasaatgut aus Indonesien und alternative Verfahren zu ihrer Bekaempfung [Native molds on soybean seed from Indonesia and alternative methods for controlling them]. PhD thesis, Justus Liebig Universitaet Giessen. 101 p. 22 cm. [Ger]*

2980. Yurgionas, Sasha. 2001. Garbanzo bean tofu is made at the Rangoon Restaurant in Philadelphia (Interview).

*SoyaScan Notes.* Jan. 8. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** This tofu is made by George (phone: 215-829-8939) from chickpea flour. It is good for people who are allergic to soybeans. The concept of garbanzo bean tofu comes from Burma. Address: Oberlin Student Co-op, Oberlin College, Oberlin, Ohio 44070.

2981. White, Jim. 2001. Edamame: One visit isn't enough, *Dallas Business Journal.* March 23. p. 63.
• ***Summary:*** This is a review of the Vietnamese restaurant named Edamame in Dallas, Texas. Edamame is the Japanese word for fresh soybeans. Yes, this Vietnamese also serves edamame as an appetizer with shaved salt ($4.50).

2982. Tedjasukmana, Jason. 2001. Fatigue in the league. *Time (Asia).* May 14.
• ***Summary:*** About soccer in Indonesia: "As long as the generals can entertain friends and snack on fried tofu (a spectator favorite) during matches, why should they change anything?"

2983. Kikkoman Corporation. 2001. Annual report 2000. 250 Noda, Noda-shi, Chiba 278-8601, Japan. 39 p. 28 cm. [Eng]
• ***Summary:*** The information in this English-language annual report is current as of April 2001. Contents: Financial highlights. Introduction. Message from the president (Yuzaburo Mogi): Fiscal year in review, operating results, strengthening the competitive business, summary of business policy (business principles {based on consumer satisfaction}, medium-term business strategy, business organization, basic policy on distribution of profits, tasks for the coming years, in closing). Global operations: United States, Europe, Asia, Japan. Topics: Commemorative events held to mark milestones at Singapore and Taiwan plants, Kikkoman takes part in Dutch water resource preservation project. Research and development. Financial review: Operating results. Consolidated balance sheets, etc. Corporate history (chronology from April 1925 to Aug. 2000). Global network (directory of Kikkoman names, addresses, and phone numbers worldwide). Board of directors and officers. Corporate data. Overall, sales and profits remained approximately unchanged from 1999.

Overseas, Kikkoman is benefitting from the growing popularity of soy sauce. Statistics demonstrate this. Over the last 26 years, overseas of Kikkoman soy sauce have grown by an average of more than 10% a year. Last year, overseas sales of soy sauce topped 120 million liters for the first time. Overseas sales (excluding exports from Japan) accounted for about 30% of consolidated net sales and 50% of Kikkoman's consolidated operating income–excluding the Coca-Cola Business. Sales volume in the USA, the company's largest overseas market, rose to 95 million liters, grew steadily, and accounted for 80% of Kikkoman's total overseas sales of soy sauce. Last year, Kikkoman's share of the U.S. home-use market hit an all-time high of 55%. In Europe, production capacity at the plant in the Netherlands is presently being raised to 7 million liters, from 6 million liters, to meet rising demand. In China, Kikkoman is constructing a soy sauce plant; shipments are slated to start in the spring of 2002. The China plant will be the company's third in Asia outside Japan, joining plants in Singapore and Taiwan.

Effective from fiscal 2000, the results of the Tone Coca-Cola Bottling Co., Ltd. and two other companies accounted for by the equity method have been included in the consolidated results, following the introduction of new accounting standards based on the Securities and Exchange Law of Japan. However tables on p. 22 make it easy to compare Kikkoman's 2000 financial performance with that of the year before. Excluding Tone: Sales were down 1.4% but net income (profit) was up 39.6%.

Photos (p. 3 and 7) show Yuzaburo Mogi. Address: Noda, Japan.

2984. Lin, Chang-Chi. 2001. Frozen edamame: global market conditions. In: T. Lumpkin, ed. 2001. Second International Vegetable Soybean Conference. Pullman, Washington: Washington State University. 202 p. See p. 93-96.
• ***Summary:*** Contents: Introduction. Market overview–global supply: Taiwan, China, Thailand, Indonesia, Vietnam, other supply. Market Overview–global demand: Japan, the United States. Asia foods. Address: CEO, Asia Foods Group of Companies & Chairman, Taiwan Frozen Vegetables & Fruits Manufacturers' Assoc., No. 1 Wen-Hua West Road, Fengshan, Kaohsiung 830, Taiwan, ROC, Email: seika@asiafd.com.

2985. Mai, Pham. 2001. Pleasures of the Vietnamese table: Recipes and reminiscences from Vietnam's best market kitchens, street cafés, and home cooks. New York, NY: HarperCollins Publishers. xii + 242 p. Aug. Illust. (Photos by Martin Jacobs, some color). Index. 24 cm.
• ***Summary:*** This is a marvelous, very original book, with real passion for food and cookery and a deep curiosity on this subject and desire to learn. It overflows with warmth, devotion, and kindness, and is full of insights about Vietnam, its food, and most of its best cooks–street food cooks. Here we see the origin of the modern restaurant and its chefs. Contains more than 100 authentic recipes and many black-and-white photos.

The Vietnamese eat fresh herbs like vegetables. The Hmong are one of Vietnam's ethnic groups.

The ancestors of today's Vietnamese migrated south from southern China in about 1500 BC. By the 2nd century BC they had annexed the country and introduced their

system of government, Confucianism, and Buddhism. Over the centuries they introduced their food traditions–stir-frying, eating with chopsticks, steaming, and such ingredients as soy sauce, tofu, noodles, and ginger.

Vietnam is often divided into three culinary regions: the fertile south, the cooler central region, and the harsh, mountainous north–which suffered most from recent American war.

Important ingredients include: Bean sauce (tuong hot). Hoisin sauce (sot tuong). Soy sauce (nuoc tuong {liquid}; Brands–Pearl River Bridge, Kikkoman. Although not used as widely as fish sauce, soy sauce is a common seasoning in vegetarian and stir-fried dishes).

Soy related recipes: Vietnamese bean dipping sauce (tuong goi cuon, with ¼ cup fermented whole soybeans {tuong hot}, p. 28). Soy-lime dipping sauce (nuoc tuong pha, with 1/3 cup soy sauce, preferably light Chinese style sold under the brands Kim Lan, Bo De, or Pearl River Bridge, p. 29). Sweet soy sauce with chilies and ginger (nuoc tuong den ot, with 3 tablespoons sweet soy sauce, p. 30, 37). About soy sauces (light, dark, and sweet, p. 37. Kikkoman is considered light. There are two types of dark soy: One, also called "black soy," contains molasses and is thick. The other, called sweet soy sauce, is even thicker and sweeter).

Tofu, tomato and chive soup (canh dau hu he, with 6 ounces soft or medium tofu, p. 74). About fermented black beans (tau xi, an ancient Chinese seasoning, also called salted black beans, are sold in 1-pound plastic bags, paper cartons, or earthenware jars. The author prefers Yang Jiang Preserved Beans with Ginger by Pearl River Bridge).

Chapter 7 is "Return to the grandmotherland: Vegetarian favorites and meatless recipes." Of her beloved grandmother (now age 102) she writes: "When my grandfather died years ago at an early age, my grandmother was forced to raise seven kids by herself while running the family plantation. That twist of fate turned her into a vegetarian, in part because vegetarianism is a form of merit-making" (gaining merit, duoc phuoc). "In doing so, one's wishes would be granted. In my grandmother's case she prayed for the well-being of her children." "Many Vietnamese are vegetarians who practice vegetarianism on one level or another... With the shortage of animal protein and the pervasiveness of the Buddhist influence in the culture, it is not uncommon to find many Vietnamese dishes eaten in two ways–*man* (with meat) and *lat* (without meat). Indeed almost every meat dish in this book can be made vegetarian."

Vegetarian recipes (p. 185-99, with tofu unless stated): Salad rolls with jicama, peanuts and basil (bo bia chay, with 1 {6 ounce} piece tofu and 1 tablespoon soy sauce). Salad rolls with tofu and mushrooms. About tofu and *tau hu ky* [yuba or bean curd sticks]. Cucumber and tofu salad (goi chay). Vegetarian pho noodle soup (pho chay). Vegetable curry (ca ri chay, with 2 pieces dried bean curd skin [yuba]). Spicy lemongrass tofu (dau hu xa ot). Rice noodles with stir-fried vegetables (bun chay). Vegetarian claypot rice with ginger (com tay cam chay). Black mushrooms with bean threads in claypot (nam kho). Water spinach with tofu (rau muong xao). Twice-cooked eggplant with garlic and basil (ca tim xao rau que).

Warm soymilk with pandanus leaf (sua dau nanh, with 1 pound dried soybeans made into fresh soymilk, p. 220-21). The headnote to this interesting recipe begins: "I grew up on soy milk, but never thought of making it fresh until I started until I started going back to Vietnam. There, fresh soy milk is sold at markets and on street corners early in the morning and late at night. Sometimes I can walk into a market and just sniff my way to a soy milk vendor. I definitely have a nose for *sua dau nanh,* especially if its been flavored with pandanus leaf."

Glossary (p. 223-32) includes: Bean sauce *(tuong).* Fermented black beans *(tau xi).* Fermented soybeans *(tuong hot).* Hoisin sauce *(sot hoisin,* incl. soybean purée). Peanuts *(dau phong).* Tofu *(dau hu).*

About the author (with portrait photo on inside rear dust jacket): She was born in Vietnam and raised in both Vietnam and Thailand. She fled Vietnam "just days before Saigon fell to Communist rule on April 30, 1975. We left with the clothes on our backs, fighting our way through the pandemonium at the airport before climbing aboard a plane that would fly us to safety." Six years ago she ventured back to Vietnam for the first time–to be with her grandmother (and give her a modern wheelchair) and to eat *pho.* Her inaugural tour to Vietnam in 2000 was televised internationally by CNN, and was frequently rebroadcast on United and Delta airlines. She has returned about once a year since then, for the same reasons but also to learn about the food and cookery from the best cooks in the country–at market stalls, not fancy restaurants. She is now chef and owner of the acclaimed Lemongrass Restaurant in Sacramento, California. She also writes and teaches. Her first book, *The Best of Vietnamese and Thai Cooking* was published in 1996. Address: Chef and owner, Lemon Grass Restaurant, Sacramento, California.

2986. Nuntapunt, Montha. 2001. Using *Trichoderma harzianum* for vegetable soybean basal stem rot control. In: T. Lumpkin, ed. 2001. Second International Vegetable Soybean Conference. Pullman, Washington: Washington State University. 202 p. See p. 135-137. [5 ref]
• ***Summary:*** Contents: Introduction and methods. Results. Conclusions. Address: Chiangmai Field Crops Research Center, Maejo, Sansai District, Chiangmai 50290, Thailand.

2987. *Ontario Soybean Growers Newsletter.*2001. Market scan [Total soybean imports and total foods soybean imports to selected Asian countries]. Aug. p. 12.

• ***Summary:*** A table shows total soybean imports / total foods soybean imports to selected Asian countries. All figures are in tonnes (metric tons):

Japan 4,800,000 / 980,000.

Hong Kong 35,000 / 35,000.

Singapore 26,000 / 26,000.

Malaysia 200,000 / 70,000.

Taiwan 2,400,000 / 350,000.

Indonesia 600,000 / 350,000.

South Korea 1,200,000 / 200,000.

Philippines: 100,000 / 28,000.

Thailand 900,000 / 100,000.

Total for these countries: 10,261,000 / 2,139,000.

"Canada has been exporting soybeans to Asia for 30 years."

Source: Statistics Canada, Cereal and Oilseeds Review Series.

Note: Statistics for China and Vietnam are not available. Address: Chatham, ONT, Canada N7M 5L8.

2988. Shanmugasundaram, S. 2001. Global extension and diversification of fresh and frozen vegetable soybean. In: T. Lumpkin, ed. 2001. Second International Vegetable Soybean Conference. Pullman, Washington: Washington State University. 202 p. See p. 161-165. [9 ref]

• ***Summary:*** Contents: Introduction. Extension of vegetable soybean. Diversification of fresh and frozen vegetable soybean. Conclusions. Acknowledgement.

World maps show: (1) Progress in evaluation and release of AVRDC vegetable soybean [varieties] from 1979 to 1983. Countries include England, France, Niger, Nigeria, Pakistan, India, Thailand, Malaysia, Indonesia, Philippines, Taiwan, Japan, and Korea. (2) AVRDC vegetable soybean evaluation, commercial production and export as of 2000. Symbols show: On-station tests, varieties released, commercial production, and exporting. [Note: The term "Vegetable soybean" here means whole, dry, vegetable-type soybean varieties, not green vegetable soybeans]. Countries include England, Germany, France, Italy, Ukraine, Ghana, Nigeria, Congo [formerly Zaire], Zambia, Namibia, Lesotho, Swaziland, Zimbabwe, Mauritius, Malawi, Tanzania, Kenya, Uganda, Saudi Arabia, Pakistan, Bhutan, Bangladesh, India, Nepal, Thailand, Cambodia, Sri Lanka, Malaysia, Singapore, Indonesia, Australia, Fiji, Solomon Islands, Papua New Guinea, Marshall Islands, Guam, Philippines, Laos, Vietnam, Taiwan, China, Korea, USA, Guatemala, El Salvador, Nicaragua, Costa Rica, Panama, Ecuador, Argentina, Chile, Brazil, Suriname, Guyana, West Indies, Granada, St. Vincent, Honduras, and Belize.

Note: This is the earliest document seen (Aug. 2009) concerning soybeans in Namibia. This document contains the earliest date seen for soybeans in Namibia (2001). Address: Plant Breeder and Director, Program I, Asian Vegetable Research and Development Center, P.O. Box 42, Shanhua, Tainan 741, Taiwan, ROC. Email: sundar@netra.avrdc.org.tw.

2989. Shurtleff, William; Aoyagi, Akiko. 2001. The book of tempeh: A cultured soyfood. 2nd ed. Revised. Berkeley, California: Ten Speed Press. 176 p. Aug. Illust. by Akiko Aoyagi Shurtleff. Index. 28 cm. [374 ref]

• ***Summary:*** This revision has completely new front and rear covers, designed and illustrated by Akiko. It contains a completely new "Appendix B–Directory of Tempeh Makers" (p. 157-58, updated to 16 June 2001). The page "About the Authors" (autobiographical) has been updated, and the original photographs have been replaced with more recent ones–reflecting the fact that Bill and Akiko separated in Nov. 1993 and their marriage ended in May 1995.

The last page, "Soyfoods Center," has been updated.

On page 176 is "The Best of Vegetarian Cooking from Ten Speed Press" (descriptions of eight cookbooks, with price and ISBN).

The inside rear cover has been updated, and now includes current information about: (1) *Tempeh Production,* a book published by Soyfoods Center about how to start and run a company making tempeh on any of four scales and budgets in North America, and on either of two scales in tropical developing countries. (2) *Tempeh and Tempeh Products: Bibliography and Sourcebook,* published by Soyfoods Center. (3) SoyaScan, the unique computerized database produced by Soyfoods Center. This database now contains more than 62,000 records from 1100 B.C. to the present, and more than 76% of all records have a summary / abstract averaging 146 words in length. A description of the four different types of records (published documents, commercial soy products, original interviews and overviews, and unpublished archival documents), and the number of each type, is given.

The title page, copyright page, and table of contents have been redesigned and updated to give the book a much more contemporary look. Other small changes have been made throughout the book. Still contains 130 vegetarian recipes–both western and Indonesian.

Ten Speed Press gave this book a new ISBN: 1-58008-335-8. Yet despite the many changes described above, the authors preferred not to have this called a "new edition" or "revised edition." Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549. Phone: 925-283-2991.

2990. Shurtleff, William; Aoyagi, Akiko. 2001. The book of miso: Savory, high-protein seasoning. 2nd ed. Revised. Berkeley, California: Ten Speed Press. 278 p. Illust. by Akiko Aoyagi Shurtleff. Index. Aug. 28 cm. [223 ref]

• ***Summary:*** This revision has completely new front and rear covers, designed and illustrated by Akiko. It contains a completely new "Appendix D–Miso Manufacturers in the West" (p. 255, updated to 10 May 2001). The page "About

the Authors" (autobiographical) has been updated, and the original photographs have been replaced with more recent ones–reflecting the fact that Bill and Akiko separated in Nov. 1993 and their marriage ended in May 1995.

The last page, "Soyfoods Center," has been updated.

The inside rear cover has been updated, and now includes current information about: (1) *Miso Production,* a book published by Soyfoods Center about how to start and run a company making miso on any of various scales and budgets. (2) *Miso and Soybean Chiang: Bibliography and Sourcebook,* published by Soyfoods Center. (3) SoyaScan, the unique computerized database produced by Soyfoods Center. This database now contains more than 62,000 records from 1100 B.C. to the present, and more than 76% of all records have a summary / abstract averaging 146 words in length. A description of the four different types of records (published documents, commercial soy products, original interviews and overviews, and unpublished archival documents), and the number of each type, is given.

The title page, copyright page, and table of contents have been redesigned and updated to give the book a much more contemporary look. Other small changes have been made throughout the book. Still contains 130 vegetarian recipes–both western and Indonesian.

Ten Speed Press gave this book a new ISBN: 1-58008-336-6. Yet despite the many changes described above, the authors preferred not to have this called a "new edition" or "revised edition." Address: Soyfoods Center, P.O. Box 234, Lafayette, California 94549. Phone: 925-283-2991.

2991. Srisombon, S.; Shanmugasundaram, S.; Sophanodora, D. 2001. The history of vegetable soybean development, current status and future development in Thailand. In: T. Lumpkin, ed. 2001. Second International Vegetable Soybean Conference. Pullman, Washington: Washington State University. 202 p. See p. 183-186. [7 ref]

• ***Summary:*** Contents: Introduction. Vegetable soybean development: Production and market promotion, research, yield constraints. Future prospects. Conclusion.

"From the time the soybean was introduced from China to the northern part of Thailand the vegetable soybean was consumed for more than a hundred years in Thailand." Soybeans with medium size seeds (15-20 gm per 100 seeds), used for food and oil extraction, have also been used traditionally as green vegetable soybeans (called *tua rae* in Thai). "Green pods attached to the stems are commonly boiled and sold countrywide in the local markets."

In the late 1980s, the development of vegetable soybeans for export began with the establishment of a frozen vegetable factory as a joint venture between Thais and Japanese. In 1990 the first small exports of vegetable soybeans from Thailand to Japan began. In 1999 the export volume increased dramatically to about 9,000 tonnes, making Thailand the 3rd largest exporter of vegetable soybeans to Japan–after China and Taiwan. Address: 1. Senior Research Scientist, Field Crops Research Inst., Dep. of Agriculture, Paholyothin Road, Chatuchak, Bangkok 10900, Thailand, Email: kssssb@yahoo.com 2. sundar@netra.avrdc.org.tw 3. fcri@doa.go.th.

2992. Irawan, Bambang. 2001. Stabilization of upland agriculture under El Nino induced climatic risk: Impact assessment and mitigation measures in Indonesia. production. *Palawija News (Bogor, Indonesia)* 18(4):1-5. Dec.

• ***Summary:*** Contents: El Nino and La Nina: tendency during 1876-2000. Impact of El Nino in 1982 and 1997 on rainfall. Impact of El Nino on food crops area.

Table 1 (p. 2) shows El Nino and La Nina events by 25 year intervals from 1876 to 2000. The year and SOI of each event is given.

El Nino and La Nina events are shown by SOI value (Southern Oscillation Index). El Nino events have a negative number; the larger the negative number, the bigger the event. La Nina events have a positive number. "The frequency of El Nino has tended to increase from once per 8 years during 1876-1976 to once per 4 years during 1977-2000 (Table 1). The extreme negative SOI particularly occurs in March, April, June, July, September, and October. This indicates that those months have a higher probability than other months for a drastic decrease in rainfall and an increase of ambient temperature.

The biggest El Nino events in history were 1982, 1977, and 1997. The 1997 El Nino caused a greater decrease of rainfall than the 1982 event; -30.8% and -62.2% for wet and dry seasons in 1997, vs. -17.3% and -44.0% for wet and dry seasons in 1982. Address: Indonesian Center for Agricultural Socioeconomic Research and Development (ICASERD), Bogor, Indonesia.

2993. Breier, Davida Gypsy; Mangels, Reed. comps. 2001. Vegetarian & vegan FAQ: Answers to your frequently asked questions. Baltimore, Maryland: The Vegetarian Resource Group. 272 p. Illust. Index. 23 cm. [69 ref]

• ***Summary:*** Contents: 1. Most frequently asked questions (incl. How many people are vegetarian? Detailed results of polls conducted in 1994, 1997, 2000). 2. Vegetarianism in daily life (incl. How do you pronounce "vegan?" Ans: VEE-gun. Who are some famous vegetarians? What is the history of vegetarianism?). 3. Nutrition (incl. I need impartial, major scientific studies that show a correlation between a vegetarian diet and disease prevention? Gas caused by eating soy). 4. Food ingredients (incl. Soy cheeses, soy lecithin). 5. Recipes (incl. many recipes for tofu, tempeh, soy whipped cream, chocolate pudding with soymilk, soy yogurt, wheat gluten / seitan, TVP). 6. Vegetarian products (incl. What is seitan? Where can I buy seitan? What is tempeh? What is TVP? Where can I buy TVP? What is

tofu? What do I do with it? Alternatives to dairy products. Vegan eggnog. Soy candles). 7. Cooking and baking (Tofu, draining tofu, tofu cream cheese, Tofutti). 8. Travel and restaurants. 9. Veggie kids (Soy-based infant formula. Phytoestrogens in and safety of soy infant formula). 10. Soy (p. 168-76; contains good, balanced responses to the anti-soy articles by Fallon and Enig, p. 173-76). 11. Vegan concerns. 12. Unique questions. 13. Questions about VRG. 14. Appendix: Quick guide to fast food. Quick guide to helpful websites. Protein content of selected vegan foods. Calcium content of selected vegan foods. Iron content of selected vegan foods. Daily values. A senior's guide to good nutrition. Eat better, perform better, sports nutrition guidelines for the vegetarian. Why is wine so fined? Handy guide to food ingredients. List of suggested reading: Vegetarian cookbooks, vegetarian families, vegetarian travel. School foods information. Feeding plans for infants and toddlers. VRG publications, resources, and tabling materials.

Soy-related questions and answers outside of Chapter 10: Gas and bloating after eating soy (p. 64). Casein found in many soy cheeses (p. 80). Soy lecithin (p. 85). Recipes: Tofu dill dip (p. 88). Spinach pie (with tofu, p. 93). Tempeh stuffed potatoes (p. 94-95). Spicy sautéed tofu with peas (p. 98). Quick sloppy joes (with tempeh, p. 98). Sweet potato slaw (with tofu). Tofu balls (p. 100). Pad Thai (p. 102-03). Davida's spicy garlic noodles and tofu (p. 105). Soy whipped cream (with soymilk, p. 106-07). Chocolate pudding (with soymilk, p. 107). Heavenly chocolate cupcakes (with soymilk, p. 109). Tofu cheesecake (p. 112). Homemade soymilk, rice milk, almond milk (p. 115). Homemade tofu (p. 115). Tofu recipes on the Web (p. 116). Homemade soy yogurt (p. 116). Homemade wheat gluten & seitan (p. 116). What is tempeh? What is TVP (p. 119). Vegetarian mince or meatless ground beef (p. 120-21). vegetarian and soy cheeses (p. 121). Tofurky (meatless turkey, p. 122-23). Tofutti (non-dairy soy ice cream) and vegan eggnog (p. 125). Soy-based vegan candles (p. 126). Using tofu (p. 129-31). Tofu cream cheese (p. 131). Soymilk and soy creamer (p. 132). Soy buttermilk and soy mayonnaise (p. 133). Feeding an infant with soy formula (p. 154). Are the phytoestrogens in soy formula safe? (p. 155). Helping kinds to switch to soymilk from cow's milk (p. 156). Address: 1. Baltimore, Maryland; 2. R.D.

2994. Huang, Hsing-Tsung. 2002. Takamine Jokichi and the transmission of ancient Chinese enzyme technology to the West. In: Alan K.L. Chan, Gregory K. Clancey and Hui-Chieh Loy, eds. 2002. Historical Perspectives on East Asian Science, Technology and Medicine. Singapore: World Scientific Publishing Co. See p. 525-32.

• ***Summary:*** "When we talk of technology transfer in the last hundred years, we tend to think of the traffic as flowing entirely from West to East. Actually, even in the 20th century significant bits of Chinese or East Asian technology were also being transmitted to America and Europe. Of these the most influential and yet least appreciated is the use of microbial enzymes in food processing and related industries."

Most of the enzymes used today are derived from 3 genera of moulds, namely *Aspergillus, Rhizopus* and *Mucor.* In the early 1950s Dr. Huang gained a working knowledge of the enzyme industry in the U.S. when he worked as a research chemist at the Enzyme Research Department of Rohm and Haas Co. (Philadelphia, Pennsylvania).

Table 1 shows microbial enzymes used in food processing in 2002, and Table 2 shows those used in food processing in 1951. Takamine Laboratories (Clifton, New Jersey) made and marketed Takadiastase, a digestive aid. Wallerstein & Co. (New York) produced the enzyme papain for chillproofing of beer. Rohm & Haas pioneered the application of pancreatic enzymes for the bating of hides. All 3 companies were founded at about the turn of the 19th to 20th centuries.

Jokichi Takamine's innovation was based on koji (Chinese: *qu* [pronounced ch'ü]; the Japanese word is written with the ancient Chinese character), which has been used in Japan for centuries to make saké (and other alcoholic drinks), soy sauce, and miso (both soy condiments). "Modern microbiological studies show that the principal organisms in *qu* are grain molds of the genera *Aspergillus, Rhizopus,* and *Mucor.*

"The origin of *qu* is obscure. It was a known entity in the early Zhou (1000 B.C.), but it could have been in existence much earlier, perhaps even before the legendary Xia dynasty (2000 B.C.). According to the *Jiu Gao* (Wine Edict), c. 300 A.D., by Jiang Tong, *qu* was first obtained when steamed rice was inadvertently left in the open and became mouldy [endnote 3 gives the exact Chinese characters]. This view is supported by two pieces of evidence. First, rice was already cultivated extensively and pottery steamers were known around 6000 B.C. in the Hemudu culture near Hangzhou [W.-G. Hang-chou, or Hang-chow, capital of Zhejiang province in eastern China]. Second, this is precisely the way a rudimentary *qu* was prepared and used in making wine in the 1950s by the aborigines in Taiwan. Thus the earliest *qu* probably had rice as the growth substrate. Rice is still the principal substrate in South China today. But during the Zhou [1045-256 B.C.], as barley and wheat (which were considered inferior grains) grew in importance as cultivated crops in North China, they were adopted as the preferred substrates for making *qu.* Endnote 4. For further details on the origin of *qu,* see H.T. Huang's book titled *Fermentations and Food Science* in the *Science and Civilization in China* series.

"The art of using *qu* or koji to make fermented drinks, i.e. *sake*, was brought to Japan from South China, probably towards the end of the Han dynasty (Shinoda Osamu 1967,

p. 551-74). Their employment in the making of fermented soy condiments, such as *Jiang*, arrived later during the Tang (618-907 A.D.), accompanied by the famous agricultural treatise *Qimin Yaoshu* (Important Arts of the People's Welfare) of 544 A.D. But the Japanese soon developed their own versions of soy condiments such as miso which is quite unlike the fermented *jiang* (soy paste) of China." Modern microbiology has shown that the principal mould in koji is *Aspergillus oryzae*.

"The technology of *qu* was also transmitted, presumably by Chinese immigrants in more recent centuries, to Indonesia. It is called *raggi [ragi]* by the natives or *peh-khak* ('white qu') by the Chinese settlers. In the 1890s Dutch scientists determined that the fungi in *raggi* were species of *Mucor* and *Rhizopus*. They tried to exploit the amylolytic activity of these fungi for converting grains to alcohol commercially in Seclan [Seclin], France, and Antwerp, Belgium, but their attempts were unsuccessful."

These early ventures might have remained forgotten were it not for the work Jokichi Takamine in the USA. There follows a summary of Takamine's life to 1890. In his travels in the U.S. Takamine learned how the brewers and distillers there "used malt to hydrolyze grains into sugar so they could be fermented into alcohol. He realized that Japanese *koji* was much more active than malt for the hydrolysis of grains. He studied the production of 'diastase' (amylolytic [starch splitting] enzymes) by the *koji* mold *Aspergillus oryzae* when he returned to Japan. The results convinced him that replacing malt with *koji* enzymes would be a great improvement in the manufacture of whiskey." In 1890, with the help of his wife's parents, Takamine made the fateful decision to move his family to the USA and to start the Takamine Ferment Company in Peoria, Illinois, to produce diastase for a local distillery company. The initial results were very promising.

"However, Takamine's apparent success presented an unwelcome threat to the malt producers in Peoria. They incited local xenophobia [fear and hatred of strangers or foreigners or of anything that is strange or foreign]. One night in 1894 the distillery in which his experiments were being conducted was burned down." Note 1. There is no evidence that he ever sold any of his purified enzymes in Peoria. [Three years later] "He moved his family to Chicago, where he continued to promote his diastase preparation. Fortunately, by this time, he had obtained a patent (U.S. 525,820) on the use of his diastase as a cure for dyspepsia." Parke, Davis & Co. (Michigan) agreed to make and market the product under the brand name Takadiastase. In 1897 he moved his family and research laboratory to New York City. Address: Goodwin House, 4800 Fillmore Ave., Alexandria, Virginia 22311.

2995. Hutabarat, Budiman; Maeno, Nobuyoshi. 2002. Economic significance of legumes, root and tuber crops in Asia and the Pacific. *Palawija News (Bogor, Indonesia)* 19(3):1-10. Sept.

• ***Summary:*** "The economic contribution of legumes, roots and tuber crops was overlooked during the green revolution era" [1943 to late 1970s; the term was first used in 1968], at which time productivity increases mainly occurred in two main foods crops: rice and wheat.

Despite the remarkable successes of the green revolution in the 1970s, hunger and poverty still linger in many parts of the world today–due to population growth and fixity and scarcity of natural and economic resources.

In Asia, nearly 50% if the total harvested area is in China, nearly 37% in India, with Indonesia coming in third at less than 7%. In China, the rate of soybean area growth is decreasing by 2.25% a year, in China it is constant, and in Indonesia it is barely growing, while the area in Sri Lanka and Viet Nam is growing decisively. Address: 2. Program Leader, Research and Development Director of CGPRT Centre, Bogor, Indonesia.

2996. Slater, Nigel. 2002. Recipes: Nigel Slater's cookbook of the month. Thai Food by David Thompson. *Observer (London).* Nov. 10. p. 147.

• ***Summary:*** At last we have the definitive book on Thai cooking. David Thompson, who spent years in researching and writing this book, is the Australian chef at Nahm in London's Halkin Hotel; before that he was owner of the Darley Street Thai in Sydney.

Recipes include: Stir-fried Siamese watercress with yellow beans, garlic and chillies *(Pak bung fai dtaeng;* with "2 tbsp yellow bean sauce, rinsed" and "2 tbsp light soy sauce"). "This simple dish can be enhanced with... roast duck and fermented bean curd."

2997. *SoyaScan Notes*.2002. The International Center for Aquaculture and Aquatic Environments at Auburn University (Auburn, Alabama) (Overview). Nov. 25. Compiled by William Shurtleff of Soyfoods Center.

• ***Summary:*** This center is doing pioneering work in Alabama and in several developing countries (incl. Brazil, Ecuador, and Philippines) with watershed management, water quality, and aquaculture. Their mission is research, outreach, and education. One exciting idea is their "Alabama Waterwatch" program, in which citizen volunteer monitors across the state (including retired lakeside homeowners and urban environmentalists) regularly monitor the water quality in streams, rivers, and lakes, then enter the data information into the ADEM (Alabama Dep. of Environmental Management, a state agency) database. ADEM then uses this data in their reporting to EPA. This sometimes leads to confrontations between polluters and those who want clean water. "We are learning, as citizens of

the USA, that we have to do a lot of things ourselves–Neighborhood Watch." "Alabama is probably the only state in America in which all of the rivers in the state are displayed on the State Seal–showing graphically the state's commitment to water quality issues.

Website: www.ag.auburn.edu/Dept/FAA. Address: 201 Swingle Hall, Auburn Univ., Auburn, Alabama 36849. Phone: 334-844-9210.

2998. *Canadian Soybean Bulletin (OSG, Chatham, Ontario, Canada).*2002. Canadian soybean exports. Winter. p. 2.

• ***Summary:*** A large table shows statistics in tonnes (metric tons) of soybeans exported to various countries, and regions, each year from 1998/99 to 2001/2002. The countries are: In Asia–China, Hong Kong, Indonesia, Japan, Malaysia, Philippines, Singapore, South Korea, Taiwan, and Thailand. In Western Europe–Austria, Belgium, Denmark, France, Germany, Italy, Netherlands, Norway, Portugal, and Spain. By continent–Africa, Central America, Eastern Europe, Middle East, Oceania, South America, and United States.

In 2001/2002 the countries to which the largest amount of Canadian soybean exports went were (in tonnes): Japan 126,619, Malaysia 101,698, United States 60,244 Germany 29,377, Indonesia 26,836, Hong Kong 22,800.

Total soybean exports have declined dramatically during the past two years, from a peak of 946,360 in 1999/2000, to 746,241 in 2000/2001, down to 471,492 in 2001/2002.

2999. Encyclopaedia Britannica: Southeast Asia–History. 2002. Chicago, London, Toronto...: Encyclopaedia Britannica, Inc. 32 volumes. See Macropedia, vol. 27, p. 722-727.

• ***Summary:*** An excellent, detailed history of Vietnam is given here. Address: Chicago, Illinois.

3000. Food and Agricultural Organization of the United Nations. 2002. Soybeans: Area harvested, yield, and production. *FAO Yearbook–Production (Rome, Italy)* 56:116-17.

• ***Summary:*** The following nations are listed for the first time as soybean producers in the *FAO Production Yearbook.* F = FAO estimate. * = Unofficial figure.

Belize: No area or production statistics are given. Yield was 1,576F kg/ha in 1989-91, 2,012F kg/ha in 2000, 1,586F kg/ha in 2001, and 1,500F in 2002.

East Timor: Harvested 1,000F ha in 1989-91, 2000, 2001, and 2002. Yield was 2,809F kg/ha in 1989-91, 808F kg/ha in 2000, 2001, and 2002. Produced 3,000F metric tons in 1989-91, and 1,000F metric tons in 2000, 2001, and 2002.

Tajikistan: No area or production statistics are given. Yield was 147F kg/ha 2000, 309F kg/ha in 2001, and 400F kg/ha in 2002.

3001. Nguyen, Chi; Monroe, Judy. 2002. Cooking the Vietnamese way. Revised and expanded to include new low-fat and vegetarian recipes. Minneapolis, Minnesota: Lerner Publications. 72 p. Illust. Index. 23 x 20 cm. Series: Easy Menu Ethnic Cookbooks.

• ***Summary:*** This thin hardcover book is an introduction to Vietnamese cooking, but not a vegetarian cookbook–though it contains some vegetarian recipes. Contains many color photos. The section titled "Special ingredients" includes cellophane noodles (made from mung beans), coconut milk, fish sauce (nuoc mam), ginger root, lumpia, mung beans, sesame seeds, soy sauce, and tofu. The Vietnamese use nuoc cham (p. 33) the way diners in many countries use salt: The main ingredients are fish sauce, garlic, red pepper flakes, sugar, vinegar and water. Soy sauce is also widely used as a seasoning–as in fried rice, grilled lemon-grass beef Soy-related recipes include: Steamed tofu (Dau hui hap, p. 59).

3002. Thompson, David. 2002. Thai food (Aharn Thai). Berkeley, California: Ten Speed Press. xiii + 673 p. Illust. Index. 25 cm. [218 ref]

• ***Summary:*** This is a superb, massive, beautiful and unique book–a wholistic study of food in Thai culture overflowing with lovely and expressive color photos by Earl Carter.

Contents: Acknowledgements. Introduction, by David Thompson, and author's notes. Part one: Thailand and food. 1. A history. 2. Culture and society. 3. Regions of Thailand. 4. Rice.

Part two: Fundamentals of Thai cooking. 5. The Thai kitchen. 6. Ingredients and basic preparations. 7. Relishes. 8. Soups. 9. Curries. 10. Salads. 11. Side dishes and accompaniments. 12. Menus.

Part three: Food 'outside' the meal. 13. Snacks. 14. Desserts. Select bibliography (Books in English: Primary sources 23. Secondary sources 65. Cookbooks 18. Total English: 106. Thai sources: Cookbooks 46. Memorial books: 66. Total Thai: 112. Grand total: 218).

Introduction: The author has written this book, in part, to describe this ancient cuisine which "reached an apex in the last decades of the 19th century," and "before it is eroded, altered and modernised." The transliteration is phonetic; it is not the official system devised by King Rama VI.

The section titled "The importance of Buddhism" (p. 38-40) in Thai cookery and culture states: "It is the obligation of every Thai male to become a monk for at least three months, usually around the age of 20,..." This a rite of passage from childhood to adulthood, and acquaints each young man with the basics of Buddhism and meditation. Strict Buddhists abstain from eating meat and "there is a strong tradition of vegetarianism in Thailand." Meat does not have a primary role in the Thai diet and most Thai

believe that forgoing meat earns merit for themselves or another. Some give up meat once a week, or for a prolonged period, or even for an entire year.

Chapter 6, "Ingredients and basic preparations," discusses the following: Bean curd *(dtor huu):* There are several types, from firm to soft. The author prefers the softest kind, sometimes called "silken bean curd."

Fermented bean curd *(dtor huu yii):* Of Chinese origin and fermented with a red mold, it is sold in small jars and comes in two types: "very red, or creamy white veined with pink. The author prefers the latter, which is more versatile and subtle.

Fermented soy bean *(tua nao):* This ancient fermented product was once used extensively in Thai cookery. But it as largely been replaced by shrimp paste, so it is not so common now. "Before *tua nao* is used in a recipe, it is grilled or toasted, then ground."

Soy sauce *(nahm siu uu):* A lighter-style soy sauce is generally preferred by Thai cooks. "Sweet Indonesian soy sauce *(kecap manis)* is used only occasionally.

Yellow bean sauce *(dtow jiaw):* "This is a sauce based on yellow soy beans, which are salted and then fermented with rice mould... [it] tastes delicious, very much like Japanese miso." Its use usually indicates a dish of Chinese influence. There are two basic types: "the first, and more traditional is creamy white; the more common one is honey brown."

Peanuts and wing beans [winged beans] are also discussed in chapter 6.

Soy-related recipes: Murray perch and mushroom soup with yellow beans *(dtom het dtow jiaw;* p. 249). Light soy sauce (p. 341). Fermented bean curd simmered in coconut cream *(lon dtor huu yii;* p. 430-31). Deep-fried bean curd with crab, pork and spring onions. *(tor huu yord sai tort;* p. 440-42). Prawns and yellow beans simmered in coconut cream *(lon dtao jiaw;* p. 444-46). Pickled ginger with yellow beans *(king dong dtow jiaw;* p. 457). Bean curd stir-fried with bean sprouts *(tor huu pat tua nork;* p. 462). Bean curd and bean sprout soup *(tgeng jeut or huu orn;* p. 469-70). Stir-fried Siamese watercress with yellow beans, garlic and chillies *(pak bung fai dtaeng;* p. 532-33). Yellow bean and ginger sauce *(nam jim dtow jiaw;* p. 545). Spicy yellow bean sauce *(nam jim dtow jiaw;* p. 558). Address: Chef, restaurateurs, cookery writer, and preserver of traditional Thai culture, Sydney, Australia.

3003. *Ontario Soybean Growers Newsletter.*2003. OSG promotes Canadian soybeans on mission to Asia. Feb. p. 2. • ***Summary:*** "The Canadian soybean industry travelled to Asia in November 2002 to conduct eight seminars in eight Asian cities. The seminars were held in Japan (Tokyo, Nagoya, Osaka, Fukuoka), Malaysia (Penang, Kuala Lumpur), Singapore and Hong Kong.

"Liam McCreery and Kim Cooper from the Ontario Soybean Growers participated in this trip, along with 12 other members of the Canadian Soybean Export Association, representing exporters, researchers and government.

"The objectives of this trip to Asia were:

"To meet with soyfood associations and various buyers and give them presentations on the Canadian soybean industry and the IP [identity preserved] soybean standard that was developed by the Canadian Soybean Export Association last year.

"To demonstrate how both the Canadian and Ontario governments are working in partnership with the Canadian soybean industry to develop, market and ensure the highest quality of food-grade soybeans to meet export customers' needs.

"To gather information on customers' markets, needs and suppliers (market intelligence) in order to better provide a quality and competitive product.

"To provide information to export customers on the 2002 soybean crop in terms of yield, quality and grade. To emphasize Canada's commitment to further develop research and marketing programs in response to buyer's needs.

"This trip was very successful in attaining its objectives. All mission members and our overseas buyers felt these seminar presentations were very informative and needed if we are to further expand our market base around the world."

A large photo shows OSG past chair, Lam McCreery. Address: Chatham, ONT, Canada N7M 5L8.

3004. **Product Name:** Trader Joe's Organic Baked Thai Tofu.
**Manufacturer's Name:** Trader Joe's (Marketer-Distributor). Made by Wildwood Natural Foods in California.
**Manufacturer's Address:** Monrovia, CA 91016.
**Date of Introduction:** 2003. February.
**Ingredients:** Organic tofu (filtered water, organic soybeans, nigari {magnesium chloride, a natural firming agent}), organic soy sauce (water, organic soybeans, sea salt, organic whole wheat, alcohol {to preserve freshness}), organic lemon juice, Fruitrim (fruit juice, natural grain dextrins), rice wine, organic garlic, organic ginger, organic brown rice syrup, organic cilantro, organic toasted sesame oil, peanut oil, jalapeno peppers, organic cayenne pepper, Thai curry paste (garlic, red chili, lemon grass, galangal, salt, ginger root, onion, pepper), organic lemon grass. Certified organic by Quality Assurance International (QAI). Manufactured in a facility that processes peanuts.
**Wt/Vol., Packaging, Price:** 7 oz (198 gm) vacuum pack. Retails for $2.99 at Trader Joe's (2003/02, Lafayette, California).

**How Stored:** Refrigerated.
**New Product–Documentation:** Trader Joe's Fearless Flyer. 2003. Feb. p. 5. "One of the greatest things about tofu, aside from its obvious health benefits, is its ability to absorb the flavors of the marinades and spices with which it's cooked. We have two Organic Baked Tofus that will cause you to seriously reconsider how you view tofu."

Product with Label purchased at Trader Joe's in Lafayette, California. 2003. Feb. 16. 4 by 2 inches. Self-adhesive label on plastic bag. Red, purple, black, and white on greenish yellow. "Perishable. Keep refrigerated. Ready to eat." USDA Organic logo. QAI logo. 2 servings. Soyfoods Center taste test. 2003. Feb. 16. Delicious. Not too spicy.

3005. *Bluebook Update (Bar Harbor, Maine).*2003. Soybeans used as food will grow by 72% this decade: Soyatech releases new study. 10(1):2.
• ***Summary:*** "Whole Soybeans as Food Ingredient," a new study published [in January] by Soyatech, Inc., focuses on the market for soybeans for food.

Over the past 30 years, soybean production globally has grown over 400%. The production in 2002 was about 184 million metric tons, with the combined products of Argentina and Brazil looking like they might overtake the United States, the largest producer. The lower cost of production factors like land and labor in South America and the high value of the dollar are contributing factors.

Annually, 85% of soybeans are crushed into meal and 9% are processed into human food, 95% of which is consumed in Asia. China, Japan, Korea, Indonesia, and Taiwan are the main consumers.

A small percentage of the beans crushed into meal are processed into soy protein ingredients for food. Examples include soy protein concentrates, soy flour, and isolated soy proteins. 3.2% of the crushed beans are used in this manner; however, use of crushed soybeans is food is expanding at 6 times the rate of the use of whole soybeans.

The use of soybeans for food will expand by 72% between the years of 2000 and 2010, requiring that additional soy protein plants be constructed. Distribution channels will also require expansion.

Although only 0.2% of the U.S. soybean crop is processed into human food domestically, 8.8% are when global exports are included. 6.3 million acres of soy beans therefore ultimately are used for food.

A pie chart titled "Soybean usage: 1996-2001" shows: Soybean crush 84.4%. Direct food use 8.6%. Feed/seed/residual 5.7%. Change in stocks. 1.4%.

3006. **Product Name:** Pete's Tofu 2 Go [Sesame Ginger Tofu with Jazzed Ginger Soy Sauce, Lemon-Pepper with Mango Chipotle Sauce, Santa Fe Sizzle with Pineapple Mango Fusion Sauce, Thai Tango with Mango Wasabi Sauce].
**Manufacturer's Name:** Sunrise Soya Foods.
**Manufacturer's Address:** 729 Powell St., Vancouver, BC Canada V6A 1H5. Phone: 1-800-661-2326.
**Date of Introduction:** 2003. March.
**Ingredients:** Sesame Ginger: Tofu (water, certified organic soybeans, calcium sulfate), whole sesame seeds, dehydrated ginger, dehydrated garlic, spices, soybean oil, soy sauce (water, wheat, soybeans, salt), vinegar, brown sugar, salt. Jazzed ginger soy sauce: water, soy sauce (water, wheat, soybeans, salt), brown sugar, dehydrated organic ginger, sesame seeds, sesame oil, vinegar, lemon juice, dehydrated onion, dehydrated garlic, citric acid, xanthan gum.
**Wt/Vol., Packaging, Price:** 14.4 oz (206 gm) in tray inside plastic bag. Retails for $2.79 (2004/03, Lafayette, California).
**How Stored:** Refrigerated.
**New Product–Documentation:** Leaflet (8½ by 11 inch, color) from Natural Products Expo West (Anaheim, California). 2003. March. "Pete's Tofu: Taking the guesswork out of tofu!" "Pete's Tofu: A whole new way to enjoy tofu."

Product (Sesame Ginger) with Label purchased at Trader Joe's in Lafayette, California. 2004. March 13. 4¼ by 8½ by 2 inches deep. Brown, green, black, and white on tan. Color photo shows four triangles of tofu around a square pan of the sesame ginger sauce with mint leaves on a red plate. "Made from organic soybeans. Cholesterol free, High in soy protein. High in calcium. No preservatives added. Ready-to-eat tofu with sauce for snacking and more." Contains two 6.2 oz pouches of tofu plus two 1 oz packets of sauce. Logo: "Certified organic by Quality Assurance International (QAI)." Soyfoods Center evaluation: This product comes in innovative packaging. Four tofu triangles (which have been marinated and baked, or deep-fried) are packed two-deep in each of two vacuum pack cubes. These cubes are placed in the two compartments (2½ inches square by 3/8 inch deep) of a plastic tray. The sesame ginger sauce comes in small plastic pouches. These three items are invisible inside the outer plastic bag. To serve. Cut open the vacuum pack cubes. Place tofu triangles in compartments of plastic tray. Cut open pouches and pour sauce over tofu. Eat as a finger food or with a food. Product concept: Excellent. Flavor and texture: Very good, but there is too much liquid in the two vacuum pack cubes; it must be drained off when they are opened.

3007. **Product Name:** Pete's Tofu [Medium Firm for Mixing, Super Firm for Dicing, Italian Herb Super Firm Tofu, Very Berry Dessert Tofu, Peach Mango, Soft for Blending, Lemon-Pepper with Mango Chipotle Sauce,

Santa Fe Sizzle with Pineapple Mango Fusion Sauce, Thai Tango with Mango Wasabi Sauce].
**Manufacturer's Name:** Sunrise Soya Foods.
**Manufacturer's Address:** 729 Powell St., Vancouver, BC Canada V6A 1H5. Phone: 1-800-661-2326.
**Date of Introduction:** 2003. March.
**Wt/Vol., Packaging, Price:** 12-16 oz (206 gm) inside plastic bag.
**How Stored:** Refrigerated.
**New Product–Documentation:** Leaflets (8½ by 11 inch, color) from Natural Products Expo West (Anaheim, California). 2003. March. (1) "Pete's Tofu: Taking the guesswork out of tofu!" Color photos show 5 of the packages. "Innovative overwrap packaging–now to the tofu category. Unique color-coded packaging. Eye-catching colors." (2) "Pete's Tofu: A whole new way to enjoy tofu."

3008. **Product Name:** Organic Thai: Zesty Thai Green Curry Tofu.
**Manufacturer's Name:** Tofu Shop Specialty Foods Inc.
**Manufacturer's Address:** 65 Frank Martin Court, Arcata, CA 95521. Phone: 707-822-7401.
**Date of Introduction:** 2003. March.
**Ingredients:** Tofu (filtered water, organic soybeans, magnesium chloride), organic peanuts, organic coconut, organic cilantro, organic jalapeños, organic herbs and spices, sea salt.
**Wt/Vol., Packaging, Price:** 8 oz (226 gm) vacuum pack. Retails for $3.99.
**How Stored:** Refrigerated.
**New Product–Documentation:** Label sent by Matthew Schmit. 2003. Sept. 8. 2½ by 3½ inches. Self adhesive. Multi-colored on white. A stylish illustration shows a female Thai dancer. "Dice it into your veggies, or steam it to bring out the flavor!"

3009. *Ontario Soybean Growers Newsletter.* 2003. Canadian Soybean Export Association holds annual meeting. May. p. 6.
• ***Summary:*** "The Canadian Soybean Export Association (CSEA) held their 8th annual business meeting recently in Guelph. The following members were elected to lead the association in 2003-2004:

Chair: Brad Richmond, Maple Leaf Foods International
Vice-Chair: Marty Huzevka, Hensall District Co-operative
Past-Chair: Martin Vanderloo, Huron Commodities Inc.
Executive Member: Jim Gowland, OSG
Secretary / Treasurer: Kim Cooper, OSG

"CSEA is a voluntary association of members of the Canadian soybean industry, working to promote exports of Canadian soybeans and soya products into world markets. This year's activities included hosting a group of soybean industry members from Japan, Taiwan and Western Europe, participating in a technical mission to Japan, Taiwan, South Korea and Singapore, and the development of two resources to promote the Canadian soybean industry." Address: Chatham, ONT, Canada N7M 5L8.

3010. Dominy, Suzi Fraser. 2003. China: Ambitious plans for soy self-sufficiency. *World Grain* 21(6):31. June. [1 ref]
• ***Summary:*** China plans to increase domestic production of soybeans and has an ambitious long-term plan to become the world's largest producer of non-genetically engineered (GE) soybeans. In 2002-03 China's soybean production is expected to reach a record 16.6 million tonnes (metric tons), up 6% from last year and up 59% from 10 years ago. China's Ministry of Agriculture says areas of increased soybean production will be 127 counties in the northeastern provinces of Liaoning, Jilin, and Heilongjiang, as well as the northern region of Inner Mongolia.

China's rapid economic growth has increased demand for meat and fish, and consequently for soybean meal used in animal and aquatic feeds.

Soybean crushing plants now under construction or just built will increase China's crushing capacity by 27% this year, to 57 million tonnes–according to China's State Grain Bureau. ADM, during the last 3 years, has signed joint agreements with the Chinese government to operate 12 crushing plants in China. This year it announced a 50-50 joint venture with Wilmar Holdings in Singapore to construct a new plant in Shanhaiguan, near Tianjin, east of Beijing.

China's crushing industry is now divided into two: large crushers of mostly imported soybeans located mainly near the coast in southern China, and traditional smaller crushers of domestic soybeans in the main soybean growing provinces of northeastern China.

In 2002 China imported 11.48 million tonnes of soybeans from Brazil, Argentina, and the USA, worth US$2.3 billion. The amount is expected to increase by 50% this year.

A color illustration shows ADM's joint venture in the East Ocean facility.

3011. McKee, David. 2003. Southeast Asia: Growing together. Forging a refined grain industry. *World Grain* 21(8):30-32, 34-35, 37-42. Aug. [1 ref]
• ***Summary:*** The limited soybean production in the 10 ASEAN member countries benefits from varying degrees of governmental protection. Yet they are large importers, with nearly 3.5 million tonnes (metric tons) of soybean meal and 3 million tonnes of soybeans. Indonesia produces about 800,000 tonnes/year and imports 1.4 to 1.5 million tonnes. Thailand produces 600,000 to 700,000 tonnes; in 2002 Thai imports were 1.3 million tonnes of soybeans and 1.9 million tonnes of soybean meal.

The Philippines has small production, but the country's 3 crushers import about 350,000 tonnes of soybeans. Another 1.25 million tonnes of meal are imported. Vietnam also has small local production, but the country's booming feed industry imported 600,000 tonnes of soybean meal in 2002. Vietnam is the only country in the region experiencing double-digit growth in grain demand. The government has announced plans to promote more vegetable oil production and consumption, and Vietnam's first modern soybean crushing plant is now under construction. A huge new grain port is being built in South Vietnam, 70 km east of Ho Chi Minh City. The import terminal will be able to handle panamax-sized vessels.

Traditionally the USA has been the largest supplier to the region, but Brazil, Argentina and China are now taking increasing shares of that market.

3012. *Corn and Soybean Digest.*2003. Bean beat: Soy snack noodles are success with Indonesian children. Sept. p. 32.
• ***Summary:*** Some 97% of Indonesian children like to eat a healthy snack made by enriching a wheat noodle with 20% soy flour from the USA. Since Aug. 2002 more than 75,000 school children in Indonesia have received a total of 16 million packages of the protein-rich snacks through International Relief and Development (IRD).

3013. *Iowa Soybean Review (Iowa Soybean Association, Urbandale, Iowa).*2003. Top U.S. customers received assistance. 15(1):15. Oct.
• ***Summary:*** Every one of the top ten U.S. soybean customers was once a recipient of some type of U.S. foreign assistance. "Today these nations are powerful U.S. trade partners. A table shows export value in millions of U.S. dollars."

Whole soybeans: European Union $1,167 million. China $1,012. Mexico $755. Japan $724. Taiwan $385. Indonesia $245. Korea $226. Canada $130. Thailand $115. Israel $95.

Soybean meal: Canada $200 million. Indonesia $167. Philippines $138. Dominican Republic $71. Turkey $62. Saudi Arabia $59. Japan $59. Mexico $50. Egypt $49. Thailand $44. Source: U.S. Department of Commerce.

3014. Saulnier, John M. 2003. Oh soy, can you see: Edamame market climbing like Jack's Beanstalk in USA. What Emperor Cheng-Nung of China considered to be a sacred grain way back in 2838 BC has become the darling of the modern bean scene among health-conscious Americans, a staple for Japanese beer drinkers, and a popular side dish for sushi lovers the world over. *Quick Frozen Foods International* 45(2):84. Oct.
• ***Summary:*** A good, very interesting long article–especially the part about Thailand. "The East Asian legume, which has been cultivated in China for almost 5,000 years, has seemingly leapt onto the USA cuisine scene of late as more folks have mastered the dexterous skill of finger popping the beans out of their fuzzy pods onto a plate or directly into one's mouth." Imports of edamame from mainland China and Taiwan have dominated the U.S. market in recent years. Edamame grown in the USA are supplied mostly by SunRich Farms in Minnesota and Cascadian Farm in Washington state.

LACO, a company in Thailand's northern province of Chiang Mai, has long been exporting edamame to Japan. But now they are preparing to do new business in the United States, and expect to sign a contract to supply a supermarket chain in the United States.

Color photos show: (1) Front panel of Edamame Soybean Rice Bowl: Szechwan Vegetable Seapoint, by Seapoint Farms. (2) Edamame Boiled Soybean, by Shirakiku (Text also in Japanese; a brand imported from China, distributed to retail supermarkets in Los Angeles, California, by Nishimoto Trading Co., Ltd.). (3) Two men in Northern Thailand at LACO (Lanna Agro Industry Co., Ltd.) standing in front of a field of green soy beans. (4) Chotiroj WongWan, managing director of LACO and his wife, Gorragot (who is deputy managing director), standing outside their processing plant in Thailand.

3015. Koh, Joan. 2003. Youth centers. *Time (Asia).* Dec. 1.
• ***Summary:*** Singapore shops are getting a makeover. "Across the street at Cathay Cineleisure Orchard, you'll find 21 shops offering everything from animé comics to beauty products made of tofu."

3016. *Time (Europe).*2003. It's a mall world. Dec. 8.
• ***Summary:*** Singapore shops are getting a makeover. "Across the street at Cathay Cineleisure Orchard, you'll find 21 shops offering everything from animé comics to beauty products made of tofu."

3017. Del Vecchio, Claudia. 2003. New developments at the Original Well-Bean Coffee Co. Inc. (Interview). *SoyaScan Notes.* Dec. 11. Conducted by William Shurtleff of Soyfoods Center.
• ***Summary:*** Claudia's company is now international and growing. Kosmo (kosmoliving.com) is a company that was started in China, as the equivalent of Starbucks, by two Chinese lawyers who now live in China. One was born in Malaysia and the other in China, but they both have international experience and are fluent in English; one worked in New York City and both have traveled worldwide. In their extensive research, they found that–next to petroleum–coffee is the highest selling commodity. To compete with Starbucks they began to look for something different. A friend of Claudia's introduced them to her Well-Bean coffee and suggested that they might take the healthy, organic route. They liked the idea and contacted Claudia,

who explained that she is a nutritionist who does wellness, healthy eating, organic and soybeans. They liked the idea even more, so (after seeing a lawyer), Claudia signed a contract with them about 18 months ago; it includes a clause that they will not use her invention of a coffee made of equal parts coffee and roasted soybeans without including her, and that in the future she will be an integral part of the company with a job, overseeing the menus, developing new products, etc. They gave her shares in the company (but no money) in exchange for being able to use the rights to her coffee. In Nov. 2002 Kosmo opened its first shop, in Shenzhen, a city in southern China (Guangdong province), just north of Hong Kong. In June 2003 Kosmo opened its second shop in Beijing. By mid-January 2003 Kosmo plans to have 13 shops in China. Claudia and the attorneys trust each other, and she also already traveled to China twice. She met the ambassador to UNICEF (which is involved with Kosmo). She visited all 9 of the Kosmo coffee shops plus Beijing, Hong Kong, Singapore, Bangkok [Thailand]. "It's been amazing." China is a great place to launch such a business since everything is so inexpensive there and its is the world's biggest market. Their main clientele now is foreign, health-minded coffee drinkers who live and/or work in China. Kosmo was invited into Walmart and Sam's Club in China because of the Well-Bean Coffee. "The buyer called, she said she loves this new coffee, and she wants it in both Walmart and Sam's Club." Kosmo actually turned down Walmart and chose Sam's Club as a better outlet; they now have coffee carts in the huge Sam's Clubs in two locations in China–Shenzhen (opened in Aug. 2002) and Beijing; they brew the coffee-soy blend fresh in the stores and sell it to shoppers. Kosmo also managed to get exclusive rights to sell coffee at the State Council in Beijing; that's where CNN, CNBC, most reporters and Chinese government officials gather, work, and socialize.

Claudia now has 100 flavors of Well-Bean Coffee on the market. Wegmans, supermarket chain in Rochester, carries the major flavors and requires a UPC indicia. These flavors are regular, hazelnut, French vanilla, Swiss chocolate, and decaf. Her roaster takes care of packaging, labeling, and shipping the various flavors. The name of the flavor is listed on the front panel, but the amount used is so miniscule (trace amounts) that the FDA does not require that it be listed with the ingredients.

Claudia has also created a totally new beverage–a coffee-tea named "High Antioxidant Brew"–the basic idea is to combine the beneficial antioxidants of tea with the good taste of coffee. There is interest in importing it to Japan. She has also created a salt substitute (named Shakeit-Hearty–with a heart around the word "Hearty"), without using potassium chloride–which is forbidden for many cardiac patients.

Pretty soon Claudia will have an empire of great ideas and a big need for a skilled person to work full time running it. Claudia has a family and works as a nutritionist. In a growing business: "When you're one person trying to do it all–its kind of hard." She is not able to spend much time promoting her company and she has never advertised her products. Address: Founder and owner, Original Well-Bean Coffee Co., Inc., 206 Dickinson Rd., Webster, New York 14580. Phone: 1-800-633-9850.

3018. FBX. 2003. Soyfoods Summit: February 18-20, 2004. Hyatt Regency La Jolla, San Diego, California. www.foodbevx.com (Brochure). Little Falls, New Jersey: IQPC. 12 p. 28 cm.

• ***Summary:*** This brochure begins: "The Food & Beverage Exchange is proud to present its 7th Annual Soyfoods Summit." In association with Soyatech. Media partners: Nutrition Business Journal, The Soy Daily, Nutraceuticals World. The conference, which is being organized by The Food & Beverage Xchange, a division of IQPC (London, England), will have two separate tracks of presentations: (A) Technology & applications, and (A) Health benefits of soy. Summit chairs: Peter Golbitz, president, Soyatech, is chair of track A. Geri Berdak, Director, Public Affairs, The Solae Company, is chair of track B.

The facts: (1) "The US Soyfoods market has grown at an average annual rate of 14% per year for the past ten years and hit $3.65 billion in 2002." (2) "Per capita soy consumption will rise by 50% in the next 5 years." The main speakers, with their organization, track, an outline of their talk, and a small photo are given. Track A: Dr. Jonathan F. Gordon, Firmenich Inc. Hiraoki Iwamoto, Tendre Corp., Japan (frozen tofu). Phil Fass, ADM. Dr. Michael Shemer, Tivall Corp., Israel. Motohiko Hirotsuka, Fuji Oil Co Ltd, Japan. Brad Strohm, Wenger Manufacturing Inc. Mian Riaz, Texas A&M University. KeShun Liu, Univ. of Missouri at Columbia. Victor Braverman, Braverman & Associates, Mexico. Jorge Arturo Canas Diaz, Central Heledra Diaz, Costa Rica.

Track B: Milagros Virginia C. Lim, Nestle Philippines Inc, Philippines. Mark Messina, Nutrition Matters Inc. John L. Williams PhD, Univ. of South Dakota. Prof Fujian Yang Zhenhua 851 Bio-Science Co Ltd, China. Omer Kucuk M.D., FACN, Wayne State Univ., Karmanos Cancer Inst. Helen Kim PhD, Univ. of Alabama at Birmingham. Prof. Mindy S. Kurzer, Univ. of Minnesota. Dr. Ari Babaknia, DrSoy. Wendy Barrett, Eat Smart. Deborah Miller, The Solae Group.

Day 1–General session at end of day: John A. Schillinger, PhD, Heartland Fields, LLC. Peter Hannam, First Line Seeds.

Day 2–General session running all day: Paul Lang, Natural Products Inc. Seth Tibbott, Turtle Island Foods. Tom Woodward, Tetra Pak, Singapore. Ted Nordquist, WholeSoy Co. Hsien-Hsin Chang, Lightlife Foods. Gerard Klen Essink, Prosoy Research & Strategy, The Netherlands.

Frank Daller, Soyadairy, Canada. Daniel Burke, Pacific Soybean & Grain. Garnet Pigden, The Solae Company. Gerry Amantea, Hain Celestial Group Inc. Johanna McCoy, Soy Happy. Kim C. Kristoff, Gemtek.

Post-conference interactive workshops: Tim Redmond, formerly with American Soy Products. Patricia Godfrey & Danielle Karleskind, Cargill Soy Protein Solutions. Peter Golbitz, Soyatech.

For those who register and pay in full by Dec. 5, the Gold Package of conference plus three workshops the price is $2,999. By Dec. 31 it rises to $3,099. By Jan. 9 it rises to $3,199. After Jan. 9 the full price is $3,299. This does not include lodging and food. The price is $1,299 for those who register by Aug. 1, but $1,599 after Sept. 15.

Note: Talk with two people who will speak at this conference. They are paid no honorarium for speaking, and they must pay their own transportation both ways and all room and board expenses while at the conference. Why do they go? Both say this gives them an opportunity to attend the conference free of charge, to have a nice vacation in a warm and beautiful part of California, and to meet now people and promote their ideas and (informally) their products.

3019. Irawan, Bambang. 2003. El Nino and La Nina: tendency of occurrence and impact on food production. *Palawija News (Bogor, Indonesia)* 20(4):1-6. Dec.

• ***Summary:*** The 3 key variables in measuring El Nino and La Nina are: Frequency, duration, and magnitude. "El Nino events which occur for at least 4 months successively and have a high probability to induce drought and food crop failures, have shown an increase in their frequency during the last 25 years, from 3 events between 1925 and 1975, or once every 16 years, to 6 events during 1976-2000, or once every 4 years.

"El Nino magnitude, shown by extreme negative SOI (Southern Oscillation Index), also inclined to increase, from averaging -14.7 between 1925-1975 to -17.5 between 1976 and 2000. Likewise the duration of El Nino events has also increased from an average of 6 months during 1951-1975 to 9 months during 1976-2000. Most of the El Nino events occur during the dry season, April to September. Such patterns of occurrence are disadvantageous to food production in Indonesia because during the dry season farmers usually suffer from water shortages and El Nino events usually lead to rainfall decreases" [drought].

Unlike El Nino, La Nina events are usually cause increases in rainfall. Most La Nina events occur during the wet season, mainly from November to February. They can actually result in positive effects on food production by increasing the water supply, but they can also be destructive, causing floods and increase of pest problems. The frequency of La Nina events has decreased from once every 8 years during 1925-1975 to once every 12 years during 1976-2000. Likewise, the duration of El Nina events has decreased from about 10 months in 1925-1975 to 7 months in 1976-2000. La Nina magnitude has decreased from an average of +16.1 in 1926-1950 to 13.7 in 1976-2000.

Conclusion: Future El Nino events will be a more serious climatic anomaly than La Nina due to its increasing frequency, duration, and magnitude. Address: Indonesian Center for Agricultural Socioeconomic Research and Development (ICASERD), Bogor, Indonesia.

3020. Inram, N. 2003. Soya handbook. Singapore: Tetra Pak. *

3021. Food and Agricultural Organization of the United Nations. 2003. Soybeans: Area harvested, yield, and production. *FAO Yearbook–Production (Rome, Italy)* 57:115-16.

• ***Summary:*** The 2003 Production Yearbook, under "Soybeans" (p. 115-16, in English, French, and Spanish) gives area harvested (1,000 ha), yield (kg/ha), and production (1,000 metric tons), each for the years 1989-91, 1995, 1996, 1997, for the following places: World. Africa: Benin, Burkina Faso, Burundi, Congo–Democratic Republic, Cote d'Ivoire, Egypt, Ethiopia PDR, Ethiopia, Gabon, Liberia, Madagascar, Morocco, Nigeria, Rwanda, South Africa, Tanzania, Uganda, Zambia, Zimbabwe.

North and Central America: Belize, Canada, El Salvador, Guatemala, Honduras, Nicaragua, Panama, USA.

South America: Argentina, Bolivia, Brazil, Colombia, Ecuador, Paraguay, Peru, Suriname, Uruguay, Venezuela.

Asia (fmr = former). Asia: Azerbaijan, Bhutan, Cambodia, China, East Timor, Georgia, India, Indonesia, Iran, Iraq, Japan, Kazakhstan, Korea–Democratic People's Republic of (north), Korea–Republic of (south), Laos, Myanmar, Nepal, Pakistan, Philippines, Sri Lanka, Syria, Tajikistan, Thailand, Turkey, Viet Nam (Vietnam).

Europe (former). Europe. Albania, Austria, Bosnia Herzegovina, Bulgaria, Croatia, Czechoslovakia, Czech Republic, France, Germany, Greece, Hungary, Italy, Moldova Republic, Romania, Russian Federation, Serbia-Montenegro, Slovakia, Slovenia, Spain, Switzerland, Ukraine. Note: Serbia-Montenegro appears for the first time. Harvested 112,000 ha (yield = 2,099F kg/ha) in 1999-2001, 87,000 (yield = 2,369F) in 2001, 100,000 (yield = 2442F) in 2002, and 131,000 (yield = 1,720F) in 2003. Produced 224,000 metric tons in 1999-2001, 207,000 MT in 201, 244,000 MT in 2002, and 226,000 MT in 2003.

Oceania. Australia.

Note: In this 2003 Yearbook the USSR was not listed for the first time in the history of the publication.

3022. Hosoi, Tomohiro; Kiuchi, Kan. 2003. Natto–A food made by fermenting cooked soybeans with *Bacillus subtilis*

*(natto).* In: Edward R. Farnworth. 2003. Handbook of Fermented Functional Foods. Boca Raton, Florida: CRC Press. 390 p. See p. 227-50. [111 ref]

• ***Summary:*** Contents: Fermented soybean foods in Asia. Ingredients of natto: *Bacillus subtilis (natto)* spores, soybeans (color, size, protein content, sugar content, washing and storage methods). Natto processing: Washing and soaking of soybeans, steaming of soybeans, inoculation with *Bacillus subtilis (natto)* spores, packaging, fermentation, packing for shipment, changes in packages. Assessment of quality: Chemical composition, sensory tests (8 criteria), changes in consumers' preferences (growing preference for larger soybeans and natto with markedly weaker odors and strings). Health benefits: *Bacillus subtilis (natto)* cells (effects on intestinal microflora and feed efficiency, effects on the immune system, anti-allergy effect of subtilisin, fibrinolytic activity of subtilisin, role of vitamin K-2 (menaquinoe-7) in the prevention of osteoporosis), phytoestrogens–effects on cancer and osteoporosis. Conclusions.

Natto and related foods are all made by fermentation with the bacterium *Bacillus subtilis (natto).* These include sweet dou chi *(xian doushi)* in China (where it is used as a seasoning for Beijing duck [Peking duck]), kinema in Nepal and Myanmar, tua nao in Thailand, and chungkuk-jang in Korea.

In the year 2000 a total of 10.1 million metric tons of soybeans in Japan were converted directly into foods; more than 80% of these soybeans were imported. Between 1991 and 2000 there was a 13% increase in soybean consumption for natto products.

Natto makers prefer to use certain soybean varieties such as Suzuhime and Suzumaru which are grown in Hokkaido, Kosuzu in Iwate, Miyagi, and Akita Prefectures, and Natto-Shoryo in Ibaraki Prefecture.

Natto makers generally desire the following qualities in soybeans: 1. Extra small or small size (for consumers from Tokyo northward). 2. Easily washable. 3. Yellow surfaces and hila. 4. A suitable degree of stickiness when made into natto. 5. Relatively sweet taste. 5. Minimal changes in constituents and appearance during storage.

Japan's leading natto trade association is called the "Federation of Japan Natto Manufacturers Cooperative Society." A soybean allergen has been identified as *Gly m* d 28K. This allergen is found in high concentrations in various nonfermented soybean products such as soy protein isolate, tofu, dried frozen tofu, and yuba. However fermented soybean products such as natto, soy sauce and miso do not contain this allergen. Address: 1. PhD, Tokyo Metropolitan Food Research Centre; 2. PhD, Dep. of Food Science and Nutrition, Kyoritsu Women's University. Both: Tokyo, Japan.

3023. Somerville, Annie. 2003. Everyday Greens: Home cooking from Greens, the celebrated vegetarian restaurant. New York, London, Toronto, Sydney, Singapore: Scribner / Simon & Schuster. xix + 395 p. Illust. by Mayumi Oda. Index. 24 x 19 cm. [30+ ref]

• ***Summary:*** A delightful and lovely vegetarian cookbook, filled with the spirit of Greens and Zen Center in San Francisco. Soy-related recipes: Crispy spring rolls with spicy dipping sauce (with ½ lb firm tofu brushed with tamari or soy sauce. The refreshing dipping sauce contains ¼ cup tamari or soy sauce, p. 5-6). Vietnamese spring rolls with peanut-hoisin sauce (with 14 oz firm tofu, p. 7-9). Tai's Vietnamese tofu sandwich (with 1 package regular tofu, 14 to 16 oz, fried, p. 129-30. "This warm, braised tofu sandwich is reminiscent of sandwiches sold by street vendors in the cities of Vietnam"). Spring stir-fry with peanut sauce and Thai basil (with ½ lb firm tofu, p. 210-11. For the sauce: "Be sure to use high-quality nonhydrogenated peanut butter; it makes all the difference here"). Udon with miso, shiitake mushrooms, and bok choy (with ½ lb firm tofu, p. 246-48).

"The Asian pantry" (p. 358-60) includes entries for ginger, and "tofu or bean curd" (including silken tofu). "Condiments and seasonings" (p. 360-62) includes coconut milk, hoisin sauce ("This dark, intensely flavored sauce has a perfect balance of sweet and salt; that's what makes it so deliciously addictive"), miso, mushroom soy sauce, tamari, and toasted sesame oil. "The dessert pantry" (p. 363-66) includes various types of chocolate, soy milk ("For desserts and pastries, we prefer vanilla soy milk to plain soy milk; with its smooth vanilla flavor, it's especially good with chocolate"), almond paste ("just plain almonds ground with sugar"). Address: USA.

3024. Bittman, Mark. 2004. The minimalist: Tofu without a grimace. *New York Times.* March 17. p. F3(L), col. 1.

• ***Summary:*** "Like almost everyone I know, I think I should eat tofu more often. It is cheap, easy to prepare and convenient, and its health benefits are close to overwhelming." Includes a classical Vietnamese recipe for Tofu and onions in caramel sauce.

3025. Hymowitz, Ted. 2004. Early experimental gardens and swapping stations established by European powers during the Age of Exploration (Interview). *SoyaScan Notes.* April 12. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Early experimental gardens (agricultural experiment stations) and major swapping stations were developed by the Portuguese on the Cape Verde Islands (west of Guinea-Bissau), the Spanish (under Cortez / Cortés) in Mexico City, the British at Kew, Nairobi, Singapore, and the colony of Georgia (the Trustees' Garden

of Georgia, a government experimental farm at Savannah, laid out in 1733), etc.

The swapping consisted of bringing plants from Europe to these gardens or new colonies, and taking plants to Europe from these places.

Cortez was too busy with conquest to attend to the botanical garden in Mexico City (not Acapulco), so he put one of his fellow generals in charge of it; that man kept a meticulous log of his acquisitions. Unfortunately, there is no mention of soybeans. Address: Prof. of Plant Genetics, Dep. of Crop Sciences, Univ. of Illinois, Urbana, Illinois.

3026. Kikkoman Corporation. 2004. Annual report 2004. Year ended March 31, 2004. 250 Noda, Noda-shi, Chiba 278-8601, Japan. 33 p. 28 cm. [Eng]

• ***Summary:*** This year's annual report is unfortunately a minimal and rather uninteresting version with almost no information about activities in the USA and Japan, and little financial information in dollars–only yen.

Consolidated net sales fell 2.4% to ¥334.656 trillion, operating income fell 4.8% to ¥69 trillion, but net income rose 11.7% to ¥9.287 trillion. Cash dividends per share were up 25%, to ¥10 from ¥8.

Message from the CEO (Yuzaburo Mogi, with color photo): "Summary of business policy. Business principles: The activities of the Kikkoman Group are shaped by three core principles: To pursue the fundamental principle 'consumer oriented.' To provide high-quality products and services and to promote the international exchange of food culture. To become a company whose existence is meaningful to the global society.

"The future performance and prosperity of a company are the direct result of customer satisfaction. Indeed, optimizing satisfaction is the key to future growth and earnings. Accordingly, the Kikkoman Group continues to develop products imbued with value that mirror the ever-changing needs of consumers and that provide opportunities for new culinary experiences."

"In order to earn recognition as a socially responsible company whose existence is meaningful to society, Kikkoman is committed to deepening its involvement in social activities while working to assure that its operations co-exist in harmony with the environment."

"Business strategy: Overseas we are making progress ramping up production capacity at our plants in Wisconsin, U.S.A., the Netherlands and in Singapore. Shipments are also increasing steadily from our plant in China. With these developments, we are creating a foundation to enable us to meet new demand for, and stimulate greater consumption of, soy sauce in markets around the world."

The section titled "Soy sauce division" (p. 7) states: "In Japan the home-use sector, *Tokusen Marudaizu Shoyu* (premium soy sauce), *Gen-en Shoyu* (light soy sauce), *Tokusen Yuki Shoyu* (organic soy sauce) and other products generated strong sales. However, sales in the home-use sector were down year on year due to lower sales of 1-liter bottles of mainstay *Koikuchi Shoyu* (regular soy sauce)."

"From June 2003, Kikkoman progressively switched to using non-genetically modified soybeans for its soy sauce in response to customer calls for safe and reliable products that are free of any concerns surrounding genetically modified ingredients.

"Overseas, in the U.S. and Asia outside Japan, sales were sluggish in the first half of the year due to the Iraq war and fallout from SARS, but results improved in the second half on the back of a recovering economic picture. Sales continued to grow steadily in European soy sauce markets."

Small color photos across the bottom of pages 6-7 show bottles of various Kikkoman soy sauce products.

Note: SARS stands for "severe acute respiratory syndrome," a viral disease in humans. There was a near pandemic between Nov. 2002 (it began in south China) and July 2003, with 8,096 infected cases and 774 deaths. Address: Noda, Japan.

3027. Ebine, Hideo. 2004. Industrialization of Japanese miso fermentation. In: Keith H. Steinkraus, ed. 2004. Industrialization of Indigenous Fermented Foods. 2nd ed. Revised and Expanded. New York, NY & Basel, Switzerland: Marcel Dekker. xix + 796 p. See p. 99-147. Chap. 2. [87 ref]

• ***Summary:*** Contents: Introduction. History and earliest known references to miso. Indigenous process: Raw materials used in ancient times. Industrial / Commercial production today. Contrast between indigenous and modern processing. Critical steps in manufacture / fermentation. Major problems in industrialization. Optimal environmental conditions for microorganisms. Essential microorganisms for fermentation. Possible spoilage microorganisms. Chemical / Biochemical changes in miso during fermentation. Changes in physiological functions during fermentation. Forecast of the role of miso in the future.

Foods similar to miso are made in other parts of East- and Southeast Asia. They are referred to as "jiang" in China, "doenjang" in Korea, "taucho" in Indonesia, and "tao-si" in the Philippines.

Note: In the Philippines, the word "tao-si" (also spelled "tausi" or "taosi") refers to salted, fermented black soybeans (soy nuggets), not to a kind of miso. Address: Professional Engineer, Shishitsuka, Tsuchiura, Ibaraki-ken, Japan.

3028. Fukushima, Danji. 2004. Industrialization of fermented soy sauce production centering around Japanese shoyu. In: Keith H. Steinkraus, ed. 2004. Industrialization of Indigenous Fermented Foods. 2nd ed. Revised and Expanded. New York, NY & Basel, Switzerland: Marcel Dekker. xix + 796 p. See p. 1-98. Chap. 1. [179 ref]

• ***Summary:*** Contents: Introduction. History: Historical development of soy sauce in China (Chiang, shih), introduction of soy sauce in Japan, origin of fermented soy sauce in the United States. Present soy sauce situation: Japan (types of soy sauce, manufacturing, flavor components and quality evaluation), China, Southeast Asia, United States. Change of soy sauce manufacturing methods from indigenous to modern processing: Treatment of soybeans and wheat as materials, koji fermentation, brine fermentation, pressing, pasteurization, refining and bottling. Microbiology and biochemistry: Role of koji as an enzyme source (unique source of enzymes, peptidases in koji, role of proteinases in koji during protein digestion, role of glutaminase in koji in formation of glutamic acid during protein digestion) effect of heat treatment of soybean proteins on their digestibility and nutritive value (enzyme digestibility and yield of soy sauce, enzyme digestibility during and nutritive value of protein), microorganisms during brine fermentation in soy sauce (change of microflora during brine fermentation, properties of *Tetragenococcus halophilus*, properties of *Zygosaccharomyces rouxii,* properties of *Candida species),* safety of soy sauce and physiological functional properties (Studies of mycotoxins and safety of soy sauce, studies of mutagens and safety of soy sauce, long-term animal tests and anticarcinogenicity of soy sauce, other physiologically functional properties of soy sauce). Application of new technology for soy sauce manufacture: Manufacture of soy sauce through fermentation by bioreactor with immobilized whole cells, enzymatically hydrolyzed vegetable protein, breeding of koji mold through protoplast fusion. Forecast.

Contains 68 figures and 23 tables.

The section titled "Origin of fermented soy sauce in the United States" states (p. 10) that in 1907 a plant manufacturing fermented soy sauce was opened in the United States by Shinzaburo Mogi–a relative of the Mogi family of Kikkoman fame. Note: The author does not say where this plant was, nor does he cite an evidence to support his claim. As of Jan. 2005, Soyfoods Center has been unable to find any such evidence. "After that, another soy sauce company named Oriental Show-You Company was promoted in 1917 in Columbia City, Indiana." Shinzaburo Mogi was one of the stockholders in this company. Shinzo Ohki, a Japanese man living in the USA, began to make regular (koikuchi) shoyu in the traditional Japanese way, and at one time was making 30,000 gallons/ year. In 1961 the Oriental Show-You Co. was sold to Beatrice Foods, Inc. and subsequently became part of La Choy Food Products which was also owned by Beatrice.

Figure 12 (p. 28) shows imports of soy sauce to the USA from 1947 to 1981. This graph was taken, without citing the source, from: Shurtleff & Aoyagi. 1985. *Soyfoods Industry and Market,* 5th ed. p. 103.

Concerning the soy sauce market in the United States (p. 28-31): In 1973 Kikkoman opened its first plant to make fermented soy sauce at Walworth, Wisconsin. In 1998 Kikkoman opened a 2nd such plant in California. In 2001 these two Kikkoman plants made 85,000 kiloliters and 20,000 kiloliters (kL) of soy sauce respectively, for a total of 105,000 kL. To take advantage of the rapidly growing American market for soy sauce, several other foreign manufactures also opened plants making fermented soy sauce. In about 1980, Wan Ja Shan (Taiwan) opened a plant making regular Japanese-style soy sauce (koikuchi). In 1991 San-J (San Jirushi, Japan) opened a plant making tamari soy sauce. In 1994 Yamasa (Japan) opened a plant in Salem, Oregon. In 2001 the total annual production of these 3 plants was estimated at about 20,000 kL. In addition, HVP soy sauce (unfermented) is made and sold in the USA under brands such as La Choy, Chun King, and Aloha–with total production in 2001 estimated at 15,000 kL. Thus in 2001 total soy sauce production in the USA was estimated at 140,000 kL with the following market shares: Kikkoman 75%, 3 other makers of fermented soy sauce 14.2%, and HVP 10.7%. Figure 14 shows total U.S. consumption of soy sauce from 1950 to 2001, including total domestic production, total Kikkoman U.S. production, and total imports. Address: Noda Inst. for Scientific Research, Noda-shi, Japan.

3029. Kiuchi, Kan; Watanabe, Sugio. 2004. Industrialization of Japanese natto. In: Keith H. Steinkraus, ed. 2004. Industrialization of Indigenous Fermented Foods. 2nd ed. Revised and Expanded. New York, NY & Basel, Switzerland: Marcel Dekker. xix + 796 p. See p. 193-246. Chap. 4. [142 ref]

• ***Summary:*** Contents: Introduction–Description and history of natto: Raw materials, natto in East Asia (History of natto, natto in China *{douche} [doushi / douchi],* natto in Japan {itohiki-natto, cracked natto, yukiwari-natto is one of the trade names of barrel natto and a special product of Yamagata prefecture, barley natto, salted natto, dried natto, soboro-natto, how natto is used in foods}, tua'nao [thua-nao, tua nao] {incl. pe-pok in Myanmar and tau'si in Laos}, kinema, chongkuk-jung, dawadawa [the starters for these products are *Bacillus subtilis],* making of natto in the home).

Production and consumption. The fermentation process. Materials used for traditional and modern natto production. Modern manufacturing methods: Storage of raw soybeans and purification process, processes of washing and soaking, steaming and inoculation processes, natto-filling process, fermentation process, refrigeration and aging process, second packaging and shipping processes.

Change from traditional process to modern manufacturing process: Cultivation and storage of raw soybeans (traditional, modern), selection. washing and

soaking, steaming and inoculation, filling, fermentation, first refrigeration, packaging, second refrigeration. Critical steps in the manufacture and fermentation of natto. Important problems in the industrialization of natto: Soaking, steaming, filling, fermentation Optimum conditions for fermentation: Initial stage of fermentation (lag phase), middle stage of fermentation (log to stationary phases), latter stage of fermentation (death phase). Microbiology and biotechnology: Determinative or systematic characteristics of natto bacilli, difference between natto bacilli and other *B. subtilis* as natto starters, enzymes and other materials produced by natto bacilli. Other aspects of the microbiology of natto: Phages of natto bacilli, plasmids of natto bacilli. Chemical and biochemical changes during fermentation: Soybean characteristics on steaming, relationship between the components of natto and those of soybeans, changes in soybean constituents during fermentation (carbohydrates, fatty acids, organic acids and other volatile components), size of soybeans, steaming condition. Starter cultures: Marketed starters, development of new starters. Contains 26 figures.

In 1999 in Japan, about 130,000 metric tons per year of soybeans are used to make about 260,000 tons of natto or 5.20 billion 50-gm packages worth 160.5 billion yen. Approximately 500 companies make natto in Japan, but the 10 largest companies account for 85% of total production. Address: 1. Kyoritsu Women's Univ.; 2. Biotechnology Inst. of Natto, Suzuyo Kogyo Co. Ltd. Both: Tokyo, Japan.

3030. Kozaki, Michio. 2004. Tempe production in Japan. In: Keith H. Steinkraus, ed. 2004. Industrialization of Indigenous Fermented Foods. 2nd ed. Revised and Expanded. New York, NY & Basel, Switzerland: Marcel Dekker. xix + 796 p. See p. 637-45. Chap. 12. [12 ref]

• ***Summary:*** Contents: Circumstances and background of tempe. Starters for tempe production. Tempe *Rhizopus* is derived from hibiscus. Production of tempe. Nutrition and secondary processing of tempe. Future of tempe in Japan.

Before 1998, the origin of the Rhizopus mold used to make tempe in Indonesia was unknown. Research on the subject by K. Tsubaki, S. Tokumasu, and H. Konno, based on investigation of the percentage of mold genera isolated from fresh *usar* and wild hibiscus leaves in Indonesia and Japan, showed that *Rhizopus* was by far the predominant genus. Their results, shown in tables 1 and 2, were published in 1998 in the *Journal of the Japanese Tempeh Society* (vol. 3, no. 1).

Commercial tempeh production in Japan began in the 1980s. However it has gradually decreased until today it has stopped. However total annual production of about 30 tons is now continued in agricultural communities in Okayama and Saga. Address: Tokyo Univ. of Agriculture, Tokyo, Japan.

3031. Kuswanto, Kapti Rahayu. 2004. Industrialization of tempe fermentation. In: Keith H. Steinkraus, ed. 2004. Industrialization of Indigenous Fermented Foods. 2nd ed. Revised and Expanded. New York, NY & Basel, Switzerland: Marcel Dekker. xix + 796 p. See p. 587-635. Chap. 11. [88 ref]

• ***Summary:*** Contents: Introduction. Production and consumption. History of tempe. Outline of essential steps in fermentation: Cleaning the beans, soaking and hydration, boiling, dehulling and washing, steaming or boiling, inoculation, packaging, incubation or fermentation. Indigenous processes: Raw materials used in ancient times and today. Modern industrial and commercial processing methods. Changes from indigenous to modern processing methods: Treatment of raw material, starter culture, packaging and incubation, sanitation and waste management. Major problems in industrialization. Microbiology and biochemistry of fermentation. Optimum fermentation conditions. Biochemical changes during fermentation. Starter culture. Effect of processing on nutritive value. Forecast for future fermentation.

Contains 30 figures and 8 tables. Note: The source of much of the information on the history of tempeh is incorrectly cited. Address: Gadjah Mada Univ., Yogyakarta, Indonesia.

3032. Steinkraus, Keith H. ed. 2004. Industrialization of indigenous fermented foods. 2nd ed. Revised and expanded. New York, NY & Basel, Switzerland: Marcel Dekker. xix + 796 p. Illust. Pseudo-Index. 24 cm. Series: Food Science and Technology No. 136. [508 soy ref]

• ***Summary:*** This book contains the following chapters on soyfoods: 1. Industrialization of fermented soy sauce production centering around Japanese shoyu, by Danji Fukushima. 2. Industrialization of Japanese miso fermentation, by Hideo Ebine. 4. Industrialization of Japanese natto, by Kan Kiuchi and Sugio Watanabe. 11. Industrialization of tempeh fermentation, by Kapti Rahayu Kuswanto. 12. Tempe production in Japan, by Michio Kozaki. It also contains chapters on the industrialization of the production of sake, tapai, African beers, magehu, ogi, gari, Mexican pulque, Thai fish sauce (nam pla), Thai fermented fish and related products, and Myanmar fish paste and sauce.

The final chapter is titled "Industrialization of indigenous fermented food processes: Biotechnological aspects."

Soy-related chapters are also cited separately. Address: Inst. of Food Science, Cornell Univ., Geneva, New York.

3033. Narayan, Shoba. 2005. Amuse bouche: Food fight. *Time (Asia)*. Feb. 20.

• ***Summary:*** In the early 1990s, Singapore was in the avant-garde of the fusion food trend. "Some combinations were

daring–such as naturally sweet cod fish and salty miso–but others were mediocre at best."

3034. *Iowa Soybean Review (Iowa Soybean Association, Urbandale, Iowa).*2005. Vietnam–Agricultural economy is an emerging market. 16(6):20-21. March.

• ***Summary:*** Describes a trade mission to Vietnam by directors of the Iowa Soybean Promotion Board (ISPB), Nebraska Soybean Board, Nebraska Soybean Association, and by Peter Mishek, manager of international trade and business development for Ag Processing Inc (AGP). Mishek says, "The Vietnamese have a very catch-up attitude and work ethic philosophy. It's very intense. It's very focused... They realize they are behind in terms of animal and feed production... They're doing everything to catch up technologically."

They are "rapidly erecting feed mills throughout the country to meet the demands of their ever-increasing livestock production. About five years ago, Vietnam had only a handful of feed mills in the entire country. But today there are over 200 feed mills..." They are also moving to higher quality feeds for livestock and agriculture. The bigger feed mills are projecting double digit growth rates.

In 1995 Vietnam imported about 100,000 metric tons of soybean meal, whereas today they import nearly 1,2 million metric tons (MMT). "That's a tenfold increase in less than 10 years," Mishek says.

3035. Bean Me Up, Soya Station, Salad Bar. 2005. Welcome to the Soya Station (Menu). Anjuna/Vagator, Goa, India. 10 p.

• ***Summary:*** Contents: Welcome. Starters: Side dishes (incl. Spiced tofu {deep fried} with peanut or chilly sauce. Tofu or tempeh {pan fried} with peanut or tahini. Baked potato with sour cream, butter, or tofu cream cheese). Just for kids: 12 years and under (incl. Tofu bolognese, served over spaghetti. Tempeh sandwich with tortilla chips). New York Pizza (incl. Indonesian special {tempeh & pineapple}. Veg. special {tofu, onion, capsicum, mushroom & olives}, Additional toppings–tofu, tempeh). Salad bar (Tofu salad–Beet root, carrots, onions, cucumber, tofu cubes & tofunaise {vegan}, Side order of tofu or tempeh, with choice of tahini, peanut, or tomato sauce).

Good morning–Breakfast (incl. Tofu {scrambled w/ onion capsicum or butter fried w/soya sauce}, Soysage {4 pieces}, Add 10 rupees for soymilk with any breakfast dish). Desserts: Vegan (non-dairy) or dairy. Vegan includes: Soya ice cream in coconut, chocolate, banana, coffee, or berry (seasonal) flavors. Tofu brownie. All desserts served with soya whipped cream. Beverages (incl. soy milk {hot or cold}–Plain unsweetened, vanilla, chocolate, cardamom). Sandwiches (incl. Soya burger, Tofu burger, Tofu (butter fried), Tofu cream cheese {made with garlic & Herbes de Provence}, Tofu scrambled, Tofulafel. Tempeh {fried} in sesame oil & soy sauce. Seitan fried in onion). Dinner menu: All dinners are served with choice of brown rice, baked potato, or spaghetti, and vegetables of the day. Three bread choices (each with one or more of three symbols by it–vegan, dairy, hot 'n' spicy): (1) Tofu–Khadi tofu, Tofu bolognaise, Tofu lasagne, Tofu nori roll, Vegetable tofu quiche. (2) Tempeh–Tempeh potato patties, Thai style tempeh with cashew nuts, Indonesian sampler. (3) Seitan–Seitan scallopini in cream sauce (served over spaghetti). Address: 1629 Deulvaddo, Anjuna/Vagator, Goa, India 403-509. Phone: 0091-(0)832-227349.

3036. Bunge Ltd. 2005. Partnering for the future: 2004 annual report. 50 Main St., White Plains, NY 10606. 90 p. May. 28 cm.

• ***Summary:*** Consolidated net sales for 2004 (year ended Dec. 31) were $25,168 million, up 13.5% from 2003 ($22,165 million). Net income in 2004 was $469 million, up 56.3% from 2003–not including a one-time gain of $111 million on sale of soy ingredients business in Brazil. Cash dividends per share in 2004 was $0.48, up from $0.42 in 2003.

"Last year, according to the USDA, the world consumed 130 million tons of soybean meal, up from 118 million in 2000. Future growth is forecast to top 4 percent per annum.

"Demand for vegetable oil should increase at a similar rate. Growth will be particularly strong in China and India. Last year global consumption reached 100 million tons, up from 89 million tons in 2000."

"South America is cementing its position as the world's leading agricultural producer. Both Brazil and Argentina produced large soybean crops 2004, and their output is expected to grow steadily in coming years."

"Vietnam is the fastest-growing market for soybean meal consumption in Southeast Asia, a region that has seen a 40 percent increase in demand for the product since 1999 and in which Bunge is the leading importer."

"In the U.S., we formed AGRI-Bunge, LLC, a joint venture with AGRI Industries [a cooperative]. The partnership links AGRI's crop origination network in Iowa with Bunge's global sales, marketing and logistics. The result is a new source of crops for Bunge and wider market access for AGRI and U.S. farmers.

"We also entered the value-added market for cholesterol-reducing phytosterol ingredients by creating a partnership with Procter & Gamble and Peter Cremer in North America."

Eastern Europe has the "potential to regain its status as one of the world's breadbaskets." Grain exports from Black Sea nations could rise dramatically. In 2002 Bunge acquired Cereol.

In 2006 U.S. law will require labeling of trans fats. In response, Bunge and DuPont have developed Nutrim, which

contains less than 3% linolenic acid, making it naturally stable and eliminating the need for partial hydrogenation when it is used as a frying oil. This partnership links DuPont's plant science with Bunge's agribusiness and oilseed processing operations. However, Nutrim is a trademark of Pioneer Hi-Bred International, Inc. A bar chart shows projected Nutrim production, reaching 1 billion pounds by 2009. A colored graph shows global agricultural trade. Trade of soybeans and soybean products, only 50 million metric tons (MMT) in 1985, passed both wheat and coarse grains in 2001 (at about 110 MMT) and is expected to reach 175 MMT by 2015, much more than wheat and coarse grains.

Accompanying the annual report is a "Notice of Annual General Meeting of Shareholders" (89 p.). Information is given about the amount of money paid to individual company officers. For example, Alberto Weisser (chairman and CEO) was paid a base salary of $1.2 million and a bonus of $3 million, plus securities underlying options awards (130,000 shares), long-term incentive payments (LTIP; $3.7 million), and all other compensation ($55,729). Address: White Plains, New York. Phone: 914-684-2800.

3037. Mescher, Kelly. 2005. Thailand: Building demand for U.S. soybeans–personal relationship is key. *Iowa Soybean Review (Iowa Soybean Association, Urbandale, Iowa)* 16(7):16-17. Spring.

• ***Summary:*** Describes a trade mission to Thailand by directors of the Iowa Soybean Promotion Board (ISPB), Nebraska Soybean Board, Nebraska Soybean Association, and by Peter Mishek, manager of international trade and business development for Ag Processing Inc (AGP). "Thailand is often referred to as the 'agricultural super power of Southeast Asia."

"Thailand represents about 2.5 million metric tons (MMT) of soybean meal, and 2 MMT of raw" soybeans, most of which are crushed to make soybean oil and meal. The country's thriving aquaculture industry uses large amounts of soybeans in its fish feeds and shrimp feeds.

While in Thailand, the group members met with the largest feed supplier in Thailand–Charoen Pokphand (CP Group)–which is also the world's single largest buyer of soybean meal and feed manufacturer. The group also met with Thailand Oilseed Processors, a trade association. The unit of currency is the bhat; 1 billion bhat = US $25 million.

A sidebar is titled "Thai shrimp report–Post tsunami." The shrimp industry suffered total losses of US $500 million, but it is recovering fast.

3038. Brown, Samantha. 2005. Cambodia's first soya milk factory aims to nourish nation's children (News release). Agence France-Presse English Wire via NewsEdge Corporation. 2 p. July 8.

• ***Summary:*** In 1998–the year peace finally arrived in Cambodia–Pierre Tami established Hagar Soya, a micro-enterprise making fresh soy milk in Cambodia. The small business started out selling about 500 liters of soya milk and tofu locally; this gave both work and hope to dozens of poor local women. But Tami, the executive director, wanted to do more. He was successful in raising $1.3 in investment capital from an array of sources, including the World Bank's Mekong Private Sector Development Facility. He used the funds to build a state-of-the art long-life [aseptically packed] soymilk plant in Phnom Penh, Cambodia's capital.

By 2003 the expanded plant began commercial production and today it has a daily production capacity of 12,000 liters (more than 3,000 U.S. gallons). It employs 50 people, mostly poor women, who earn a decent salary. The company's flagship product, So! Soya, is now sold to more than 500 wholesalers and retailers. Plans are for 8 new soymilk products to be introduced next year.

3039. Shurtleff, William; Aoyagi, Akiko. 2005. Wei ceng zhi shu [The book of miso]. Taipei, Taiwan: Persimmon Cultural Enterprise Co., Ltd. 280 p. Nov. 14. Illust. by Akiko Aoyagi. No index. 26 cm. [Chi]

• ***Summary:*** A very attractive, complex character, Chinese-language edition of *The Book of Miso*. Address: 1. Soyfoods Center, P.O. Box 234, Lafayette, California 94549.

3040. Santoso, Sinta; Santoso, Sugeng. 2005. History of Primasoy [Tempeh maker in Australia]. Victoria, Australia. 1 p. Dec. 13.

• ***Summary:*** Both Sinta (a woman) and Sugeng (her husband) were born and raised in Malang, East Java, Indonesia. They grew up in Indonesia, where they enjoyed "Tempe Malang" as a staple food, eaten with meals at least once or twice a week. Sugeng writes: "I could remember as a child I was taken by my father, who spoke fluent English, to accompany an American to visit the tempeh village near Malang to see the tempeh production. This must have been in the sixties. I wonder if it was you."

Sinta graduated as a food chemist from Braunschweig University, Germany, and Sugeng as a process engineer from Cologne, Germany. They migrated to Australia in 1982, and were married there in 1983. They initially opened an Indonesian restaurant in Melbourne, where Sugeng met Michael Manser, the first tempeh maker in Melbourne as far as he knows. Michael has since retired; he never went to Indonesia but made excellent tempeh. After the restaurant, they worked for large companies in their professional fields. Sugeng worked for a big supermarket as a quality officer; he realized that he was not destined to work in the corporate world and began researching the tempeh industry in Australia. He came to the conclusion, after Michael retired, that there was no good quality tempeh on the market; he believes that vacuum packing and the addition of vinegar

makes the tempeh brown, chewy, watery, and bitter. "This has damaged the image of tempeh in Australia, and therefore tempeh is not very popular here now. I would really like to do some more research to extend the shelf life of tempeh so I can distribute my product interstate within Australia without using vacuum packaging." They spent months perfecting the method of making Tempe Malang in order to produce a high quality, sellable product.

"There are several tempeh manufacturers in Australia at the moment. The last of these, Nutrisoy, is owned by an Indonesian born operator. Then there are smaller operators such as Tally Ho, and Simply Soy and Blue Lotus in Melbourne. There may be more smaller manufacturers in other states which I am not aware of."

2004 July–They rent a small suburban store, close to their home at 2 Dunoon Court, Mulgrave, Victoria; they convert it into a tempeh manufacturing kitchen. The tempeh is made solely by Sinta and Sugeng.

2005 Feb.–Primasoy has its first public debut at *The Age* 'Harvest Picnic at Hanging Rock,' a food festival designed to promote locally made food and beverages. About 30,000 visitors circle the various food stands. Their tempeh was very well received by the public as a new and exciting product.

2005 March–Following the Harvest Picnic success, Primasoy begins promoting their product in selected organic food shops around Melbourne.

2006 Dec.–Sinta and Sugeng are still making tempeh commercially at Primasoy. "Things are very good. We are still experimenting with the MAP vacuum packaging. Currently we found pasteurization and light vacuum might be the way to go, but we have not yet validated it. We have been busy doing cooking demos lately and have not been concentrating on shelf life extension." They are now writing a book about tempeh. And they will have two new tempeh products early next year: (1) Tempeh with tamari, ginger and sesame oil. (2) Tempeh with roasted garlic and coriander. "Next project will be okara tempeh *(tempe gembus)* and tempeh burger. I have a leaflet with recipes and I will send it to you."

They have lost touch with Mike Manser; last they heard he was planning to move to Tasmania. Address: 2 Dunoon Court, Mulgrave 3170, Victoria, Australia.

3041. Messina, Mark J. 2005. Update on the 6th international symposium and on research on the health benefits and risks of soy (Interview). *SoyaScan Notes.* Dec. 21. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Mark is age 53. The 6th International Scientific Symposium on the Role of Soy in Preventing and Treating Chronic Disease was held in Chicago, Illinois, from 29 Oct. to 2 Nov. 2005. About 225 people attended, of whom 115-20 paid in full and another 15-20 paid in part. They have decided not to publish the proceedings in a professional journal. Mark feels that this was one of the best symposia ever. It was divided into 3 parts. (1) A Soy and Development Workshop, before the symposium, and open to the public. It was mostly about soy formula fed to infants, and its safety. Kaayla Daniel was at all the meetings and tried to get in for free on a media pass; Mark was upset. Daniel Sheehan was also there. The proceedings will be published on the Web. Solait sells almost all of the isolate used in soy infant formulas. (2) The basic symposium. (3) A post symposium meeting on soy and breast cancer. John Millner at the National Cancer Institute is thinking of doing a study on this subject to see if soy is beneficial, neutral, or harmful. It could cost about $4.9 million.

The most important paper, a breakthrough in Mark's opinion, is about the effects of supplements on hot flashes. ADM will use this to promote their isoflavones for hot flashes.

Steve Demos was given an award at the conference; he gave a heartfelt and very elegant reply.

The 7th international soy symposium will be held in Bangkok, Thailand from 7-9 March 2007–in conjunction with the 5th Southeast Asia Soyfood Seminar & Trade Show. Part of the reason for the choice of Thailand is a remarkable lady named Teeranard Chokwatana, who was present at the 6th symposium. She and her husband run a superb soyfoods company there named Nutrition House Company, Ltd. (www.nutritionhouse.co.th). Starting operations in 1991 with a vegetarian restaurant, they have 5 vegetarian restaurants and a line of vegetarian meat-alternative products. They have a royal pedigree and are very wealthy–and very nice and widely admired.

Dr. James Anderson has done another meta-analysis showing that baking soy protein isolates significantly reduces their cholesterol-lowering ability. Address: PhD, 1543 Lincoln St., Port Townsend, Washington 98368. Phone: 360-379-9544.

3042. Nutrition House Co. Ltd. 2005. Nutrition House Co. (Website printout–part). http://www.nutritionhouse.co.th. Printed Dec. 23.

• ***Summary:*** Contents: Home page: Restaurants. SPA Foods. Ready meals. J.V. About us. Health. Message from founder.

About us: "Nutrition House Co. Ltd. is committed to the manufacture of healthy meat free alternatives for the ever-growing health conscious segment of the market. Originally commencing business in 1991 with a restaurant (The Vegetarian Cottage), Nutrition House's operation has extended to a total of 5 meat free restaurants and a factory, which produces and distributes its products both nationally and internationally. Two restaurants are situated on industrial parks, offering the employees subsidized meat free meals. The remaining 3 restaurants, located around Bangkok... offer a wide variety of Thai and European meat free dishes. Our founder, Teeranard Chokwatana, is

dedicated to researching a healthy alternative to meat for ethical and health reasons." A huge sidebar down the left side of this page states: "We are SOY" in large white letters on a black background. Address: Bangkok, Thailand.

3043. Donley, Arvin. 2005. A changing market: Some Asian countries demanding high levels of oil and protein in their soybean and soybean meal imports. *World Grain* 23(12):42, 44. Dec.

• ***Summary:*** A decrease in the oil and protein levels of U.S. soybeans is leading long-time U.S. customers (such as China and the Philippines) to look to South America as their primary supplier. Nowadays the total oil plus protein levels of Brazilian soybeans are much higher than those of U.S. soybeans.

3044. Koerbitz, Werner. 2005. Status of biodiesel in Asia, the Americas, Australia, and South Africa. In: G. Knothe, J. Van Gerpen and J. Krahl, eds. 2005. *The Biodiesel Handbook.* Champaign, Illinois: AOCS Press. ix + 302 p. See p. 211-18. [7 ref]

• ***Summary:*** Contents: Introduction. The Americas: Argentina, Brazil, Canada, Nicaragua. South Africa. Australia. Asia: China, India, Japan, Malaysia, Philippines, South Korea, Thailand. Address: Austrian Biofuels Inst., Vienna, Austria.

3045. Shi, John; Ho, Chi-Tang; Shahidi, Fereidoon. 2005. Asian functional foods. Boca Raton, Florida: CRC Press. xxi + 647 p. Illust. Index. 24 cm. Series: Nutraceutical Science and Technology.

• ***Summary:*** Contents: Preface. About the editors. Series introduction. Contributors. Table of contents. 1. Functional foods and their impact on nutrition and health: Opportunities in the Asia Pacific... Contains two chapters on fermented soyfoods (Chap. 19, Miso, and Chap. 20, Doenjang) which are cited separately.

The Preface begins (p. v): "Health and 'healing' foods have a long history in Asian cultures." Asians such as the Chinese and Indians have long known that food and medicine come from the same source; they can treat illnesses and build a healthy life. Since ancient times, Chinese have compiled a remarkable amount of information about the materia medica, the use of natural substances–plants, animals, and chemical–to treat illness.

Kudzu *(Pueraria lobata, ge geng),* one of the earliest medicinal plants used in traditional Chinese herbal medicine, is discussed on pages 83-86.

In chapter 7 titled "Traditional Functional Foods in Korea," the section on "Fermented soybean foods" (p. 165-66) states that typical daily per capita consumption of these foods are: Soy sauce 20 ml, soy paste 20 gm, and hot soy paste 10 gm. In recent years there has been a decrease in soy intake due to increased use of Western seasonings such as mayonnaise, tomato ketchup, meat sauces, etc.

In Chapter 8, titled "Evolution of Korean dietary culture and health food concepts," the section on "Food as medicine" begins (p. 210): In traditional Korean culture, food was regarded as the basic source of health. It was believed that all diseases could be cured by foods. Korean knowledge of the medicinal effects of foods came, not through the sciences of nutrition, medicine, chemistry, or physiology, but through long human experience. Moreover, a key practice and discipline has long been to eat only when hungry, and not to overeat. The enormous size of the health food market in Korea today reflects the country's long tradition of 'food as medicine.'"

Page 229: "Micronutrients." Asian fish sauces are good sources of vitamin B-12 (cobalamine) because they are made from animal protein. Fish sauce from Thailand contains 1.91 mcg (micrograms) per 100 ml. This amount protects the Thai population from megaloblastic anemia caused by vitamin B-12 deficiency. The estimated average requirement for vitamin B-12 is only 2 mcg per day. However fermented soybean sauce contains very little (0.14 mcg per 100 ml); the small amount present is attributed to microbial synthesis.

Page 230: "The high salt problem." Japanese men rank highest in daily per capita sodium intake at 5.4 gm; the United States, Thailand, and New Zealand each average about 3.9 gm.–72% as much, or 28% less. Some cultures consume as little as 0.69 gm / day.

Pages 248-49: "Future potential for fish sauce." It is unclear whether fish sauce was first developed in Asia or Europe. But while it has vanished in Europe, it has become a thriving industry in Southeast Asia–perhaps because the extensive use of bland-tasting rice requires a salty and tasty protein-rich seasoning. Several species of anchovy are the preferred raw material for fish sauce. Some say that soy sauce was first developed in Japan. Address: 1. Research Scientist, Federal Dep. of Agriculture and Agri-Food Canada, Ottawa, Ontario, Canada; 2. Rutgers Univ., Rutgers, New Jersey; 3. Memorial Univ. of Newfoundland, St. John's, Newfoundland, Canada.

3046. Trieu, Thi Choi; Isaak, Marcel. 2005. Authentic recipes from Vietnam. Singapore: Periplus Editions. 112 p. Illust. (photos by Heinz von Holzen). Recipe index. 28 cm. Introduction by Annabel Jackson-Doling.

• ***Summary:*** This book often reads as if it were a written to attract tourists to Vietnam. Contents: Food in Vietnam. The imperial cuisine. The ascending dragon. Homestyle Vietnamese cooking. Cooking methods. Authentic Vietnamese ingredients (incl. tofu {p. 23}, pressed tofu {tau kwa or tou gan}, and firm tofu). Recipes.

Vietnam is in the shape of an "S" with the eastern coastline 1,600 miles long from north to south, yet only 30

miles across at the narrowest point. The country fades from cool in the north to tropical in the south. The two main deltas are the Red River Delta in the north and the Mekong Delta in the south. Vietnam is the 3rd largest rice exporter in the world after Thailand and the USA. About 60% of the arable land is devoted to rice production. Hue, in central Vietnam, was the capital of Vietnam from 1802-1945. Today Ho Chi Minh City (formerly Saigon) is the largest city in Vietnam (p. 5-8).

The section titled "The Imperial cuisine" (p. 11) is about Hue, on the banks of the Perfume River in central Vietnam. Now a rather small and sleepy place, Hue traditionally served as a cultural, educational, and religious center. It "is the site of the country's most important Buddhist monasteries and temples. It was also the political capital of Vietnam under the thirteen emperors of the Nguyen Dynasty." Hue "once inspired the creation of the most sophisticated Vietnamese cuisine [under Tu Doc (1848-1883)] and took vegetarian cuisine to even higher heights than those reached by masterful Chinese chefs."

Soy related recipes include: Yellow bean sauce (Nuoc tuong, with 3/4 cup {4 oz / 120 gm} dried yellow soy beans, boiled and drained, p. 26). Soy sauce dip (Nuoc tuong toi ot, with ¼ cup {60 ml} soy sauce, p. 26). Braised mushrooms with soy sauce (Nam xao nuoc tuong, with 2 tablespoons soy sauce, p. 49). Crab soup with tofu and rice noodles (Bun rieu, with 1 cake pressed tofu {about 7 oz / 200 gm}, p. 57). Fried tofu with lemongrass and five spice (with 4 cakes pressed tofu {about 18 oz / 600 gm in total}, halved and pressed between paper towels to remove moisture, p. 64). Stir fried water spinach with yellow bean sauce (Rau muong xao tuong, with 2 tablespoons Yellow Bean Sauce, p. 67).

The word "soy" is mentioned on pages 3, 13, 20, 26, 36, 39, 49, 72, 75, 81, 82, 88, 99, and 111.

3047. Smith, Andrew F. 2006. Soy [sauce] and ketchup / catsup (Interview). *SoyaScan Notes*. Jan. 12. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** William Shurtleff called Smith, who had written a book on the history of ketchup *(Pure Ketchup),* to ask why there were recipes in early American cookbooks titled "Tomato Soy" (Randolph 1838, p. 163) and "Soy" (Beecher 1850, p. 72) which did not call for soy [sauce] as an ingredient and did not even mention "soy" in the body of the recipe.

Smith: The price of the soy sauce imported to America from Asia in the late 1700s and 1800s would have been very high. Importers may have adulterated this soy sauce to obtain more and reduce the price. Andrew thinks that the "soy" called for in early American cookbooks would probably not have been real soy sauce; that is, it may not have been made with soybeans–you don't know for sure. Soy is a generic concept; it's like the term "ketchup," which is also a generic term. "Ketchup" and "soy" were used interchangeably. There were probably only a handful of people in 19th century America who knew was "soy" really was, and most of those did not realize that soy sauce was made from soybeans. And soy was certainly not a major part of the American diet or cookery. Mary Randolph could use the word "soy" in place of ketchup and not even give it a second thought. Ketchup is a sauce that is made from a single food product (such as mushrooms) with added spices. Soy was the same. It wasn't necessarily made from soybeans.

Once a term is adopted, like ketchup in England, it becomes an "in" word, and people then use the word to mean other things. These words are not yet clearly defined. In the United States, Noah Webster's *American Dictionary of the English Language* did not appear until 1828. It states: "Catchup or Catsup: A liquor extracted from mushrooms, used as a sauce." "Catsup: *see* Catchup, Ketchup." "Ketchup: A sauce. *See* Catchup." "Soy: A kind of sauce used in Japan."

Mary Randolph ran a boarding house. If someone came in with a "Tomato soy" recipe, she would probably have said "Okay, fine."

If a cook goes some where and samples or buys a little real soy [sauce], and finds it to be tasty, her / his goal is to go home and try to develop a kitchen recipe for it–just as with ketchup. Ketchup was originally a fermented sauce from Indonesia which included soybeans. When it arrived in England, people tried to duplicate it. Recipes are interesting in that they first show us that people were using the word "soy" to refer to sauce that contained no real soy sauce. People did not feel the need for clear definitions in the area of recipes, and especially with the terms "ketchup" and "soy." It really isn't until sauces become commercialized that clear definitions become necessary.

Concerning terms like "India soy" and "Indian soy," Shurtleff notes: Japan was closed to foreign trade until about 1868. The one exception was the Dutch trading post on the tiny island of Deshima in Nagasaki Bay in southern Japan. From there, Dutch trading ships would transport Japanese shoyu to their own network of trading posts in Southeast Asia, and to the southern tip of India, where they would sell it to the British East India Company. But, of course, they would not tell the British where it was made. So the British began calling it "India Soy" or "Indian Soy," even though (as far as we know) no soy sauce was made in India. Smith adds: The Dutch probably also traded Indonesian ketchup (kécap; Indonesian-style soy sauce, made in Indonesia) with the British, but there is less evidence of this.

In 1684, the British established a settlement on Sumatra named Bencoulin [Benkulen, Bengkulu] (alternatively spelled Bencoelen, Benkulen, Benkoelen). "It served as a center of the British pepper and spice trade during the late

17th and early 18th centuries. At the time of its founding, Bencoulin was the only British settlement in Southeast Asia." In 1825 the settlement was handed over to Dutch control in exchange for the Dutch colony of Malacca on the Malay Peninsula [in today's West Malaysia on the Strait of Malacca].

"Only one ketchup recipe known to have originated in Southeast Asia has survived. It was published by Richard Bradley in the 1732 edition of his *Country Gentleman and Farmer's Monthly Director.* The recipe was titled "Ketchup in Paste" (see Part 2, p. 150) and its main ingredient was kidney beans–which almost certainly referred to soybeans. Rich in spices, it contained no salt or sugar, so it could not have lasted for any length of time. "It appears to have had no influence on subsequent cookery writers." In short, the British first discovered ketchup–and began using the word–on the southwest coast of Sumatra, in today's Indonesia, in Bengkulu, on the Indian Ocean. That ketchup was probably Indonesian-style soy sauce. They tried to duplicate it when they returned to England, but since they didn't have soybeans, and didn't even know it contained soybeans, they developed a host of alternative recipes–based on mushrooms, walnuts, anchovies, etc.

Isn't it strange, that soy sauce was never adopted or became popular in the Netherlands, as it did in England. This raises one real question. Also: Why are there so few early records concerning soy sauce in today's Indonesia? Another question is whether the terms "India soy" and "Indian soy" refer to today's India or to the Dutch East Indies. Address: 135 Eastern Parkway, #11a, Brooklyn, New York 11238.

3048. Shurtleff, William. 2006. Thoughts and questions concerning Dutch traders, the Dutch East India Co. (VOC), soy sauce in the Dutch East Indies and the Netherlands, and the words "catchup," "catsup," "ketchup" and "ketjap" (Editorial). *SoyaScan Notes.* Jan. 15.

• ***Summary:*** During the 1600s and 1700s, traders and merchants of the Dutch East India Co. in Asia greatly preferred Japanese shoyu [soy sauce] to Indonesian kecap / ketchap [soy sauce]. In the 1640s, the Dutch replaced the Portuguese as the only nation allowed by Japan's ruling shoguns to trade with Japan. Dutch traders purchased Japanese shoyu from their trading post at Deshima, then filled orders for it from their many trading posts in the Dutch Indies (today's Indonesia and parts of India), where it was used to season foods. Dutch traders also sold it in India to British East India Co. traders, who shipped it back to England and on to the United States; in both these places it became quite popular–much more popular than it ever became in the Netherlands. The British had no access to Japan; the only way they could obtain Japanese soy sauce was to buy it from the Dutch East India Co. In short, the Dutch were the first foreigners to buy, sell, and use Japanese soy sauce.

It seems very surprising that, during this period, there is almost no evidence that these Dutch traders were importing any kind of soy sauce to the Netherlands.

Soy sauce was in England by 1679, when it was reported by John Locke in his journal. This is also the earliest date seen for soy sauce in Europe. It was not reported in the Netherlands until 1727; that year the German physician and traveler Engelbert Kaempfer wrote: "This *Soeju* [shoyu, or soy sauce] is exported by the Dutch, and brought even into *Holland."*

From 1641 to 1858 there was a Dutch East India Co. trading post on Deshima, an artificial an island in Nagasaki harbor, Kyushu. The earliest date seen for a shipment of shoyu from Deshima by Dutch traders is 1651.

About 20 years earlier, in 1619, the Dutch built Batavia [today's Jakarta] and established a settlement on Java [part of today's Indonesia].

When the British started buying "Ketchup" from the Dutch: (1) What type of Ketchup was it? Sweet or salty. Perhaps we could find the answer by doing a careful analysis of its early imitations–mushroom, walnut, and oyster ketchup. Were they basically sweet and thick like the more modern kecap manis, or were they thinner and salty–like ketjap asin or like Japanese or Chinese soy sauce? (2) Where in the Dutch East Indies was it made? (3) At which trading post did the Dutch East India Co. sell it to the British East India Co. (4) When did the earliest known sale take place and where is it recorded? (5) In what type of containers was it packaged and shipped?

If only one VOC ship a year was allowed to export Japanese goods (including soy sauce) from Deshima, the VOC would plant that shipment very carefully to maximize profits. Why would they want to sell the soy sauce at wholesale prices to the British East India Co.

The best way to understand what early ketchup was, is to study it together with soy sauce–not by itself, alone.

Did the VOC or the Dutch ever import soy sauce from the Dutch East Indies to the Netherlands? If so, starting when? What did they call it? Did they import different types?

When did soy sauce first appear in Holland / The Netherlands? Address: Founder and owner, Soyfoods Center, Lafayette, California. Phone: 925-283-2991.

3049. Welters, Sjon. 2006. Ketjap and soy sauce in the Netherlands (Interview). *SoyaScan Notes.* Jan. 15. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** Sjon first became aware of soy sauce as a child in the Netherlands in the late 1950s, when he was introduced to ketjap (sweet Indonesian-style soy sauce). When a person says "ketjap" in the Netherlands (then, as now), they mean "ketjap manis" (pronounced KET-jap

MAN-is), the sweet, thick type. People usually say simply "ketjap"; they rarely say "ketjap manis," even though that is the product name on the label. If you asked for "ketjap" in an Indonesian restaurant in the Netherlands, they would almost always bring ketjap manis.

He was first introduced to salty soy sauce years later when he became interested in macrobiotics and Japanese-style soy sauce. Sweet Indonesian-style soy sauce is sold at many supermarkets in the Netherlands, however it is usually in the special section reserved for Indonesian products; salty Indonesian soy sauce is not typically sold in that section. In the Netherlands, ketjap manis is definitely thicker than Japanese soy sauce, but not as thick as American tomato ketchup. It's consistency is more like miso-damari; if you tilt the bottle, it pours by itself. Note: Ketjap manis is fairly similar to *tonkatsu sauce,* very popular in Japan as a seasoning for deep fried foods. *Tonkatsu* means "breaded pork cutlet" (deep-fried).

For more information on ketjap manis and a color photo, go to the Conimex website (www.conimex.com); Conimex, a Dutch company specializing in the import of Indonesian food, was founded in 1932 and is now owned by Unilever. The website states: "It all started with the import of Indonesia's most important basic ingredients like spices, ketjap (sweet soy sauce) and sambal (chili paste)."

In the Netherlands, Maggi (pronounced MA-hi) is very widely used as a seasoning instead of salty Indonesian soy sauce. Made now by Nestlé, it is sold among the regular non-ethnic foods and seasonings in Dutch supermarkets. There is a special flavor in Maggi, called *lavas* (lovage, or "Maggiplant") in Dutch, that Sjon likes very much.

Note: Talk with Anneke de Weerd Shurtleff. The ingredients in Conimex Ketjap Manis are: Sugar, soya sauce (25%; water, soyabeans, salt, wheat), water, molasses, salt, brown sugar, burned sugar syrup, preservative E-202, nutrition acid E-270, aroma (with celery), bay / laurel extract. Store in a cool, dark place. The ingredients in Maggi (a concentrated liquid bouillon seasoning) are: water, hydrolyzed corn gluten and soy protein, salt, artificial flavor. "Improves vegetables, gravies, soups and stews." Address: Founder and owner, Rhapsody [natural foods restaurant], 28 Main St., Montpelier VT 05062. Phone: 802-229-6112.

3050. Altieri, Miguel; Pengue, Walter. 2006. GM soybean: Latin America's new coloniser. *Seedling (Quarterly Newsletter of Genetic Resources Action International, Barcelona, Spain).* Jan. p. 13-17. [17 footnotes]

• ***Summary:*** Contents: Introduction. Soybean deforestation. Forcing small farmers out. Soybean cultivation degrades the soil. Monocultures and ecological vulnerability. Other ecological impacts. A table titled "Global status of biotech crops in 2005," with a world map, states: "21 countries have adopted biotech crops. In 2005, global area of biotech crops reached 90 million hectares, representing an increase of 11% from 2004, equivalent to 9 million hectares. Biotech mega-countries, with 50,000 hectares or more, are (in million ha): USA 49.8. Argentina 17.1. Brazil 9.4. Canada 5.8. China 3.3. Paraguay 1.8. India 1.3. South Africa 0.5. Uruguay 0.3. Australia 0.3. Mexico 0.1. Romania 0.1. Philippines 0.1. Spain 0.1. Those with 50,000 acres or less are Colombia, Iran, Honduras, Portugal, Germany, France, Czech Republic.

A graph shows global area (million hectares) of 4 GM crops (in descending order of acreage in 2005): Soybean, maize, cotton, canola. Address: 1. Prof. of Agroecology, Univ. of California at Berkeley; 2. Prof. of Agriculture and Ecology, Univ. of Buenos Aires, Argentina.

3051. Global Industry Analysts, Inc. (GIA). 2006. Soy foods–Global strategic business report. 5645 Silver Creek Valley Rd., San Jose, California. 302 p. Jan. *

• ***Summary:*** Publisher description: This report analyzes the worldwide markets for Soy Foods in Millions of US$. The specific product segments analyzed are Soy Ingredients, and Soy Oil. The report provides separate comprehensive analytics for the US, Canada, Japan, Europe, Asia-Pacific (excluding Japan), Latin America, and Rest of World. Annual forecasts are provided for each region for the period of 2000 through 2010. The report profiles 151 companies including many key and niche players worldwide such as Archer Daniels Midland Company, Dean Foods Company, White Wave, Eden Foods, Inc., Galaxy Nutritional Foods, Inc., Gardenburger, General Mills, Glenn Foods, Greet Spot (Thailand), Griffith Laboratories (UK), H.J. Heinz Co. Hain Celestial Group, Hartz International (Australia), Hazlewood Grocery (UK), Heartland Fields (USA), Hermans Foods (Australia), High Mark Foods (New Zealand), Imagine Foods, Inc., Kerry Group PLC (Ireland), Kerry Ingredients (Australia), Kikkoman (Japan, Australia, USA, Singapore), Kimlan Foods Co. (Taiwan), Kuhne Nederland BV (Netherlands), Soyaworld, Inc., Turtle Island Foods, Inc., and Vitasoy USA, Inc.

Price: Electronic or hard copy 3,496 euros. Please note: Reports are sold as single-site single-user licenses. The delivery time for hard copies is between 3-5 business days, as each hard copy is custom printed for the organization ordering it. Electronic versions require 24-48 hours as each copy is customized to the client with digital controls and custom watermarks. Address: San Jose, California. Phone: 408-528-9966.

3052. Huang, Hsing-Tsung. 2006. My life across three continents: A memoir. Alexandria, Virginia: Published by the author. viii + 282 p. Illust. No index. 22 cm.

• ***Summary:*** The three continents are East Asia, Europe, and North America. H.T. Huang was born on 2 Nov. 1919 in Fuzhou, the capital city of Fujian province, China. He was

baptized John *(Yuehan)* with Hsing Tsung as his official Chinese name. At this time, his father was a teacher of mathematics at Trinity College Fuzhou (TCF).

Contents: List of illustrations. Acknowledgment. Foreword. 1. My childhood years. 2. Transition, Fuzhou to Malacca. 3. Growing up in Malacca. 4. Hong Kong University. 5. China interlude 1942-44. 6. Oxford and beyond. 7. Rochester, New York, and Pasadena, California. 8. Rohm & Haas. 9. Pfizer. 10. IMC, Baxter. 11. National Science Foundation. 12. Retirement years. Appendix I: China, 1979. Appendix II. China, 1982. Bibliography. Address: Goodwin House, 4800 Fillmore Ave., Alexandria, Virginia 22311.

3053. *SoyaScan Notes.* 2006. Chronology of the Dutch East India Company (VOC), 1602-1799 (Overview). Feb. 6. Compiled by William Shurtleff of Soyfoods Center.
• ***Summary:*** Throughout the 16th century (1500s), Portugal became fabulously wealthy from its monopoly of the spice trade in the East Indies. Like many commercial advantages of the time, this was achieved by control of sea routes, especially domination of the route to the East Indies via the Cape of Good Hope (at the southern tip of Africa).

A well-organized Protestant church movement developed in the Netherlands, and the dissatisfaction with Catholic Spain coincided with the Protestant revolt against the Roman Catholic Church.

1566–Anti-Catholic riots spread across the Spanish Netherlands. Philip II of Spain sends his troops whose harsh actions result in open revolt.

1568–The 80-year war of independence by the Dutch against Spain begins (ended 1648).

1579–Signing of the Union / Treaty of Utrecht with Spain marks the foundation of the United Provinces. These are the 7 northern Protestant provinces of Holland, Zeeland, Utrecht, Gelderland, Groningen, Friesland, and Overijssel. The 7 provinces that joined the union would eventually become the Netherlands; the 10 southern Catholic provinces that did not would become Belgium.

1581–The Union of Utrecht (United Provinces) declare independence from Spain.

1596–Dutch merchants begin trading with Jayakarta (today's Jakarta).

1600–The Dutch ship *Liefde* is stranded in Usuki Bay, Japan; the first Dutch contact with Japan.

1600–The Honourable East India Company is established in London, Europe's first such international trading company. The Tokugawa shogunate begins in Japan.

1602 March 20–The Dutch East India Company *(Verenigde Oostindische Compagnie, VOC*–literally "United East Indies Company") is established by Dutch merchants, when the Estates-General of the Netherlands granted it a monopoly to conduct trade, business and colonial activities in Asia. It was the world's first company to issue stocks and the first multinational corporation. The VOC eventually became the world's largest company, in existence for over 200 years. It built over 1,600 ships called East Indiamen.

The VOC consisted of 6 Chambers *(Kamers)* in Amsterdam (with 8 delegates), Middelburg (for Zeeland; 4 delegates), plus Enkhuizen, Delft, Hoorn, and Rotterdam (1 delegate each). Delegates of these chambers convened as the *Heeren XVII* (the Lords Seventeen). Because of its majority 8 delegates, the Amsterdam bloc basically decided policy. The start-up capital was 6.4 million Gulden, raised by the 8 chambers, of which 27% came from Amsterdam. This capital was raised by selling VOC stock to 1,143 subscribers.

1603 Dec. 18–The first VOC fleet of 12 ships sails under the command of Steven vander Hagen.

1605–VOC first lands in Asia. Armed Dutch merchantmen capture the Portuguese fort at Ambon (Amboyna / Amboina, a town and island in the Moluccas, in today's eastern Indonesia) and take control of the island which was the most important of the Moluccas (Spice Islands) at this time. The Portuguese had established a factory here in 1521; it was the source of their clove monopoly. This fort is developed in the VOC's first secure fort. Ambon was the headquarters of the VOC from 1610 to 1619 until the founding of Batavia (now Jakarta) by the Dutch.

1609–VOC factory (comptoir, trading post) established on site of Jacatra / Jakatra (today's Jakarta) by Dutch merchant Jan Pieterszoon Coen. Located at the far western end of the island of Java, it becomes the headquarters of the Dutch East India Company, which gradually extends control over neighboring sultanates and principalities.

1609–First VOC factory (trading post) in Japan established on the island of Hirado (Por. Firando), off Japan's southernmost island of Kyushu (northwest of Nagasaki).

1609–Twelve Years' Truce, signed in Antwerp, calls a halt to hostilities between Spain and the Seventeen Provinces.

1610–Small walled town of Paliacatta (also spelled Paliacatte; today's Pulicat) established on the east coast of southern India. It soon becomes the chief Dutch settlement and headquarters of the VOC factories on the Coromandel Coast. At its center is Fort Geldria, with its permanent garrison of Dutch soldiers, its cannon and armory to protect the various Company trading posts along the Coromandel Coast.

1612–Fort established on Ceylon (today's Sri Lanka).

1613–As early as this year, VOC leaders recognize the importance of direct trade with China. However attempts to establish a settlement on the Chinese coast in the early 1600s are not successful.

1615–Powerful Dutch merchant Isaac Le Maire tries to break the VOC monopoly on trade routes to the Indies by

sailing westward through dangerous and uncharted waters around Cape Horn, the southernmost tip of South America and into the Pacific Ocean, avoiding the VOC-controlled Straits of Magellan. The ship arrived in Jakarta in Oct. 1616, to the amazement of Governor-General Jan Coen.

1616–Danish East India Company founded.

1619–The Dutch attack and destroy Jayakarta (Jakarta, Jacatra). East of the ruins they build a new coastal town, which Coen names Batavia (essentially he renamed Jayakarta). Batavia becomes the headquarters of the VOC and of Dutch colonial power in Asia for almost 350 years.

1621–Banda Islands (in today's south central Moluccas, Indonesia) conquered by the VOC, which establishes its monopoly over nutmeg and mace there.

1621–Dutch West India Company founded. In 1624 this Dutch West India company establishes a settlement in New Amsterdam (now Manhattan, New York).

1622–VOC attack on the Portuguese in Macao / Macau fails.

1624–Chinese armies drive the VOC from the Pescadores Islands. A fortified settlement on Formosa (Taiwan) becomes VOC's base for trade with China until 1662.

1633–St. Helena island in the South Atlantic Ocean becomes a supply station.

1635–The Portuguese blockade Malacca (until 1640).

1638–Goa (capital of Portuguese India) blockaded by Dutch fleets (until 1644).

1638–Beginning of VOC's conquest of the coast of Ceylon near Kandy.

1639–The Portuguese are expelled from Japan by the shogun.

1641–The Dutch put a blockade on Melaca / Malacca (the city in today's Malaysia that controls the crucial Straits of Malacca) then seize the city from the Portuguese after 6 months. They keep this hold on Melaka for the next 150 years.

1641–The VOC trading post on Hirado (closed in 1640 by the shogun) is moved to the tiny artificial island of Deshima in Nagasaki Bay, where the men are kept as virtual prisoners (with more severe restrictions than before Shimabara Revolt and the seclusion *{sakoku}* of Japan in 1641) and allowed only one trading ship a year. The Dutch are the only Europeans allowed to trade with Japan for the next 200 years–until 1853.

1648–Treaty of Muenster ends the 80-years' war; Spain recognizes the sovereignty of the Dutch Republic, which is now the foremost commercial and maritime power in Europe, and Amsterdam is the financial center of the continent.

1651–Repeat of the war with Portugal in the Indies–in Ceylon and on the Malabar Coast of southwest India.

1652–Jan van Riebeeck establishes a supply station at Table Bay, the first European settlement near the Cape of Good Hope (on the southern tip of today's South Africa). This post later became a full-fledged Dutch colony, the Cape Colony.

1652-54–First English-Dutch sea war.

1658–Dutch replace Portuguese in Sinhalese kingdom (Ceylon) as the occupying power.

1661–Beginning of the definitive campaign (completed in 1663) to drive the Portuguese out of the Malabar Coast and to control their production of pepper.

During the 1600s (17th century), British and Dutch traders became bitter rivals in international commerce.

1662–VOC is driven out of Formosa / Taiwan by Ming Chinese troops under the command of Cheng Ch'eng-Kung, known to Europeans as Koxinga. In 1684 Manchu troops occupy Formosa.

1664–French East India Company founded.

1665-67–Second English-Dutch sea war.

1667–Dutch seize town of Macassar (Ujung Pandung) and develop trade monopoly in Makassar Strait (in today's Indonesia between East Borneo and West Sulawesi).

1667–VOC takes trading post at Achem (Aceh), the native kingdom of Sumatra.

1669–The VOC is now the richest private company the world has ever seen, with over 150 merchant ships, 40 warships, 50,000 employees, a private army of 10,000 soldiers, and a dividend payment of 40%. By now, the company is in almost constant conflict with the English. Moreover, the VOC has now grown to become a state within a state.

1682–Dutch seize Bantam in West Java. VOC outposts were also established in Persia (today's Iran), Bengal (now Bangladesh), Siam (now Thailand), and mainland China (Canton).

Dutch policy encourages monoculture of the fine spices they controlled: Amboyna for cloves, Timor for sandalwood, the Banda Islands for mace and nutmeg, and Ceylon for cinnamon.

During the 17th century, the VOC was the most important European company in the Asia trade, and Amsterdam became Europe's most important market. It took a Dutch ship 3 to 6 months to travel from Holland to Batavia. The trip was risky, in part because of the inherent dangers of bad weather and uncertain navigation, but also because no reliable method of determining longitude was discovered until the 1770s (by John Harrison in England) and measures to prevent scurvy (carrying fresh fruit, vegetables, and sauerkraut) were not put in place until the period 1772-1795.

The 17th century has been called the Dutch Golden Age, in which Dutch trade, science, and art were among the most acclaimed in the world. This Golden Age was caused by wealth, tolerance, and a new national consciousness.

1731–The Swedish East India Company founded.

1780-1784–Fourth war between the United Provinces and England; England wins, capturing many VOC ships and imposing peace terms that enabled it to trade without hindrance from the VOC and to take over key VOC settlements in Asia After this war, the VOC is in deep financial trouble.

1799 Dec. 31–The bankrupt Dutch East India Company is nationalized, dissolved and liquidated; its huge debt of 219 million Dutch guilders and all of its property are taken over by the Dutch government.

3054. *Indonesian Newsletter (Melbourne, Australia).* 2006. Old and new a delicious combination: Primasoy. 16(4):7. May.

• ***Summary:*** The article begins: "Who would ever have imagined that in the quiet Melbourne suburbs the application of modern technology to an age-old tradition would produce premium quality (and mouthwatering) results?" There Mrs. Sinta Santoso of Primasoy is making "the finest quality organic tempeh products from Australian organically grown soybeans." Describes how the tempeh is made, without vinegar. Gives recipes for Tempeh curry and Tempeh salad. Photos show both dishes and the front of the Primasoy Organic Tempeh label. Note: This newsletter is published by the consulate general of the Republic of Indonesia, Melbourne.

3055. Mescher, Kelly. 2006. Indonesia: Aquaculture and soyfoods are key selling points. *Iowa Soybean Review (Iowa Soybean Association, Urbandale, Iowa)* 17(7):14. Spring.

• ***Summary:*** "In Indonesia, the aquaculture industry is huge and growing. And aquaculture's No. 1 source of protein is soybean meal." In fact, "aquaculture is the fastest growing use of soybean meal right now."

The market for soyfoods in Indonesia is also huge and growing. They consume 2 million tons a year of soybeans. Since they have no soybean crushing plants, the soybeans are imported largely for food use. "Tempeh producers are the biggest customer of whole soybeans in Indonesia." No. 2 is tofu makers. Both tempeh and tofu are basic foods in the Indonesian diet.

Photos show: (1) Directors of the Nebraska Soybean Association observing undersea aquaculture cages. (2) Many cakes of tempeh produced in the backyard of a small mom and pop shop in Indonesia.

3056. Vandemoortele Group 2006. Vandemoortele Group takes over SoFine Foods (News release). Ghent, Belgium. 2 p. June 23.

• ***Summary:*** "The boards of Vandemoortele and Heuschen & Schrouff Foods Group confirm the takeover of SoFine Foods, a subsidiary of Heuschen & Schrouff, by Vandemoortele. SoFine Foods is a leading manufacturer of tofu, a soy-based alternative to meat products.

"Via its Alpro soya division, Vandemoortele is the European market leader in the segment of 100% natural soy products. The Heuschen & Schrouff Foods Group is through its subsidiary, Heuschen & Schrouff Oriental Foods Trading, one of the most important players in Europe in the field of import & export of authentic Asian products." Bernard Deryckere is Managing Director of Alpro. Frits Schrouff is General Director of Heuschen & Schrouff Foods Group.

"SoFine, situated in Landgraaf [Netherlands], has more than 70 employees. Set up in 1963, this organisation was the first in Europe to produce tofu on an industrial scale. Through the ensuing years SoFine Foods has grown to become a leading player in the field of tofu products. Tofu is a 100% vegetable alternative for meat products on the basis of soy and has been part of the usual diet of people in China and Japan for centuries. SoFine Foods is active, with an extensive range of tofu products (Tofu strips, Tofu mince, Tofu Balls, Tofu Burgers), in various European countries, with the focus on Belgium, the Netherlands, France and Germany. Alongside its main brand name, SoFine also owns the brand De Morgenstond, which is mainly distributed in organic food shops in Belgium and the Netherlands.

"About Heuschen & Schrouff Foods Group: The Dutch company Heuschen & Schrouff has specialised for the last 45 years in the import & export of authentic Asian products. More than 2000 articles are imported directly from countries such as Thailand, the Philippines, Singapore, Malaysia, Vietnam, Japan, China, etc. The family-run company has its own bean sprout nursery and until recently a tofu factory. The company markets its assortment in some 10 European countries. With 225 employees the group turnover is in the region of 55 million euro. SoFine realises a turnover of 8.2 million euro."

Note: Ghent, located in the Flemish region of Belgium, is the country's 2nd largest municipality by number of inhabitants.

3057. Hymowitz, Ted. 2006. The first Chinatown in the New World was in Acapulco. Soybeans were probably there (Interview). *SoyaScan Notes.* Aug. 1. Conducted by William Shurtleff of Soyfoods Center.

• ***Summary:*** We suspect, but we have no evidence, of soybeans going from the Philippines to Mexico as dunnage. We know the first Chinatown in the New World was in Acapulco. If Chinese were there, they must have had soybeans. Address: Prof. of Plant Genetics (retired), Dep. of Crop Sciences, Univ. of Illinois, Urbana, Illinois.

3058. McKee, David. 2006. South Asia: Oilseeds and feed. Regional review. Region is second largest market for

imported vegetable oil behind the E.U.; India could become a driving force in global soybean demand. *World Grain* 24(8):27-30. Aug.

• ***Summary:*** "The future of India's oilseed crushing industry is closely tied to development of the feed sector and demand for protein meals."

In about 1990 China ceased to be self-sufficient in oilseeds. Shortly thereafter, China created a new and very successful model; it eliminated the tariffs on both imported oilseeds and vegetable oil, then encouraged the oilseed processing sector to build new plants in port cities. This caused cooking oil prices to fall, which stimulated demand. It also led to the production of large amounts of high-protein oilseed meals, especially soybean meal.

A graph shows production and consumption of wheat, rice, and oilseeds in India, Pakistan, and Bangladesh in 2005/06. India, mostly because of its large population, is by far the leader in production and consumption of oilseeds in South Asia.

The major global players in the oilseed industry are Bunge, Cargill, and ADM (through its Singapore-based subsidiary, Wilmar Holdings Pte.). They have all bought into or constructed vegetable oil refineries in South Asia, starting in 2003, when Bunge acquired the vegetable oil business of Hindustan Lever. In 2004 Cargill entered a joint venture with a local company and gained control of four refineries. Wilmar, already a leader in soybean crushing in China and palm oil production in Indonesia, has partnered with the Adani Group, one of India's largest companies, to build a refinery in the state of Gujarat (in west India) at Adani's wholly owned port facility at Mundra (near Mumbai, formerly Bombay).

None of these multinationals have invested in oilseed crushing in the region–for three main regions. (1) They refine crude palm oil imported from their own operations in Southeast Asia, and soybean oil from their crushing plants in South America. (2) Indian government policy protects domestic oilseed growers and processors through high import tariffs on oilseeds (30% on soybeans) and vegetable oils (45% on soybean oil and 80% on refined palm oil). (3) They have restrictions on imports of genetically engineered soybeans.

By far the largest oilseed crusher in India or South Asia is Ruchi Soya Industries, Ltd., headquartered in the city of Indore in Madhya Pradesh state. Ruchi is said to have 25% of India's total soybean crush, and its brands are well known nationwide.

Ruchi Soya originated in the 1960s, when its charismatic founder, Mahadev Shahra, visited farmers throughout Madhya Pradesh hoping to convince them to start planting soybeans. This state is now the leading soybean producer in India, accounting for about 70% of the nation's crop. Ruchi Soya now owns and operates nine oilseed crushing plants in India, both at ports and inland. Its crushing plant at Indore is the largest in India, with a capacity of 2,500 tonnes/day. Ruchi's total soybean crushing capacity is 7,500 tonnes/day. Address: Grain industry consultant.

3059. Roonnaphai, Nareenat. 2006. Pathways out of poverty through cassava, maize and soybean in Thailand. *Palawija News (Bogor, Indonesia)* 23(3):1-4. Sept.

• ***Summary:*** "Maize, cassava and soybean are not staples in Thailand, they are food supplements and ingredients... Locally produced soybean is not large scale." Large amounts of soybeans and soy meal are imported because of booming livestock production.

"Soybean farmers in Sukhothai: In any given year, soybean can be grown three times: the early rainy season crop, late rainy season crop and the dry season crop with irrigation. Most farmers hold many farm plots and they combine paddy [rice], mung bean, morning glory *[Ipomoea aquatica; phak bung,* also called water spinach, water morning glory, water convolvulus] and chili with soybeans in their cropping pattern. Net family cash income from soybean and other crops grown in the irrigated zone is higher than multiple cropping in rainfed areas and also higher than farmers who practice soybean mono-cropping in both [either] irrigated or rainfed areas. Soybean enriches the soil and therefore there is no need to use fertilizers for crops grown after soybean reducing farm costs... Locally produced soybean is suitable for making soy milk due to its freshness and high protein content. Potential exists for simple processing of traditionally fermented Chinese soybean by farm housewife groups to expand production as well as marketing." Address: Director, Div. of Field Crop Economics Research, Bureau of Agricultural Economic Research, Office of Agricultural Economics (OAE), Bangkok, Thailand.

3060. Hymowitz, Ted. 2006. Re: Why are "India Soy" and "Indian Soy" early names for soy sauce? Letter (e-mail) to William Shurtleff at Soyfoods Center, Oct. 21. 2 p.

• ***Summary:*** Ted's guess as to why "India Soy" or "Indian Soy" were used as names for soy sauce is that it was imported into England by the Honourable East India Company. Remember, the EIC traded in China and what is today Southeast Asia. More importantly, "East India" covers more than India. Soy Sauce was probably picked up in Asia by British ships and transported to Calcutta. From there it was transshipped to England.

For the British, the main transshipment cities for Southeast Asia and greater India (what is now India, Pakistan, Sri Lanka, Bangladesh, Burma, Nepal, etc.) were Calcutta in the west, Madras in the south, and Bombay in the west. For the Spanish, Manila was a main transshipment city; goods were shipped from there to Acapulco and the Americas.

The name "ketchup" probably comes from the imports by the Dutch East India Company. Address: Prof. of Plant Genetics (retired), Dep. of Crop Sciences, Univ. of Illinois, Urbana, Illinois.

3061. AGP–A Cooperative. 2006. Annual report to members: Adding value to your harvest. 12700 West Dodge Road, P.O. Box 2047, Omaha, Nebraska 68103-2047. 33 + 4 p. 28 cm.

• ***Summary:*** Net sales for 2006 (year ended Aug. 31) were $2,360.484 million, up 0.5% from $2,348.167 million in 2005. Earnings from continuing operations (before income taxes): $75.136 million, up 49.2% from the $50.360 million in 2005.

AGP now has marketing offices in: Pecs, Hungary. Jakarta, Indonesia. Queretaro, Mexico. Manila, Philippines. Singapore. Komarno, Slovakia. Bangkok, Thailand. Istanbul, Turkey. Hanoi, Vietnam.

This was "the second best year of earnings in AGP's 23-year history... Accordingly, your Board of Directors approved total patronage refunds of $32.6 million, designating 30 percent to be paid in cash again this fiscal year... [and] equity redemption for fiscal 2006 of $28 million, making the two year total of equity redeemed $56 million. Cash patronage, equity redemption and value-based premium programs totaled over $43 million dollars for fiscal 2006, also the second best in the history of your cooperative" (p. 5).

Today AGP's "owners are 205 local cooperatives and six regional cooperatives, representing 250,000 farmers from 15 states throughout the United States and Canada" (p. 7). Note: Technically AGP represents 250,000 "producers." A producer can refer to either a farmer or a land-owner, and both can be a member of a local cooperative.

"Record premiums paid: Participants in AGP's value-based premium programs–oil and protein components, Vistive soybeans, and non-GMO soybeans–earned a record $6.4 million in premiums from those programs" (p. 9).

Note: Talk with Bill Lester, formerly of AGP. 2007. Feb. 24. AGP will pay its member co-ops total patronage refunds of $32.6 million this year. 30% of this amount ($9.78 million) will be paid in cash (from this year's earnings), and the remaining 70% ($22.8 million) comes from retained earnings (or equity) (from past years' earnings), and is called "equity redemption." AGP is redeeming the old equity that the member co-ops owned in it. Retained earnings is the members co-ops' investment in AGP. On the AGP balance sheet, this equity appears as a debt to individual member co-ops. For example: Heartland Co-op, Des Moines, Iowa. In 1999 AGP owes it $12,300. In 1998 AGP owes it $13,465, etc. right up to the current year. This debt is paid when the members' equity in the company is redeemed / allocated. The oldest debts to each member co-op are always paid first, and they are always paid before Dec. 31 each year.

A local member co-op's total earnings for any given year consists of its own earnings plus the earnings it gets from AGP. By law, the co-op must pay 20% of its net earnings that year in cash to its producer members. A typical local co-op pays 30% of that year's earnings in cash to its member producers (since that cash takes care of the tax liability) and keeps 80% as "retained earnings." Each member producer must pay the income taxes on these retained earnings–even if he doesn't get the money. One of the problems in the past is that sometimes the producer doesn't receive enough cash from his co-op to pay the tax on the "retained allocated earnings." When the producer finally gets paid his retained earnings, it is tax free.

Retained earnings is the way AGP borrows money from its co-op members to finance its ongoing operations. It takes a certain amount of cash or "working capital" to operate a business. AGP has two choices: Keep it as "retained earnings" from the membership or borrow it (as from a bank). Presently AGP has about 7 years of retained earnings (back to about the year 1999) that it has not yet paid to its co-op members. Yet this is perpetually rotating, or "rolled forward" as the oldest debts are paid back each profitable year to the co-op members. This system of paying the oldest debts first is also a way of transferring money form older producers (some of who may no longer be living) to current producers. Well-run cooperative soybean processors, such as AGP, have a relatively small number of years of unpaid retained earnings (7). Address: Omaha, Nebraska. Phone: (402) 496-7809.

3062. Ressner, Jeffrey. 2006. A dotcom for the dinner table? *Time*. Nov. 2.

• ***Summary:*** On Yahoo! Food: "The local dining guide for Los Angeles called a cheap Vietnamese veggie joint in Reseda named Vinh Loi Tofu its highest rated restaurant, based upon a single review." Whose ever heard of Vinh Loi Tofu?

3063. Nguyen, Andrea Quynhgiao. 2006. Into the Vietnamese kitchen: Treasured foodways, modern flavors. Berkeley, California: Ten Speed Press. vii + 344 p. Foreword by Bruce Cost. Illust. (color photos by Leigh Beisch). Index. 25 x 24 cm. [58 ref]

• ***Summary:*** This is a very attractive book, well written and very engaging. Soy related recipes include: Baguette sandwich (with seared or grilled firm tofu, p. 34-35). Mock turtle stew of pork, plantain, and fried tofu (p. 153-55). Panfried stuffed tofu with fresh tomato sauce (Dau hu nhoi thit xot ca, p. 188-90). Deep-fried tofu simmered with scallion (Dau hu chien tam hanh la, p. 191).

In the "Guide to ingredients" chapter are substantial entries for: Hoisin sauce (tuong hoi xin, made from

soybeans, p. 329). Soy sauce (nuoc tuong, xi dau, p. 333. "Soy sauces are not all the same. There are many kinds and they all taste different." The author prefers Pearl River Bridge, dark, golden label).

From the publisher's description: "When author Andrea Nguyen's family was airlifted out of Saigon in 1975, one of the few belongings that her mother hurriedly packed for the journey was her small orange notebook of recipes." The family fled together by air in April 1975. Andrea was only six years old. Seven days later Saigon fell to the communist North Vietnamese / Viet Cong. Her father had many connections: he was a former military governor in the administration of President Ngo Dinh Diem (1901-1963; his family name is Ngo), the first president of South Vietnam. They arrived in Camp Pendleton (the Marine Corps base) in southern California and were soon living in San Clemente. Of the 58 recipes, 39 are in English and 19 in Vietnamese. Address: Food writer, Santa Cruz, California.

3064. Planck, Nina. 2006. Real food: What to eat and why. New York and London: Bloomsbury Publishing. [viii] + 343 p. Index. 22 cm. [30+ ref]

• ***Summary:*** This book is carefully researched and very well, thoughtfully and fairly written; the author has written for *Time* magazine and comes with very good credentials for this book. Born in 1971 in Buffalo, New York. "She was a speechwriter to the U.S. ambassador to Britain when she opened the first farmers' market in London on June 6, 1999. Six months later she quit her job to open ten more markets, write *The Farmers' Market Cookbook,* and host a British television series on local food. In 2003 Nina created the Mount Pleasant Local Food Market in Washington, D.C. In New York City she ran Greenmarket, the largest network of farmers' markets in the United States. Nina's new company, Real Food, runs markets for farmers and purveyors of regional and traditional foods" ("About the author," p. 344).

The author advocates the following: (1) Eat real, traditional foods rather than more modern "industrial foods." These real foods include plenty of meat, fish, poultry, eggs, and dairy products made from whole raw (unpasteurized) milk from cows grazed outdoors on grass (rather than corn and soybeans, which cows were not designed by eat by nature) without synthetic hormones–plus real, organically grown fruits, vegetables, whole grains and legumes (including traditional soy foods), real salt, and dark chocolate

(2) Eat real fats–including butter, beef fat, coconut oil, lard, and extra-virgin olive oil, including saturated fats and cholesterol. Avoid industrial fats–such as margarine, polyunsaturated vegetable oils (including soybean, corn, and sunflower oil), and shortening. (3) Go beyond and disregard the cholesterol myth; the evidence supporting it is weak. (4) Stop eating a vegetarian diet, and especially a vegan diet (which no traditional society has ever practiced).

To start with the section on soy foods: In the Chapter 8, titled "Other real foods," the section on soy foods is titled "Traditional and industrial soy are different" (p. 225-34). Traditional soy foods are those that have a long history in the diet, and are still made in pretty much the way they used to be. Her information on the early history of the soybean and soy foods (p. 225-26) contains many errors, as well as some interesting observations. Some of the earliest soyfoods were fermented (starting with soy nuggets and jiang in China). She lists five health benefits of fermentation. Fermentation (along with cooking) helps to reduce the phytic acid in soybeans. Soy foods do not contain reliable vitamin B-12. The author states several times that soy protein is not complete protein. Most nutritionists for the past 50 years have correctly avoided this "is" vs. "is not" labeling and instead have listed all foods along a continuum from high quality to low quality. By the latest measures of protein quality, soy protein (by itself, without supplementation by cereal grains) has about the same quality as beef, but lower than that of eggs or milk. While noting that about 85% of all soybeans are genetically engineered, she fails to mention that most traditional soyfoods in the USA are made from organic, non-GE soybeans. She discusses the important part that soy plays in the Okinawan diet, where the people have the highest longevity in the world. Yet soy "should be viewed as part of a diverse diet, not as a nutritional silver bullet." We heartily agree. She lists the many traditional soyfoods (p. 231-32), made basically the traditional way, including: Bean sauce (jiang), miso, natto, soy milk (non-industrial), soy sauce. sufu (fermented tofu, incl. Filipino tahuri), tofuyu (fermented tofu from Okinawa), tamari (liquid left after miso is made), tempeh, tofu, and edamame. She recommends that we avoid modern soy protein products made from defatted soybean meal (typically extracted with hexane solvent), including soy protein isolate, "industrial soy milk," soy based infant formula, and soy sauce which uses defatted soybean meal instead of whole soybeans. But what would she do with all the oil left over after using whole soybeans?

Concerning a diet rich in fish, meat, and poultry. She partly ignores the ethical issues involved in killing billions of those animals each year and the environmental issues involved in raising them. These are both huge issues. Several complex issues that she addresses head-on and in a fair, interesting way: (1) Is milk good for humans (p. 39-86).

One of the basic hopes / agendas behind this book is that people will start to leave cities, buy a piece of land (as the author's own family did when she was age 2), grow their own food and raise their own animals for milk, meat, and eggs. There is a steadily growing number of books advocating this traditional way of life.

The Glossary (p. 306-15) contains many good definitions that most people will be able to understand. The bibliography (p. 316-21) is substantial, and there are also endnotes (p. 290-303) but the book would be better if more of its controversial or historical statements cited authoritative sources. Address: USA.

3065. Ramirez, Anthony. 2007. Where there's a plant, this librarian has an answer. *New York Times.* Jan. 16. p. A27.
• ***Summary:*** About the library of the Horticultural Society of New York (in midtown Manhattan), and its librarian Katherine Powis. States that "the Vietnamese use *Pandanus amarylifolius,* a tropical plant in the screw pine genus, to flavor soy milk."

3066. Vialle, Cynthia. 2007. Re: In 1637 the Dutch exported ten barrels of *moersackij* (shoyu) from Japan. Letter (e-mail) to William Shurtleff at Soyinfo Center, Feb. 19. 1 p.
• ***Summary:*** "About soy. Do you know that soy was also called murasaki? Sakijmoer or moersakij in the Dutch records. I have a reference of 1637 that ten barrels of moersakij were shipped from Japan to Siam or Batavia. Two Japanese historians told me that moersakij is murasaki, soy. It's nothing to do with the history of the word, but I thought it might be of some interest to you."

On March 28 Cynthia sent the following citation: "10 vaten moersackij" = 10 barrels of murasaki [soy sauce]. "Hirado, 27 Nov. 1637. Shipped in the *Aeckersloot* sailing from Hirado to Siam and Batavia.

Source of document: "Nationaal Archief, The Hague, Archive of the Dutch Factory in Japan, record number 837." Address: Leiden Univ., Netherlands.

3067. 7th international soy symposium: Role of soy in health and disease prevention. Program and abstracts. 2007. Singapore: Printed for Boon Yee Yeong. 100 p. Held 7-9 March 2007 at Shangri-La Hotel, Bangkok, Thailand. Illust. No index. 30 cm.
• ***Summary:*** This is the first time the International Symposium of the Role of Soy in Health and Disease Prevention is being held in Asia. It will take place in conjunction with the 5th Southeast Asia Soyfoods Seminar and Trade Show–Science to Market Opportunities in Asia, which will be held at the same location March 6-8. This document was compiled and organized by Boon Yee Yeong, who owns her own company in Singapore; her clients include ASA.

Contents: Scientific and organizing committee: Chair (Dr. Mark Messina), Panel of Advisors, Secretariat. About the organizers: Institute of Nutrition, Mahidol University (INMU, Thailand), ASA International Marketing (ASA IM; the overseas arm of the United States Soybean Export Council), The Soy Food Forum (SFF; a network of organizations in Asia with particular interest in soy).

Acknowledgements: Platinum and gold level sponsors: Otsuka Pharmaceutical Co., Ltd. (own SoyJoy brand), Tetra Pak Asia Pte Ld.–Soy Knowledge Centre. Silver and bronze level sponsors: The Solae Company, Solbar Plant Extracts Ltd., Green Spot Co. Ltd. (Thailand's pioneer and leading soymilk maker with over 45 years of experience. Produces a wide range of soymilk products under the Vitamilk, Vitamilk Champ, and V-soy trademarks). Media sponsor: Be Media Focus (Thailand) Co. Ltd. (Publisher of Food Focus Thailand a trade magazine). Exhibitors: 13 companies are listed, about half from the USA.

Symposium program. Post-Symposium seminar program. Speaker profiles. Symposium abstracts: Opening session: Soy and health–An overview. Session 1: Soy and cardiovascular diseases. Session 2: Soy and cancer prevention. Session 3: Soy and bone health. Session 4: Soy and menopause. Session 5: Soy and other health aspects.

Post-Symposium seminar abstracts: Soy complementary food & soy milk programs. Micronutrient fortification programs.

Poster presentation abstracts.

3068. *World Grain.*2007. Bunge to acquire Chinese soybean processing plant. 25(5):12. May.
• ***Summary:*** On April 20, Bunge announced the establishment of a joint venture to operate a soybean processing plant (which began operations in 1996) in Tianjin, China (near a modern port), with Chia Tai (Tianjin), part of the Charoen Pokpand Group, based in Thailand. Bunge will own a majority interest in the venture and will manage operation at the plant, its third in China. The plant will supply the livestock and feed industries, and the large consumer market in and around Beijing.

"Driven by rapid commercialization of its meat and feed industries and strong growth in food consumption overall, China's soybean meal and soybean oil consumption have risen at compound annual rates of over 11% and 13% respectively, since 1999, according to USDA statistics."

Under the joint venture, the plant's daily crushing capacity will be expanded to 4,000 tonnes, from its present 1,000 tons.

3069. *SoyaScan Notes.*2007. Early Dutch exports of soy sauce from Japan, and early documents that mention soy sauce in Europe (Overview). June 10. Compiled by William Shurtleff of Soyinfo Center.
• ***Summary:*** 1647–Documents show that the Dutch East India Co. (VOC) began exporting soy sauce from Japan, from their tiny artificial harbor in Nagasaki harbor, and exported some almost every year from 1751 on. Most of this soy sauce was sent and used at to their trading posts in Southeast Asia.

Concerning early documents that mention soy sauce in Europe:

1679–John Locke (England) mentions "saio" in his journal.

1688–William Dampier (England) mentions "Soy" in his journal.

1690–E.B. (England). The canting crew. "Catchup, a high East-India Sauce."

1696–Ovington, Suratt (England). "Bambou and Mangoe Achar [pickle], Souy the choicest of all Sawces, are always ready to whet the Appetite."

1705–Samuel Dale (England). "3. Soia *Offic.* [probably Officinarum] Phaseolus Japonicus ex quo Japonesium Soia, qui intinctus species est, conficitur *Herm.* Species Phaseoli parvi albi, è Japonia allata, è qua conficiunt condimentum *Ketchup* dictum, duum generum, liquidum nimirum & solidum.

1736–The first Dutch soy sauce, exported from Japan via Batavia in the Dutch East Indies, arrives in Holland.

1750–Soy sauce first arrives in the Unites States (actually the British colonies of North America) in New York City. It is imported from Europe and advertised as being on sale in a retail store.

3070. Messina, Mark. 2007. International symposium on soy meets in Thailand. *Soy Connection* 15(3):1-3. Summer.

• ***Summary:*** "The 7th International Symposium on the Role of Soy in Health and Disease Prevention was held in Bangkok in March, attended by nearly 250 scientists. The symposium was followed by a workshop on the role of soy in malnourished populations. The meetings presented an excellent opportunity for Western scientists to learn about current Asian research.

"A recurrent theme of the Symposium was the potential of soyfoods to benefit malnourished populations."

Papers on soy and heart disease were present by Paul Nestel (Australia), Kenneth Setchell (Cincinnati, Ohio, USA), and John Erdman (Univ. of Illinois).

Cancer: The session on soy and breast cancer concluded that "the evidence that adult soy intake reduces breast cancer risk is equivocal, but in contrast, evidence seems to indicate that soy intake during adolescence reduces breast cancer risk later in life. Specifically, all four of the epidemiological studies that have examined this issue have found early soy intake to be protective. In the most recent study,... researchers from the National Cancer Institute found that adult Asian women in the United States who consumed the most soy between ages 5 and 11, were 58% less likely to develop breast cancer than were women who consumed the least amount of soy during this period." Mindy Kurzer (Univ. of Minnesota) presented a study on soy protein and prostate cancer.

Also discusses soy and malnourished populations and other highlights from the Bangkok meeting. Address: M.S.

3071. Yu, Jonathan; Yu, Beth. 2007. Re: History of Cherry Food Industry / APY Food Processing in Quezon City, Philippines. Letter (e-mail) to William Shurtleff at Soyinfo Center, Aug. 24. 1 p.

• ***Summary:*** Cherry Food Industry operated as a soy processing company in 1976. In January 1985 the company was registered as APY Food Processing. APY signifies the initials of Mrs. Adelaida Pua Yu, the owner, who had the first factory running at # 74 Speaker Perez St., Barangay Lourdes, Quezon City with 10 employees. From its initial operations until January 1995, Mrs. Yu successfully maintained the factory. In 1993, Jonathan Yu and wife Beth participated in the family business operations. Since the other siblings of Jonathan were engaged in other concerns, the management and operations of the company was transferred to the youngest Jonathan Pua Yu in 1995.

The company now makes the following soy products: Nippon Tofu. Toho. Tokwa. Taohue. Soymilk. Address: Quezon City, Philippines. Phone: (632) 365-0835.

3072. Pinto, Rodrigo G.; Hunt, Suzanne C. 2007. Biofuel flows surge (Document part). In: Linda Starke, ed. 2007. *Vital Signs 2007-2008: The Trends that are Shaping Our Future.* New York, NY: W.W. Norton & Co. 166 p. 166 p. See p. 40-41. [28 ref]

• ***Summary:*** Figures (graphs) show: (1) World biofuel production, 1975-2006. It has risen dramatically since the year 2000 (when it was about 18 million liters), to about 44.3 million liters in 2006, when 86.2% of the total was ethanol and the remaining 13.8% was biodiesel. (2) Ethanol production, United States and Brazil, 1975-2006. Brazil has long been the larger producer, but was passed by the USA in 2005. (3) Biodiesel production, top four nations, 2002-06. Germany has been by far the leader for these five years. In 2006, Germany was followed by: USA (#2), France (#3), Italy (#4).

A table shows "World ethanol production 1975-2006, and biodiesel production 1991-2006." Biodiesel production grew from 11 million liters in 1991, to 143 million liters in 1993, to 1,063 million liters in 2001, to 6,153 million liters in 2006 (preliminary; up 80% over 2005).

The growth of world biodiesel production was propelled by especially rapid production increases in Malaysia, China, Colombia, Brazil, the Philippines, and the United States.

"The main forces driving this expansion include high [petroleum] oil prices, the use of ethanol in place of toxic fuel additives such as MTBE and lead, mounting concerns about climate change, and a growing array of government mandates and incentives that have strong support from the agricultural sector."

Notes: There are 1,136 liters of biodiesel in a ton; a liter of biodiesel contains roughly 87 percent as much energy as a liter of diesel.

*E.O. Licht's World Ethanol and Biofuels Report* is often cited as a good source of information on the global picture. Most biodiesel in the USA is made from soybean oil. The National Biodiesel Board is a trade association for the U.S. biodiesel industry, which works to promote policies, regulations, research and development that will lead to the increased production and use of biodiesel. Its counterpart for ethanol is the Renewable Fuels Association. Address: Worldwatch Inst., 1776 Massachusetts Ave., N.W., Washington, DC 20077-6628.

3073. Dorff, Erik. 2007. The soybean, agriculture's jack-of-all-trades, is gaining ground across Canada (Web article). http://www.statcan.gc.ca/pub/96-325-x/2007000/article/10369-eng.pdf. 14 p. Oct. 26. Printed 28 Jan. 2010. [7 ref] • ***Summary:*** An outstanding overview and description of the current status of soybeans in Canada.

Contents: Introduction. Development of the soybean sector in Canada. Growth in soybean area across the country. The soybean–an international super-crop. Soybean dollars make sense to farmers. One crop, many uses. Food for human consumption. Animal feed. Industrial products. Soybean not a "has-bean" crop in Canada. The gift of the bean (a brief early history of the soybean in the USA and Canada).

Figures: (1) Gains in soybean area reflect crop development efforts (1951-2006; 000 hectares). (2) One crop many uses. Diagram showing uses as: Food for human consumption, animal feed, industrial products. (3) Bred in Canada: soybeans of prominence. AC Proteus, Toki (for tofu), Nattawa (for natto), Maple Arrow (expanded soybean range out of southern Ontario), Maple Presto (the fastest maturing soybean). (4) Traditional soy foods: a brief guide (with a description of each). Edamame, miso, natto, soy sauce, soy milk, tempeh, tofu.

Tables: (1) Census of agriculture tracks growth in soybean area. Gives the area planted in Canada, Prince Edward Island, Nova Scotia, New Brunswick, Quebec, Ontario, Manitoba, Saskatchewan, and Alberta in the census years of 1976, 1981, 1986, 1991, 1996, 2001, and 2006. Soybeans were planted in each of these provinces in the three most recent census years. (2) Top 10 soybean producing nations (Average 2000 to 2005): After the USA, Brazil, and Argentina, China is 4th, India 5th, Paraguay 6th, Canada 7th, Bolivia 8th, Indonesia 9th. and Italy 10th. (3) Average soybean composition. Columns: Characteristic, oil, feed and meal beans, soy milk / tofu soybeans. For the latter: 100 seeds should weigh more than 20 gm. Colour very light with clear hilum, oil content 17-19%, protein content 44-47%, soluble sugar content 11-13%, insoluble sugar content 21-25%, minerals 5%. (4) Nutritional comparisons: Tofu and soy milk with ground beef and cow's milk.

Maps: (1) Soybeans in Canada (3 maps on one page). Map A shows that quite a bit of Quebec's soybean acreage lies south of the Saint Lawrence River, in the region named "Southern Quebec" (which includes the Eastern Townships at its southernmost area–its south-western end).

"Until the mid-1970s, soybeans were restricted by climate primarily to southern Ontario. Intensive breeding programs have since opened up more widespread growing possibilities across Canada for this incredibly versatile crop: The 1.2 million hectares of soybeans reported on the Census of Agriculture in 2006 marked a near eightfold increase in area since 1976, the year the ground-breaking varieties that perform well in Canada's shorter growing season were introduced" (p. 1).

"For years, soybeans were being grown in Canada but it wasn't until the Second World War that Statistics Canada began to collect data showing the significance of the soybean crop, with 4,400 hectares being reported in 1941. In fact, one year later the area had jumped nearly fourfold, to 17,000 hectares. In 1943 a program aimed at actively breeding soybeans suitable for southern Ontario was initiated.

"During the Second World War, North American manufacturers used oil from soybeans not only as a food but also to produce a wide number of industrial products including glycerine for the manufacture of nitroglycerine used for explosives and ammunition.

"By 1951, 62,967 hectares had been planted with soybeans (Figure 1), but they were still mostly confined to southern Ontario, the region with the longest and warmest growing season in Canada" (p. 2).

"It wasn't until varieties with earlier maturity and improved tolerance of cooler climates were successfully developed–the 'Maple' series of soybean cultivars–that significant soybean production was pushed beyond southern Ontario. The 1976 release of the Maple Arrow variety in particular is credited with expanding the range of soybean production into eastern Ontario (Table 1)."

The "growth between 2001 and 2006 was particularly notable in the Prairie provinces, with Manitoba's soybean area increasing sevenfold to over 141,869 hectares and its more western neighbours, Saskatchewan and Alberta, beginning to actively pursue soybean production. These gains in area were the payoff from research aimed at finding and breeding soybean varieties suited to the Prairies as well as from crop promotion and market development" (p. 5).

"In the 2006 calendar year, farm cash receipts from soybeans amounted to $680 million in Canada, making it the fifth most valuable field crop, trailing canola ($2.5 billion), wheat ($1.8 billion excluding durum), potatoes ($899 million) and corn ($753 million). In Ontario, where it was also the most planted crop, it was the top crop in terms of farm cash receipts, at $547 million, eclipsing the receipts from corn ($449 million) and wheat ($275 million)" (p. 6).

"International trade contributed to the value of soybean receipts. Preliminary figures place soybean exports at over 40% (1.5 million tonnes) of the soybeans grown in Canada in the 2006 crop year (3.5 million tonnes).

"Of the four top buyers in 2006, Japan led the list, importing $138 million in Canadian soybeans, followed by Malaysia ($52 million), the Netherlands ($49 million) and Iran ($43 million). At the same time, Canada imported about 302,000 tonnes of soybeans valued at approximately $81 million, 99% of which came from the United States" (p. 7). Address: Statistics Canada.

3074. *SoyaScan Notes.*2007. Chronology of major soy-related events and trends during 2007 (Overview). Dec. 31. Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** Feb.–The Soy Connection for the Food Industry (Vol. 1, No. 1) starts to be published by United Soybean Board as an free e-newsletter. The subject of the first issue is Qualisoy soy oil.

March 6–8 International Soy Utilization conference in Bangkok, Thailand. It is organized by: The Institute of Nutrition, Mahidol University (INMU), ASA International Marketing (ASA IM), and the Soy Food Forum Southeast Asia (SFF).

April 4–Organizations listed in the Soya & Oilseed Bluebook are invited and enabled to update their own listings online. The update listing will appear as soon as the Bluebook editors review it and in the print edition in the fall. The Bluebook will continue to be printed as a bound book. Preferred customers will receive a free copy. Qualified people or organizations in the industry who request a copy pay shipping and handling. Those outside the industry must pay for shipping and handling plus a $95 fee.

June 11–The Hain Celestial Group completes its acquisition of the tofu and meat-alternatives business of WhiteWave Foods Co., a subsidiary of Dean Foods. The product line includes grilled and baked tofu, seitan, tempeh, etc. These products are expected to complement Hain Celestial's existing meat alternatives under the Yves brand in Canada and the United States. The White Wave tofu business generated sales of approximately $8 million in the last financial year.

July 11–Solae announces that it has completed its purchase of Cargill's Prolisse line of isolated soy proteins (ISP; soy protein isolates), including the patented membrane technology for processing ISP.

Aug. 16–CPM (Waterloo, Iowa) acquires Crown Iron Works (Minneapolis, Minnesota). CPM is owned by Golbert Global, a private equity group. The acquisition doubles the size of CPM.

Aug. 7–SunOpta (incl. SunRich), headquartered in Canada, announces that it has acquired a soymilk plant in Heuvelton, New York, from ProSoya Corporation (Ottawa, Ontario). Allan Routh is president of the SunOpta Grains and Foods Group.

Sept. 11–Hain Celestial Group announces it will delay filing its annual report with the U.S. Securities and Exchange Commission (SEC) pending a review of its practices in granting stock options. Thus, the annual report was received by shareholders in April 2008, rather than the typical Nov. 2007.

3075. Brown, Lester R. 2008. Plan B 3.0: Mobilizing to save civilization. New York and London: W.W. Norton & Co. xiv + 400 p. Jan. 16. Illust. Index. 21 cm. [1023 endnotes]

• ***Summary:*** A remarkable, very important book. A must-read for all who care about the fate of their planet and civilization.

Contents: Preface. 1. Entering a new world. I. A civilization in trouble: 2. Deteriorating oil and food security. 3. Rising temperatures and rising seas. 4. Emerging water shortages. 5. Natural systems under stress. 6. Early signs of decline.

II. The response–Plan B: 7. Eradicating poverty, stabilizing population. 8. Restoring the earth. 9. Feeding eight billion well. 10. Designing cities for people. 11. Raising energy efficiency. 12. Turning to renewable energy.

III. An exciting new option. 13. The great mobilization (as during World War II). Notes. Acknowledgments. About the author.

The section titled "The changing food prospect" (p. 36-38) notes that even though there has been a drop in grain production per capita, this has been partially offset by the enormous growth in world soybean production, from 68 million tons in 1984 to 222 million tons in 2007. In Brazil and Argentina, the growth of soybean production since about 1980 has been spectacular; by 2005 soybean production in both countries was rivaling or exceeding grain production. Increasingly, high-protein soybean meal is used to feed livestock, poultry, and fish. Feed rations containing about 80% grain and 20% soybean meal are now standard fare worldwide. "This allowed the global diet to improve even as the grain supply per person was declining." The world's farmers are now struggling to expand production fast enough "to feed 70 million more people each year and to allow billions of low-income consumers to move up the food chain. But they are being further challenged by the explosive "demand for grain to produce fuel ethanol for cars."

Tables: 1-1 (p. 16). Top 20 failing states, 2006. From worst to better: Sudan, Iraq, Somalia, Zimbabwe, Chad, Ivory Coast, Democratic Republic of the Congo, Afghanistan, Guinea, Central African Republic, Haiti, Pakistan, North Korea, Burma, Uganda, Bangladesh, Nigeria, Ethiopia, Burundi, Timor-Leste [East Timor]. Some 17 of these countries have rapid rates of population growth;

they are caught in the demographic transition trap. 7-1 (p. 150). Plan B budget: Additional annual funding needed to reach basic social goals. Total: 77 billion dollars. 8-1 (p. 170). Plan B budget: Additional annual funding needed to restore the earth. Total: 113 billion. 12-1 (p. 261). World energy from renewables in 2006 and Plan B goals for 2020. 13-1 (p. 274). Plan B carbon dioxide emissions reductions and sequestrations in 2020. Reduction of 81.5% from 2006 baseline. 13-2 (p. 282). Plan B budget: Additional annual expenditures needed to meet social goals and restore the earth. Total: 77 + 113 = 190 billion. 13-3 (p. 284). Military budgets by country and for the world in 2006 and Plan B budget. Total: 1,235 vs. 190. / Can we save the earth? "It depends on you and me, on what you and I do to reverse these trends. It means becoming politically active. Saving our civilization is not a spectator sport.

"We have moved into this new world so fast that we have not fully grasped the meaning of what is happening... The two overriding policy challenges are to restructure taxes and reorder fiscal priorities." Taxes must be restructured "to get the market to tell the ecological truth." Fiscal priorities must be reordered "to get the resources needed for Plan B." (p. 285-86). Address: President, Earth Policy Inst., 1350 Connecticut Ave., N.W., Suite 403, Washington, DC 20036. Phone: 202-496-9290.

3076. Moskin, Julia. 2008. Yes, MSG: Monosodium glutamate never shook off its image problems, but these days its the secret behind spicy tuna rolls and Thai noodles. *New York Times.* March 5. p. D1, D5. Food section.
• ***Summary:*** The "Chinese restaurant syndrome" started in 1968 when a Chinese-American physician wrote a rather light-hearted letter to the *New England Journal of Medicine.* In September 2008 the University of Tokyo will host the "centenary celebrations honoring Prof. Kikunae Ikeda's 1908 discovery of glutamate flavor"–umami. Ajinomoto, a Japanese company, transformed that flavor into a crystalline powder and patented it in 1909.

Contains two recipes that use MSG as an ingredient and a photo of many commercial products that contain MSG.

3077. *Seedling (Quarterly Newsletter of Genetic Resources Action International, Barcelona, Spain).*2008. Indonesians take action over soya prices. April. p. 24.
• ***Summary:*** "In January 2008 about 10,000 people took to the streets in Jakarta to complain about the rising cost of soya, one of Indonesia's staple foods." The cause was higher shipping (petroleum) costs and higher world prices for soybeans [due in part to demand for biodiesel].

The president was forced to announce emergency measures to boost local soybean production. Indonesia now imports two-thirds of the soybeans it consumes.

3078. Hogervorst, E.; Sadjimin, T.; Yesufu, A.; Kreager, P.; Rahardjo, T.B. 2008. High tofu intake is associated with worse memory in elderly Indonesian men and women. *Dementia and Geriatric Cognitive Disorders* 26(1):50-57. June. [28 ref]
• ***Summary:*** High consumption of tofu was associated with worse memory, while high consumption of tempeh was independently associated with better memory. Tempeh contains high levels of phytoestrogens, but (due to fermentation) also contains high folate levels which may exert protective effects. But some of the tofu was made using formaldehyde as a preservative. Address: 1. Dep. of Human Sciences, Brockington Building, Loughborough Univ., Loughborough LE11 3TU, UK; 2. Univ. of Respati Health Inst., Yogyakarta, Indonesia; 3. Oxford Institute of Ageing, Oxford, Somerville College Woodstock Road, Univ. of Oxford, Oxford, UK; 4. Center for Health Research, Univ. of Indonesia, Jakarta, Indonesia.

3079. **Product Name:** Trader Joe's Edamame (Refrigerated, Ready to Eat).
**Manufacturer's Name:** Trader Joe's (Marketer-Distributor).
**Manufacturer's Address:** Monrovia, CA 91016.
**Date of Introduction:** 2008. June.
**Ingredients:** Soybeans (in the pods), salt.
**Wt/Vol., Packaging, Price:** 8 oz (237 gm) clear clamshell pack with glossy paperboard sleeve. Retails for $2.29 at Trader Joe's (2008/06, Lafayette, California).
**How Stored:** Refrigerated.
**New Product–Documentation:** Product with Label purchased at Trader Joe's in Lafayette, California. 2008. June 15. Clear clamshell tub is 5 by 7 by 2 inches deep. Glossy paperboard sleeve around tub is blue, orange and white on light and dark green. Front panel text: "Trader Joe's Soybeans in Pod. Edamame. ready-to-eat." A circular logo in the lower right corner reads: "5g of fiber * 9g of protein" around the circle (white on orange). At center of circle (orange on white): "High in fiber & good source of protein."

On the rear panel of sleeve are nutrition facts and ingredients. "Product of Thailand."

Talk with Tak Kimura of Concord. Last year Trader Joe's got rid of all of its foods that were made in China because of all the bad news about poor quality control in China. They do not import themselves, so they probably buy this from a Chinese importer, who gets it from Thailand.

Soyfoods Center taste test. 2008. June 15. Excellent flavor, texture, appearance, and label design. The level of salt seems just right.

3080. Bakkum, Leila. 2008. Update on Barry Evans and American Miso Co. (Interview). *SoyaScan Notes.* July 1. Conducted by William Shurtleff of Soyinfo Center.

• ***Summary:*** Barry Evans has moved to China and is now living and traveling there and in Thailand. He is traveling throughout the country, visiting existing suppliers, trying to find new ones, and working to be able to go direct, to eliminate middle-men. He seems to be having the best time of his life.

American Miso Co., Inc. (Rutherfordton, NC) will soon be celebrating its 30th anniversary. Greg Gonzales, a former miso maker, has moved on, and Joe Kato is now the main miso maker.

Update: e-mail from Barry Evans. 2008. July 2. "I have had the most interesting, most exciting three years of my life here in Asia. I don't know why I didn't leave the US long ago! He has found the top expert on Thai massage and has had over 100 two-hour superb treatments from her at $6/hour. He has also become an expert on and grown to love Thai cuisine.

"Thai people don't like to leave Thailand because they can't get real Thai food abroad and they never really like other cuisines very much. Now I know why."

"I have had a chance to travel widely through much of East Asia in search of the best sources of organic food and I can state unequivocally that in my own experience the Chinese especially are quite conscientious in their devotion to organic standards and have a keenly developed ecological consciousness." Address: Great Eastern Sun Trading Co., 92 Macintosh Rd., Asheville / Enka, North Carolina 28806. Phone: 828-665-7790.

3081. *SoyaScan Notes.*2008. Xiamen (Amoy), Hokkien, and the word "ketchup" (kiô-chap) (Overview). Aug. 8. Compiled by William Shurtleff of Soyinfo Center.
• ***Summary:*** Xiamen was the port of trade first used by Europeans in 1541. It was China's main port in the nineteenth century for exporting tea. As a result, Hokkien (also known as the Amoy dialect) had a major influence on how Chinese terminology was translated into English and other European languages. For example, the words "Amoy", "tea" (tê), "ketchup" (kiô-chap), "Pekoe" (peh-hô), kowtow (khàu-thâu), and possibly Japan (Jit-pún) originated from the Hokkien.

It seems likely that the Indonesian word for soy sauce (ketjap, kecap) also originated from the Hokkien of southeast China.

3082. Crown Iron Works. 2008. A crowning achievement: 130 years of innovation, perseverance, and trust. Minneapolis, Minnesota: Published by Crown. [vii] + 119 p. Illust. Index. 28 x 24 cm.
• ***Summary:*** This is a very handsome history (by Carol Pine) of Crown Iron Works, filled with fine photos and many sidebars: Contents: 1. Opportunity, grit and craftsmanship (1878-1945): Tackling tough assignments, organic growth–the "slow, hard way," every kind of building imaginable, steel posts by the millions, the roar before the rout, standing tall in World War II, getting their act together, a near-death experience. 2. Re-engineer... or disappear (1946-1969): Inspiration from Henry Ford, a far cry from forging, hail the "monarch of Manchuria" [the soybean], Crown's next near-death experience, nurturing ideas, teamwork for "curious dummies," more cause for reinvention, no ducking the facts, duck boats and Minnie's makeover. Soybeans supplant steel (1970-1982): Another Mr. Wizard, a heavy metal medley, telling it like it is, selling the "bigs," young and restless, can we do it?, a day in the life of "Sam Soybean" (diagram), aging aircraft and blind transport, a pivotal choice, pillorying paper, German engineering, Yankee ingenuity, Crown timeline. 4. Crown joins the "global village" (1983-1989): The new Crown circa 1984, the man behind the anvil, the globe trotting begins, inflation beyond imagination, extractors in Europe, consorting with Krupp, geopolitical pistachios, in China patience, from Chicago a good fit, a breach and a bond, a handshake is a deal, pairing with Pisces, home runs for crown. 5. An old company with new tricks (1990-1999): The dehulling gamble, taking it on faith, keep it simple, extraction traction, on the road again, initiative pays, good faith rewards, from bulbs to beer, Crown's global voices, from Indonesia to Mexico, doing business in Russia's wild west, birthday greetings, business a la barbecue, from detergent to diesel fuel, a genuine win-win equation, "urning" confidence. 6. Feeding and fueling the world (2000-2008): Gazillion gallons, learning from Europe, wired and willing, all points east, whose process is it?, nothing ventured, Jesse [Ventura] see, Jessee do, the road to refining, a reluctant farewell, busy, busy, busy, the "pack rats" prevail, when last seen, a day in the life of "Sam Soybean" today (color diagram), into the old carbon dioxide, locally grown food and fuel, what makes us proud. In closing. Appendixes: In closing. Employees. Management team. Office locations. Trademarks and brands. Acknowledgments. Photo credits.

Photos show: August Malmsten, John Hernlund, Andrew Nelson, Eli Anderson, Minneapolis Star and Tribune Building (Crown had a big part in the building of Minneapolis), barbed wire screw posts, A Nilson tractor, Eli and Clifford H. Anderson, Crown Iron soy bean plant, Dawson Mills' plant, Bill Kratochwill, a home coal stoker, Minneapolis structural steel projects, Clifford I. and George Anderson, Jeff Scott, Heinz Schumacher, Crown employees 1937, Clifford H. Anderson, Crown employees 1972, Crown extractor, Clifford I. Anderson, Hubert Humphrey Metrodome, a 4,000 Series Crown Exractor, a carbon dioxide press using the HIPLEX process, A Crown Friendship Engineering plant in Wuhan, China, Crown employees at 125th anniversary in 2003. Crown's new office and warehouse on Broadway and Johnson streets. George Anderson. Archimedes screw pump, Crown Model

III extractor, Crown / Schumacher Counterflow DTDC (DT = desolventizer-toaster), overseas installations (Brunswick, Georgia; Caramura, Brazil; Philippines); by the late 1980s Crown plants were computerized, Kin Kong Yee of Pisces, inside a Crown Jet Dryer, inventors Darcy Moses and Bill Stevenson, Crown Jet Dryers, new headquarters in northeast Minneapolis, Model IV extractor for the pharmaceutical industry, Clifford Anderson in China, Jeff Scott in China, Valentin Zaletkin and Boris Solovyov in Moscow, Hernan Paredes, biodiesel decanters, computer generated image inside a Crown biodiesel plant, Jesse Ventura and George, huge Crown extractor in Argentina, welded heat exchanger coils, Harburger–Freudenberger HIPLEX Press (using carbon dioxide), Cliff Anderson who retired in 2008, Crown employees in 2007, Crown management team in Aug. 2007. Address: Minneapolis, Minnesota.

3083. Nguyen, Can Van. 2008. Tofu in Vietnamese life. Translated by Duong Thanh Nguyen. In: Christine M. Du Bois, C.-B. Tan, and S.W. Mintz, eds. 2008. Urbana, Illinois: University of Illinois Press. viii + 337 p. See p. 182-194. [7 ref]

• ***Summary:*** Contents: The origins of tofu in Vietnam: Oral history and direct documentary evidence, evidence for the earlier diffusion of tofu. The role of tofu in Vietnamese life. Tofu in Vietnamese cuisine. Other soybean uses. A photo shows a man making tofu in Hanoi, Vietnam.

Tofu is a popular daily food throughout Vietnam. It would be difficult to find anyone who eats rice but never eats tofu. "Most Vietnamese consider tofu a traditional, cheap, and well-liked dish."

In Vietnam, certain villages have long specialized in tofu production. "Elderly informants told us that it is a hereditary trade, handed down from generation to generation for a long time." But these elders do not know when or how this skill came to Vietnam.

In Vietnam, it is hard to find early documents that mention tofu or soybeans, for after so many decades of war, many of the old scripts and documents have been lost. For example, the *Dai Viet Su Ky Toan Thu (Complete Set of Dai Viet History)* is thought to be the most reliable history of Vietnam. The introductory chapter of the 1983 edition states that it was written by Le Van Huu (lived AD 1230-1322), finished in 1272, and consisted of thirty volumes. But no original is known to exist today, and some scholars doubt that there ever were 30 volumes. The original of the 1983 version was edited and printed in 1697 by historians who lived some 400 years after the original edition was first printed.

Two early Vietnamese books that mention soybeans and tofu have been found. Both are available in modern editions: (1) *Van Dai Loai Ngu,* by Le Quy Don (lived AD 1723-1783); modern edition published 1962. In his discussion of grains, he mentions soybean *(dai dau).* (2) *Nu Cong Thank Lam,* by Le Huu Trac (lived AD 1720-1791); modern edition 1971. He stated that the soybean *(dau nanh)* has a sweet and warm nature, and "is good for recovery after an injury, for the beauty of women, for bone marrow, for vitality, and as an antidote for ingested toxins. He noted the tofu contains nourishing substances (known today as amino acids and vitamins)." He described two methods of separating liquid soymilk from the solid residue and then of curding the soymilk to make tofu, and he gave eight vegetarian dishes made with tofu–including: Tofu soaked in soy sauce; Wine fermented tofu. Grilled vegetarian tofu chao.

Le Quy Don and Le Hu Trac are two famous 18th century Vietnamese polymaths. Since both men were born in the early 1700s, it seems quite likely that tofu existed in Vietnam during the 1600s.

However, some scholars believe that tofu arrived in Vietnam much earlier, in the 10th to 11th centuries. These scholars given four reasons for their belief–all based on circumstantial evidence.

(1) Early relations and mass migrations: China and Vietnam have had relations for more than 2,000 years. Chinese imperial envoys imparted cultural information to small groups of Vietnamese leaders. Moreover, there were many wars between China and Vietnam throughout their ancient history. The migration of thousands of people during these times also spread cultural knowledge–such as (perhaps) how to make tofu.

(2) Migrations of Chinese and Vietnamese Buddhists: Because Buddhists have traditionally been vegetarians, they have long been interested in soybeans and soyfoods. A book titled *Thien Uyen Tap Anh,* considered to have first appeared in the 13th to 14th centuries AD, states that "the Buddhist master Vo Ngon Thong (?-AD 826) came from Quang Dong (Guangdong [Canton]), China... In December 1820 he came to Kien So temple (now in Gia Lam district, Hanoi) to meditate and founded the 'Vo Ngon Thong' sect in Vietnam" (Vietnam Buddhist Church 1990). Elsewhere the book describes how two other Chinese Buddhist masters came to Vietnam during the periods 1054-1071 and 1091-1170. In addition, the monks who were students of these masters went to China during this period to meditate. The Vietnamese may well have learned how to make and use tofu during this time either in Vietnam or in China.

(3) Exchanges between the imperial governments of China and Vietnam: There were frequent high-level exchanges. The *Complete Set of Dai Viet History* mentions that in the year 1007 the Vietnamese emperor sent two envoys to Song dynasty China; they returned in 1009. In the year 1020 another envoy went to China and returned. These envoys may have eaten tofu while in China, and they may have asked for training in how to make it.

(4) Vietnamese folk songs and sayings: "These suggest an ancient origin for tofu in Vietnam." The words to one

song say: "If you want to enjoy tofu with traditional Chinese soy sauce, sharpen your knife ad scissors, shave your head, and become a monk." This suggests that tofu first appeared in Vietnam in Buddhist temples–during the Northern Song dynasty in China, and the Ly and Tran dynasties in Vietnam. Nevertheless, these are only theories.

Since ancient times, Vietnamese have eaten "vegetarian dishes every day, including tofu, in accord with their beliefs that vegetarian food is clean and promotes tranquility."

In Vietnam today, various types of tofu are sold including: Firm tofu, grilled tofu, deep-fried tofu, fermented tofu, and soft tofu. It is used in four basic categories of dishes: vegetarian, nonvegetarian, vegetarian soups, and nonvegetarian soups. The two most popular dishes cooked in Vietnamese homes are: Boiled tofu with sauce *(dau phu luoc)*. Tofu cooked with tomatoes and ginger *(dau phu sot ca chua)*.

Other foods made from soybeans: (1) Soymilk, served sweetened with sugar. Before carbonated beverages / soft drinks became popular, during the hot summer months, soymilk was the favorite drink in Vietnam. Today some families still make soymilk at home. (2) Soy sauce (dau tuong). (3) Sweet silken tofu, curded with calcium sulfate *(tao pho)*. (4) Meat alternatives made from tofu. Address: National Academy of Social Sciences and Humanities, Hanoi, Vietnam, researcher at Chinese Studies Institute..

3084. Sidharta, Myra. 2008. Soyfoods in Indonesia. In: Christine M. Du Bois, C.-B. Tan, and S.W. Mintz, eds. 2008. Urbana, Illinois: University of Illinois Press. viii + 337 p. See p. 195-207. [17 ref]

• ***Summary:*** Contents: Introduction. The promotion of soybeans. The story of tofu in Indonesia. Indonesia's *Oncom*. *Tempe*–what is it, and how is it made? The story of *Tempe*. Other soyfoods. Soy products as a source of proteins. Conclusion. Notes. Address: University of Indonesia, lecturer of Faculty of Letters..

3085. **Product Name:** Trader Joe's Edamame (Shelled, Refrigerated, Ready to Eat).

**Manufacturer's Name:** Trader Joe's (Marketer-Distributor).

**Manufacturer's Address:** Monrovia, CA 91016.

**Date of Introduction:** 2008. September.

**Ingredients:** Soybeans (shelled), salt.

**Wt/Vol., Packaging, Price:** 8 oz (237 gm) clear clamshell pack with glossy paperboard sleeve. Retails for $2.29 at Trader Joe's (2009/04, Lafayette, California).

**How Stored:** Refrigerated.

**New Product–Documentation:** Product with Label purchased at Trader Joe's in Lafayette, California. 2009. April 19. Clear clamshell tub is 5 by 6 by 2 inches deep. Glossy paperboard sleeve around tub is dark green, white and orange and white on light and dark green. Front panel text: "Trader Joe's Shelled Soybeans. Edamame. ready-to-eat." A circular logo in the lower right corner reads: "5g of fiber * 9g of protein" around the circle (white on orange). At center of circle (orange on white): "High in fiber & good source of protein."

On the rear panel of sleeve are nutrition facts and ingredients. "Product of Thailand."

Soyfoods Center taste test. 2009. April 19. Excellent flavor, texture, appearance, and label design. These shelled soybeans seem to need more salt.

3086. Associated Press 2008. As prices for U.S. soybeans rise, so does hunger in Indonesia: The country relies on imports to produce staples such as tempeh and tofu. But with costs soaring, producers and vendors are cutting back or going out of business. *Los Angeles Times*. Nov. 2.

• ***Summary:*** Many of Indonesia's poor have long relied on tempeh and tofu and tasty, nutritious, low-cost sources of protein and basic food. But now the cost of the two foods has doubled, driven by the soaring price of soybeans imported from the United States.

The same problem is found in countries worldwide. During the past 10 years, Indonesia–a nation of 220 million people–went from growing more than half its soybeans, to importing 70% of its needs from the USA. This is the negative side of globalization. Address: Los Angeles Times.

3087. Kim, Vitali. 2008. Yuba in Russia (Interview). *SoyaScan Notes*. Nov. 11. Conducted by William Shurtleff of Soyinfo Center.

• ***Summary:*** Quite a bit of dried yuba (fu-ju; dried bean curd sticks) is now consumed in Russia, especially in salads. Most of it is imported from China and Vietnam. The Russian people eat yuba because they like the flavor. The price of dried yuba (fu-ju) is now about 190 rubles ($7.00) per kg.

Vitali has purchased equipment for making tofu and called (and e-mailed) to ask about "technology for fu-ju production."

Note: Elista is located between the Black Sea and the Caspian Sea, not far north of the Caucasus mountains. Address: Elista, Republic of Kalmykia, Russia.

3088. Lyddon, Chris. 2008. Global grain trade review: Volatility the dominant factor in the 'wildest 12 month history of the grain market.' *World Grain* 26(11):26-33. Nov.

• ***Summary:*** A table titled "Global grain trade activity (in 1,000 tonnes)" gives the following statistics for soybeans: 2007-08 Top exporters: 1. United States 31,434. 2. Brazil 25,500. 3. Argentina 13,500. 4. Paraguay 5,080. 5. Canada 1,825. World total 78,968 (+15% over last year).

Top soybean importers: China 36,500. E.U.-27 15,400. 3. Japan 4,050. 4. Mexico 3,750. 5. Argentina 2,950.

Also gives the top 5 importers and exporters of soybean meal for 2007-08. Exporters include: 4. India 4,850. 5. Paraguay 1,112. World total 56,2062 (+6%). Top importers: 1. E.U.-27 23,900. 2. Indonesia 2,400. 3. Vietnam 2,400. 4. Thailand 1,950. 5. Korea 1,835.

Various factors have been cited as the cause of this volatility: (1) Energy policy–using maize, rapeseed, and soybeans to make biofuels. (2) Commodity speculators–who can make prices rise faster than they would otherwise. (3) Hedge fund position limits. (4) Government intervention by embargoes and export taxes. (5) The low value of the U.S. dollar. (6) The long term trend (spanning about 15 years) of declining wheat acres. (7) Fundamentally tight stocks. (8) Disruption of supply by things like floods. Address: European editor; chris.lyddon@ntlworld.com.

3089. Vitasoy International Holdings Ltd. 2008. Interim report 2008. New Territories, Hong Kong. 48 p. Nov. 30 cm. [Eng; Chi]

• ***Summary:*** For the six months ended 30 Sept. 2008, group turnover (sales) was HK$1,425 million, up 20% over the same period last year. Gross profit was HK$637 million, up 12% over the same period last year. "In view of the Group's strong financial position and satisfactory operating performance, the Board of Directors has declared an interim dividend of HK$2.8 cents per ordinary share." Sales performance was very encouraging in Mainland China (60%) and in Australia and New Zealand (23%); it was healthy in Hong Kong (5%) and in North America (5%).

North America production efficiency: During the 1st half of fiscal 2008/09 the Group's production plant in Ayers, Massachusetts [Nasoya] had sales of HK$175 million, an increase of 11% over the same period last year. "Operating loss narrowed to HK$9 million, versus HK$10 million for the corresponding period in fiscal 2007/08" (p. 12).

North America market performance: In 2007, retail sales of soyfoods grew by only 1%. Tofu sales decreased by 2% whereas soymilk sales grew by 3%, of which refrigerated soymilk was up 6% and ambient [Aseptic] soymilk was down 8%. "Total tofu sales grew by a healthy 12% while pasta sales were up by an even more impressive 34%. However soymilk and imported products were down by 16% and 33% respectively" (p. 12-13).

In April 2008 the Vitasoy Group acquired the entire equity of Unicurd Food Co., (Private) Ltd. ("Unicurd"), which is a leading manufacturer and marketer of soyfoods in Singapore. "This acquisition is aimed at expanding the Group's market presence in the Asia Pacific Region." The Unicurd production plant "at Senoko South Road, Singapore, supports the Singaporean market and exports to Europe, New Zealand, South Africa, Dubai and other parts of Asia. In the six months to 30 Sept. 2008 Unicurd recorded total sales revenue of HK$31 million..." (p. 13).

In Hong Kong, Vitasoy has a new logo and package design (p. 15). Address: No. 1, Kin Wong Street, Tuen Mun, New Territories, Hong Kong. Phone: 466 0333.

3090. Sudiarno, Tarko. 2008. Rustono: King of tempeh in Kyoto. *Jakarta Post (The) (Indonesia).* Dec. 1. www.thejakartapost.com /news/2008/12/01 /rustono-king-tempeh-kyoto.html.

• ***Summary:*** A color photo shows Rustono looking very happy and standing next to a tempeh making machine that he ordered from Bantul, Yogyakarta. Rustono, age 40 was born in Purwodadi, Central Java, Indonesia. He now lives in a Japanese village about an hour's drive from Japan; he likes living there, and finds the people friendly, just like villagers in Java. Previously a bellboy for a star-rated hotel in Yogyakarta, he now has about 350 tempeh customers in Japan. One winter, in the snow, he and his wife built their own tempeh factory, 4 by 8 meters. Some 60% of his customers are Japanese. Address: Staff writer, Japan.

3091. Golbitz, Peter. 2009. Update on work with soyfoods in Africa (Interview). *SoyaScan Notes.* Jan. 28. Conducted by William Shurtleff of Soyinfo Center.

• ***Summary:*** Peter finds his new work with SunOpta to be very interesting and exciting. He has long had a great deal of respect for Allan Routh, who is a superb entrepreneur. This work has enabled him to travel worldwide–South Africa, Bangkok [Thailand], Paris, etc. SunOpta sales continue to grow–one billion dollars last year–despite the economic downturn. New developments related to soymilk expansion (in the USA and worldwide) will be announced in a few months.

Henry Davies, an white Afrikaner, is with the SoyCow Center in Bergville, KwaZulu-Natal, South Africa. Henry is a wonderful, amazing man, who has a passion for this work that is rare. He is married to Stella. He has stories of people who work on his farm who have reversed their low metric count for HIV by consuming soyfoods. He is a strong believer of the importance of soy in the diet, particularly in South Africa. He is sometimes hard to reach by e-mail, so he might be easier to reach on his mobile phone. He has been working with soy for about 4-7 years. He was part of the Soy in Southern Africa Alliance. He was with a company named Eden Manufacturing Pty. He had an extrusion plant that made pet food and feed. He now manufactures a high-protein, flavored porridge drink named Redi that is a combination of ground maize and soybeans. For details see his website www.edenman.co.za. Now he is importing and rebuilding VitaGoats from India and installing them with the WISHH program and some other programs around southern Africa. The VitaGoats produce soymilk (and a little tofu) using a bicycle-powered grinder and a simple cooker. The soymilk and tofu are being enjoyed by hundreds of kids every day. Henry also runs the

Eden Manufacturing Pty Ltd. Training Centre for VitaGoat and SoyCow Food Processing Systems, with Malnutrition Matters (Frank Daller) and WISHH as sponsors. The first training centre was established by WISHH in Pretoria at the Council for Science and Industrial Research (CSIR) in Pretoria. After a few months the CSIR realized they didn't have the resources to do this. So Henry took it over and established the center on his farm; at that time Peter thinks he was director of the Soyfoods Association of South Africa. The first pictures in Peter's color photo album show the old SoyCow training center, which was adjacent to his old manufacturing facility. The more recent photos at the end of the slide show are in his new (still under construction) training center on his property. WISHH helped to fund the costs of constructing the new center. Henry started running short courses on making soymilk and tofu, which WISHH funded. Peter taught several classes at these short courses–as did other people from Europe, India, Solait, Ted Nordquist, etc. Short courses typically last 2-5 days, and 50-60 people attend each course. There have been Zulu chiefs, people from Parliament–its really happening!

Henry has been traveling on behalf of WISHH, installing SoyCows and VitaGoats in various countries in southern Africa, including Mozambique and South Africa.

Recently Paul Lang cleaned, donated and sent Henry two oil expellers–which can be seen in Peter's photo album. Henry also has a solar dryer, a prototype set up by Malnutrition Matters (Frank Daller's group).

Much of this story can be found on the WISHH website. WISHH has more than one mission. The basic one is market development worldwide for U.S. soy edible protein products such as textured soy flour, soy protein isolates and concentrates to improve human health. WISHH does not promote specific products or particular companies; its work is more generic. However WISHH can ask a U.S. company such as ADM or Bunge or Cargill to donate a certain amount of a particular product to a specific WISHH project–such as a school feeding program in Guatemala that needs a container of TVP. ADM typically makes the donation to create goodwill and perhaps in hopes of a long-term business relationship, but it is ADM's responsibility to follow up. Peter has come to realize that he (Peter) has his agenda (to teach people about soy) and Jim Hershey (the executive director of WISHH) has his agenda. Jim's agenda is to take U.S. soy protein ingredients and soyfoods to the Third World. Even though SoyCows and VitaGoats do not lead to the sale of any U.S. soy protein products, this is no problem for Jim Hershey. Jim and his wife are great people. ASA is so lucky to have someone like Jim, because he is so deeply committed to his work and he works so hard, long hours, traveling a lot, and he has put so many great relationships together. He has done an incredible job. He deserves a Medal of Honor. He is a hard to reach but once he's on the phone he is very generous with his time.

Peter is now working with the World Soy Foundation (WSF), whose work is not limited to U.S. soy protein products. This enables him to help develop soybean production in South Africa–which could become self sufficient in soybeans because there is so much wonderful land and water resources, plus a First World agricultural infrastructure and food processing plants. South Africa is pretty much self-sufficient on corn, and they could be growing corn and soybeans in rotation. The country is in transition. Many white farmers are leaving for a variety of reasons that are more covert than in Zimbabwe. When black farmers move onto the vacated land, the productivity of the land often drops–due to lack of experience. People suffer and the land is not used to its full capacity. But Peter thinks the country will recover. An opposition party is finally forming to counter and balance the ANC's policies. Democracy is coming alive; the parties will have competing agendas. For white Afrikaners it may look like shambles, and there is presently a high degree of unemployment, but for Peter (who has been there 6-8 times) the long term view looks very promising.

Peter has a color photo album and slide show (of digital photos he took) that shows some of the workshops and the whole process for making soymilk and tofu using VitaGoats and Soy Cows, with Henry Davies shown (in a red shirt) in many of the slides; he will send Soyinfo Center (SC) the whole show by e-mail, and SC is free to use a few of the slides if proper credit is given to Peter. If SC lets Peter know which ones we want, he will provide the captions. It is a wonderful story. Peter is also considering putting this slide show on the Web (on an appropriate website such as WISHH or Malnutrition Matters), so anyone can see it.

Peter recommends that Shurtleff talk with Jim Hershey; Peter feels that he and Jim share a common view. Peter often talks with Jim, who has just left Guatemala and is on his way to Haiti. Jim is working on getting SoyCows (the small ProSoya systems made in India that produce several hundred liters per hour of soymilk) installed in Guatemala, sponsored by the Rotary. WISHH would not provide money to have SoyCows installed, but they would supply the beans. Before Jim went to work for ASA, he had spent a lot of time in Africa, in Cote d'Ivoire, working for the Rice Board, so he had experience in international commodity market development work. Then he went to work for ASA International Marketing, before WISHH was created.

Peter has found his work with the World Soy Foundation to be extremely gratifying. Jim and Peter put together the Soy in Southern Africa Alliance (SISA) 2-3 years ago and they raised $275,000 in about a month. From that they got matching funds from USAID and ended up with a $750,000 project. That is how a lot of the activity in South Africa got elevated to a much more productive level. Address: Director of International Business Development, SunOpta Grains and Food Group. Phone: (507) 573-5276.

3092. WISHH. 2009. WISHH–World Initiative for Soy in Human Health. (Website printout–part). http://www.wishh.org. Printed Jan. 29.

• ***Summary:*** Contents: Home. About WISHH: Mission and vision, WISHH Committee, Our supporters / partners, Staff. Global outreach: WISHH has activities in the following countries, listed alphabetically and highlighted in green: Afghanistan, Bangladesh, Botswana, Burkina Faso, Cambodia, Ivory Coast, Ghana, Guatemala, Haiti, Honduras, India, Indonesia, Kenya, Mozambique, Pakistan, Senegal, South Africa, Uganda, Vietnam, Zimbabwe. These countries are shown on a map of the world and each program is described in considerable detail if you click on the name of that country below the map. Another group of countries in the same list, whose names are written in black, are those where WISHH presently has projects but (being very busy and active) has not yet had time to describe that project and add a color photo. They are: Angola, Democratic Republic of the Congo (DRC), Ethiopia, Malawi, Nicaragua, Nigeria, Tajikistan, Tanzania.

Media communications: Press releases, Newsletters, Annual reports, Photo gallery (very interesting). Workshops / Training: International workshops, Washington, DC, workshops, Midwest workshops, Other training. Nutrition library: Nutrition HIV/AIDS overview, WISHH presentations, WISHH papers / publications, WISHH HIV/AIDS activities, HIV/AIDS resources, SoyCow & VitaGoat, Economics of soy. Resources / Links: Soybean organizations and agencies (33), U.S. government and international organizations (13). About soy: Soy products, composition of soy, US soy production, Supplier list. Contact us: The WISHH office is co-located with the American Soybean Association office near St. Louis, Missouri.

"Global outreach: WISHH works with multiple private voluntary organizations and commercial companies in more than 28 different developing countries in Africa, Asia and Central America. Many of these groups are using U.S. high-protein soy to improve diets and health as well as encourage growth of food industries in developing countries."

Supplier list–Suppliers of soy and soy products: ADM, Bunge Milling, Cargill, Inc., CHS (Cenex Harvest States), Soya Kenya (agent for CHS in Kenya), Louis Dreyfus Corp., Nedan Oil Mills (Pty) Ltd. (Afgri Products) (Republic of South Africa), North American Millers' Association, Rab Processors Ltd. (Malawi). Seba Foods (Malawi), The Solae Co., Soy Afric (Kenya), SunOpta Food Group LLC (USA), Zeeland Farm Soya (USA).

SoyCow & VitaGoat: Both are manufactured and supplied by Malnutrition Matters (Frank Daller), 498 Rivershore Crescent, Ottawa, ON, Canada K1J 7Y7. www.malnutrition.org. Details about each low-tech machine are given.

Color photos show: (1) Jim Hershey, executive director of WISHH, with Africans interested in soyfoods in Cote d'Ivoire. (2) Ditto. (3) Handsome boy with soy in Mozambique. (4) Jim Hershey drinking soymilk in Malawi. Address: 12125 Woodcrest Executive Dr., Suite 100, St. Louis, MO 63141. Phone: (314) 576-1770.

3093. Yoshihara, Akino. 2009. The temptations of tempeh. *Daily Yomiuri Online (Japan).* Feb. 19. www.yomiuri.co.jp / dy/features/culture /20090219TDY16002.htm.

• ***Summary:*** Tempeh was introduced to Japan about 30 years ago, but it has not become widely popular since there are now few tempeh manufacturers in Japan. Yet tempeh is made in Shiroishicho in Saga prefecture, Tokyo, Nagano prefecture and Okayama prefecture (located in southwestern Japan, just north of Shikoku Island). In Okayama prefecture about 20 firms make tempeh and 2nd generation tempeh products such as ramen noodles with tempeh or miso with tempeh. Moreover, many tempeh-related events have been organized, including cooking classes.

In 1987 the Japanese Society of Tempe was organized. Today it is headed by Masaharu Horii, professor in the Graduate School of Human Life Sciences, Notre Dame Seishin University, Okayama. The society promotes tempeh "to both the food industry and individual consumers through an annual conference featuring expert lectures and a cooking workshop."

"The society is trying to popularize consumption of tempeh as part of people's daily diet. We plan to publish a book containing useful information for consumers, such as the health benefits and a buyer's guide."

In Indonesia, long popular among the working classes, tempeh has recently become popular among the upper classes because of its many health benefits.

Note: Masaharu Horii, born in March 1939 and a researcher in the field of eating habits and food science, can be contacted at: Notre Dame Seishin University, Graduate School of Human Life Sciences, 2-16-9 Ifukucho, Okayama-shi, Okayama 700-8516 Japan. Fax: +81-86-252-5042 Address: Staff writer, Japan.

3094. Yoshihara, Akino. 2009. A life's dream sprouted from soybeans. *Daily Yomiuri Online (Japan).* Feb. 19. www.yomiuri.co.jp /dy/features/culture / 20090219TDY16001.htm.

• ***Summary:*** Rustono, a man born in Indonesia, lives with his Japanese wife, Tsuruko Kazumoto and two daughters in a house adjacent to their tempeh shop in Otsu, Japan. Otsu, the capital of Shiga prefecture, is located at the southwest end of Lake Biwa in Central Japan, just east of Kyoto.

The two met in 1995, when Tsuruko took a trip to Indonesia, at a hotel in Yogyakarta where Rustono worked. "After maintaining a long-distance relationship, Rustono came to Japan in October 1997, and the couple married and

started living in Uji, Kyoto Prefecture." Rustono, who was interested in food and Japanese culture, first worked at a confectionery shop in Uji, where he carefully observed the Japanese quality control and inspection techniques. He later worked at a food factory, where he chopped vegetables for two years. It was at about this time that Rustono got the idea of making tempeh in Japan.

Using a recipe his mother got from a neighbor, Rustono and his wife made 40 packages of tempeh a day. After about four months, however, they ran into difficulties. The quality of the tempeh bean to decrease [probably due to a decrease in the quality of the starter culture].

So Rustono returned to Indonesia for several months; there he visited about 60 tempeh makers, and vastly increased his knowledge of how to make tempeh.

Returning to Japan with renewed commitment, he also decided to change his sales strategy by focus on Indonesians throughout Japan, starting with his Indonesian friends. Before long, "his tempeh's reputation [and sales] began to grow among foreigners and Japanese by word of mouth."

In 2000 the couple moved their family and business from Uji to Otsu, where they lived in a house belonging to Tsuruko's father. They chose Otsu, in part, because of its clear water. By themselves, they built a tempeh shop during a snowy winter, "carrying sand from the bottom of the river to mix with concrete." They dug a well to reach the clear water. Good water is important in making good tempeh. They also created a new brand: Rusto's Tempeh.

They now make large batches of tempeh about 2-3 times a month, then freeze it. They ship their tempeh to about 300 locations from one end of Japan to the other.

The business is growing. Recently the couple purchased property just a few minutes walk from their home on which to build a new house and larger tempeh shop. Address: Staff writer, Japan.

3095. King, Michael. 2009. The Noble endeavor: From asset-light to infrastructure powerhouse, the Noble Group's transformation is yielding record returns. *World Grain* 27(2):30, 32-35. Feb.

• ***Summary:*** In 2004-05, the Noble Group, one of the world's most successful commodity traders, was listed as headquartered in Singapore. Today, in early 2009, headquartered in Hong Kong, China, it has become a commodities giant. Last year Noble first appeared in the Fortune Global 500 at 349; it now operates more than 100 offices in over 40 countries. In 2008 revenues are expected to be about $30 billion and profits about $1.5 billion.

While Noble is not yet in the same league as Cargill, ADM, BHP Billiton [the world's largest mining company], or Rio Tinto [A British-Australian mining and natural resources group], it probably soon will be.

Noble now accounts for about 10% of soybean exports from South America and controls about 25,000 hectares of land for oilseed and grain production. Noble Argentina is now building a state-of-the-art soybean crushing plant, with a capacity of 2.7 million tons a year, at the Port of Timbues. It also has port assets in Brazil, Paraguay, and Uruguay.

3096. Centraalbureau vor Schimmelcultures. 2009. CBS Fungal Biodiversity Centre (Website printout–part). http://www.cbs.knaw.nl. Printed April 6.

• ***Summary:*** This culture collection organization is similar to the National Center for Agricultural Research Utilization (NCAUR) in Peoria, Illinois. Contents: Home (incl. current news, biodiversity). About CBS. Research. Collections. Databases (18). Publications. Service. Links.

When we searched the 1st database, the "Filamentous fungi database," it was very slow to load and to search. It "contains data on more than 38,000 strains in the CBS collection," we got interesting results searching for: (1) Tempeh–14 hits = records found. In each record, tempeh appears in the field "Substrate." The "Taxon name" (scientific name) of *Rhizopus oligosporus* has been changed to *Rhizopus microsporus var. oligosporus* (Saito) Schipper & Stalpers. In some records the name of the collector and date collected are given. Country and locality (where collected): Indonesia.

Other organisms used to make tempeh are: *Rhizopus oryzae Went & Prinsen Geerligs. Rhizopus stolonifer var. stolonifer. Cladosporium oxysporum Berkeley & M.A. Curtis. Rhizopus azygosporus G.F. Yuan & S.C. Jong.* One culture typically costs "150 Euro (65.0 Euro for Academies, Universities, Education)."

(2) *Rhizopus oligosporus:* 5 hits.

(3) Miso: 3 hits. One substrate was soy sauce and another was koji starter culture. The fungi were: *Aspergillus oryzae var. oryzae. Aspergillus sojae Sakaguchi & K. Yamada ex Murakami.*

(4) Soy sauce: 13 hits. In addition to the two molds used to make miso, there was also: *Aspergillus oryzae var. effusus (Tiraboschi) Y. Ohara.*

(5) Chinese cheese: No hits.

(6) Fermented tofu: No hits.

(7) Sufu: 9 hits. The molds used are: *Mucor racemosus f. racemosus. Mucor indicus Lendner. Mucor hiemalis Wehmer. Actinomucor elegans (Eidam) C.R. Benjamin & Hesseltine. Mucor circinelloides f. circinelloides. Rhizopus microsporus var. microsporus Tieghem.*

(8) Douchi or doushi or doushih or dowsee or dowsi or toushih or tou-shih or fermented black beans or preserved black beans: No hits.

(9) Aspergillus: 1,213 hits.

(10) Soybeans: 1 hit. Substrate: Soybeans. Taxon name: *Aspergillus wentii Wehmer.* Country and locality: Indonesia, Java.

(11) Soybean: 18 hits. Substrate is usually "soil from soybean field." Molds are Penicillium and Aspergillus

species.

(12) Koji: 36 hits. Molds: *Aspergillus oryzae var. oryzae. Aspergillus oryzae var. brunneus Murakami. Aspergillus tamarii Kita. Rhizopus microsporus var. tuberosus R.Y. Zheng & G.Q. Chen* (koji from China). Address: Utrecht, Netherlands. Phone: +31 (0)30 212-2600.

3097. Shurtleff, William; Aoyagi, Akiko. comps. 2009. History of miso, soybean jiang (China), jang (Korea) and tauco (Indonesia) (200 BC-2009): Extensively annotated bibliography and sourcebook. 2 vols. Lafayette, California: Soyinfo Center. 1,378 p. Subject/geographical index. Printed 16 April 2009. 28 cm. [4362 ref]

• ***Summary:*** A history of the many types miso and its relatives, worldwide.

Miso, or "fermented soybean paste," is one of East Asia's most important soyfoods. Miso is an all-purpose high-protein seasoning, which has no counterpart among Western foods or seasonings. Made from soybeans, rice or barley, and salt, its smooth or chunky texture resembles that of soft peanut butter. It comes in a wide range of warm, earthy colors ranging from light yellows to rusty reds, rich chocolate browns, or loamy blacks. Each miso has its own distinctive flavor and aroma, which for the darker, more traditional varieties is savory, and sometimes almost meaty, while for the lighter-colored types is subtly sweet and delicately refreshing. Miso's range of flavors and colors, textures and aromas, is at least as varied as that of the world's fine wines or cheeses. Address: Soyinfo Center, P.O. Box 234, Lafayette, California 94549. Phone: 925-283-2991.

3098. *SoyaScan Notes.*2009. Soybean germplasm collections on the IPGRI website (Overview). May 6. Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** These four spreadsheet databases were sent to Soyinfo Center by Dr. Randall Nelson, curator, USDA Soybean Germplasm Collection, Urbana, Illinois. He created the databases (which reside only on his computer) using information found at the FAO website for germplasm collections: http://www.bioversityinternational.org / Information_Sources /Germplasm_Data bases / Germplasm_Collection_Directory /index.asp. At the "Biodiversity Directory of Germplasm Collections Query Form," after "Taxon" enter "Glycine max" then click "Search" at bottom of page. Wait for several minutes for results to be displayed.

(1) The 40 largest global *Glycine max* [domesticated soybean] germplasm collections–in descending order of no. of accessions in collection. (1) Institute of Crop Germplasm Resources (CAAS), China, 23,578 accessions. (2) Soybean Germplasm Collection, USDA, USA, 18,046. (3) Asian Vegetable Research and Development Centre (AVRDC), Taiwan, 12,508. (4) Nanjing Agricultural University, China, 10,000. (5) Institute of Agroecology and Biotechnology, Ukraine, 7,000. (6) N.I. Vavilov Research Institute of Plant Industry, Russia, 6,126. (7) Centro Nacional de Pesquisa de Recursos Geneticos e Biotec. (CENARGEN), Brazil, 4,693. (8) Soybean Research Institute Jilin Academy of Agric. Sciences, China, 4,200. (9) All India Coordinated Research Project on Soybean, Govind Bal. Pant Univ., India, 4,015. (10) Centro Nacional de Pesquisa de Soja (CNPSO), EMBRAPA, Brazil, 4,000. (11) Department of Genetic Resources I Nation. Inst. of Agrobiol. Resour. Japan, 3,741. (12) Crop Experiment Station Upland Crops Research Division, Korea, Republic of, 3,678. (13) Australian Tropical Crops Genetic Research Centre, Australia, 3,144. (14) Genebank, Inst. for Plant Genetics and Crop Plant Research (IPK), Germany, 3,063. (15) Regional Station, National Bureau of Plant Genetic Resources (NBPGR), India, 2,808. (16) Taiwan Agricultural Research Institute (TARI), Taiwan, 2,699. (17) National Research Centre for Soybean, India, 2,500. (18) Crop Breeding Institute DR & SS, Zimbabwe, 2,236. (19) Sukamandi Research Institute for Food Crops (SURIF), Indonesia 2,194. (20) Nanjing Agricultural University, China, 2,168. (21) Instituto Agronomico de Campinas (I.A.C.), Brazil, 2,000. (22) National Plant Genetic Resources Laboratory, IPB/UPLB, Philippines, 1,764. (23) CSIRO Division of Tropical Crops and Pastures, Australia, 1,600. (24) Genetic Resources Dep.–Research Inst. for Cereals and Ind. Crops, Romania, 1,600. (25) G.I.E. Amelioration Fourragere, France, 1,582. (26) Soyabean Research Institute, Heilongjian Academy of Agric. Sc., China, 1,558. (27) Institute of Oil Crops Research CAAS, China, 1,529. (28) Institute of Plant Breeding, College of Agriculture UPLB, Philippines, 1,508. (29) Instituto Nacional de Investig. Agricolas, Station de Iguala, Mexico, 1,500. (30) Stat. de Genetique et Amelioration des Plantes, INRA C.R. Montpellier, France, 1,404. (31) Kariwano Laboratory, Tohoku Nat. Agricultural Experiment Station, Japan, 1,400. (32) Int. Institute of Tropical Agric. (IITA), Nigeria, 1,358. (33) Centro de Investigacion La Selva, (CORPOICA), Colombia, 1,219. (34) Institute of Crop Breeding and Cultivation, CAAS, China, (1,200). (35) Institute for Field and Vegetable Crops, Yugoslavia, 1,200. (36) Institute of Industrial Crops Jiangsu Academy of Agric. Sciences, China, 1,199. (37) Corporacion Colombiana de Investigacion Agropecuaria, CORPOICA, Colombia, 1,170. (38) Genebank Cereal & Oil Crops Inst. Hebei Academy of Agric. Sciences, China, 1,154. (39) Instituto Nacional de Investigaciones Forestales, Agricolas y Pecuarias (INIFAP), Mexico, 1,124. (40) Maharashtra Association for the Cultivation of Science, India, 1,081.

(2) Germplasm collections (105) that have *G. max, G. soja,* advanced cultivars, breeding and inbred lines, cultivars, genetic stocks, introgressed forms, landrace or traditional cultivar, mutants, wild/weedy species, or

unknown. Listed alphabetically by country: Albania 1 collection. Argentina 3. Australia 3. Bolivia 1. Brazil 5. Bulgaria 1. Canada 1. Chile 1. China 15. Colombia 2. Cuba 1. Czech Republic 1. Ecuador 1. France 6. Germany 1. Hungary 2. India 8. Indonesia 3. Japan 5. Korea, Rep 1. Madagascar 1. Mexico 2. Nepal 2. Nigeria 1. Papua New 1. Paraguay 1. Peru 1. Philippines 2. Poland 1. Romania 2. Rwanda 1. Slovakia 1. South Africa 1. Spain 1. Sri Lanka 1. Sweden 1. Switzerland 1. Taiwan 3. Thailand 4. Ukraine 4. Uruguay 1. Venezuela 1. Vietnam 4. Yugoslavia 1. Zambia 1. Zimbabwe 1.

(3) The 23 largest global *Glycine soja* [wild annual soybean] germplasm collections–in descending order of no. of accessions in collection. (1) Institute of Crop Germplasm Resources (CAAS), China, 6,172 accessions. (2) Soybean Germplasm Collection, USDA, USA, 1,114. (3) Soybean Research Institute Jilin Academy of Agric. Sciences, China, 600. (4) Soyabean Research Institute, Heilongjiang Academy of Agric. Sc., China, 400. (5) Crop Experiment Station Upland Crops Research Division, Korea, Republic of, 342. (6) Asian Vegetable Research and Development Centre (AVRDC), 339. (7) N.I. Vavilov Research Institute of Plant Industry, Russia, 310. (8) Breeding Laboratory, Faculty of Agriculture, Iwate University, Japan, 151. (9) CSIRO Division of Tropical Crops and Pastures, Australia, 60. (10) Taiwan Agricultural Research Institute (TARI) Taiwan, 46. (11) Hunan Academy of Agriculture Sciences, China, 45. (12) Tieling District Agricultural Research Institute, China, 29. (13) Department of Agronomy National Chung Hsing University, Taiwan, 20. (14) Eastern Cereal & Oilseed Research Centre, Saskatoon Research Centre, Saskatchewan, Canada, 18. (15) Soyabean Breeding Laboratory, Tokachi Agric. Exp. Station, Nemuro, Hokkaido, Japan, 15. (16) Instituto Nacional de Investigaciones Forestales, Agricolas y Pecuarias (INIFAP), Mexico, 9. (17) All India Coordinated Res. Project on Soybean, Govind Bal. Plant Univ., India, 7. (18) Maharashtra Association for the Cultivation of Science, India, 6. (19) Sukamandi Research Institute for Food Crops (SURIF), Indonesia, 4. (20) Research Institute for Food Crops Biotechnology–RIFCB, Indonesia, 4. (21) Kariwano Laboratory, Tohoku Nat. Agricultural Experiment Station, Japan, 3. (22) Genebank, Inst. for Plant Genetics and Crop Plant Research (IPK), Germany, 2. (23) S.K. University of Agriculture and Technology, India, 1.

(4) Germplasm collections that have at least one wild perennial relative of the soybean *(Glycine* species, such as *Glycine clandestina),* in descending order of total number of accessions: (1) CSIRO Division of Plant Industry, Australia, 2,102. (2) USDA Soybean Germplasm Collection, USA, 919. (3) Plant Genetic Resources Unit, Agricultural Research Council, South Africa, 281. (4) CSIRO Division of Tropical Crops and Pastures, Australia, 87. (5) Asian Vegetable Research and Development Centre (AVDRC), Taiwan, 69. (6) N.I. Vavilov Research Institute of Plant Industry, Russia, 31. (7) Breeding Laboratory, Faculty of Agriculture, Iwate University, Japan, 23. (8) National Dept. of Agriculture, Dir. of Plant and Quality Control, South Africa, 23. (9) Seed Bank, Seed Conservation Sect. Royal Botanic Gardens, Kew, UK, 1.

3099. Simon, Karen. 2009. Optimism abounds: Higher living standards create demand for soy in China. *Iowa Soybean Review (Iowa Soybean Association, Urbandale, Iowa)* 20(7):14-15. Spring.

• ***Summary:*** "China is the No. 1 customer for U.S. soybean growers' crop, and by far the largest importer of soybeans in the world. Since 2003, China has accounted for more than 45 percent of the world's soybean imports... and it appears that China's demand for soybeans will only increase with time.

"Feed production [in China] has increased an average of 16 percent each year for the past 17 years."

"While the total population of China will continue to increase slightly, the urban population in China has increased dramatically from 17.9 percent of the total population in 1978 to 44.9 percent of the total population in 2007."

A bar chart gives the "World's largest soybean importers" (from the entire world) in million metric tons. They are: China 37.82, EU-27 5.10, Japan 4.01, Mexico 3.65, Argentine 2.95, Taiwan 2.15, Thailand 1.73, Republic of Korea 1.20, Turkey 1.20, Indonesia 1.10, Iran 1.05, Egypt 1.00, Israel 0.55, Malaysia 0.47, Syria 0.43, Norway 0.42. China imports more soybeans than all the other nations on this list combined!

3100. *Soyfoods Canada Newsletter.*2009. Canadian soybeans–a sustainable crop. Spring. p. 4.

• ***Summary:*** "Canada accounts for almost 2% of the world's soybean production. In 2007, approximately 2,700,000 tonnes [metric tons] were produced in Canada, on 2,870,657 acres (1,161,755 hectares). Soybeans are grown in three provinces: 215,006 acres in Manitoba, 434,715 acres in Quebec, and 2,224,936 acres in Ontario.

"Canadian soybean producers are known for innovative and sustainable production practices... Canada's soybean industry is known for its superior ability to segregate and trace soybean crops from seed through to end user, referred to as Identity Preservation (IP).

"Over 40%, or about 1.7 million tonnes of Canadian-grown soybeans are exported to markets such as Japan, Malaysia, Singapore, Hong Kong and Taiwan. They are used to make Asian food staples such as tofu, miso, natto, and soymilk. Japan only produces about 12% of its own country's food grade soybean requirements, and their consumers demand non-genetically modified product.

Japanese buyers value Canadian soybeans because of our industry's IP ability.

"Growing soybeans leaves a relatively small carbon footprint. As a legume, the soybean plant's ability to 'fix' its own nitrogen virtually eliminates the need for petroleum-based nitrogen fertilizer. The wide canopy of leaves formed by soybean plants helps to minimize the need for herbicide sprays."

3101. Febrina, Anissa S. 2009. The making of a staple food. *Jakarta Post (The) (Indonesia).* July 27. www.thejakartapost.com /news/2009/07/27/ the-making-a-staple-food.htm

• ***Summary:*** Production of tempeh has long been the domain of cottage or home industries. At one kampung (village; or neighborhood, or district in a city) in Tegal Parang, South Jakarta, you can see how tempeh is made at home. About 90% of the 300-plus inhabitants of Tegal Parang ("city of soy") make tempeh and/or tofu for a living. For more than 30 years, Muhammad Bintoro, age 56, has been living in this kampung and making tempeh. His tempeh shop is in his kitchen plus living room inside his home of 20 square meters that he has called home for the past 15 years.

Each day Muhammad buys 40 kg of soybeans, which his son washes and soaks overnight. The next morning Muhammad pours the softened soybeans into a machine that he built himself. He used to tread the soaked beans underfoot to remove the hulls, but now he simply runs them through this machine. The process for making tempeh is then described. Tempeh that is started on Thursday will be ready to sell on Sunday.

A color photo shows soaked soybeans being poured (with their soak water) into a square wooden box atop a soybean dehuller. Address: Staff writer, Japan.

3102. Vitasoy International Holdings Ltd. 2009. Annual report 2008/09: Where healthy life begins. New Territories, Hong Kong. 184 p. July. 30 cm. [Eng; Chi]

• ***Summary:*** For the fiscal year ended 31 March 2009, adjusted group turnover (sales) was HK$2,783 million, up 14.3% over the previous year. Of these sales, 53% came from Hong Kong and Macau, 20% from Mainland China, 15% from North America, 10% from Australia and New Zealand, and 2% from Singapore.

Gross profit was HK$1,279 million, up 13.1% from the previous year. Sales analysis by product categories: Soymilk 44%, tea 20%, tofu 10%, lunch boxes and snacks 8%, dairy milk 5%, etc.

At "Chairman's statement," a large color photo shows Winston Yau-lai LO, age 68. His resume is on p. 49. The resume of Ms. Yvonne Mo-ling LO, aged 61 (who is on the board of directors), is on page 51. Total dividends for the year are 21.5 cents per share.

In North America, Vitasoy USA lost money but, "in terms of profit from operation, it continued to achieve improvement by narrowing its operating loss further to HK$6 million, versus HK$11 million for the fiscal year 2007/2008. Tofu sales in North America grew by 11% "and pasta / wrap sales by an even stronger 29%. However, the sales of soymilk and imported products were down by 18% and 20% respectively." "In the last quarter of 2008, it was decided that Vitasoy USA should exit the loss-making aseptic soymilk business and concentrate on the tofu and Asian market businesses which were making positive contributions to the Group" (p. 33-34).

Singapore: "In early April 2008 we acquired the entire equity of Unicurd–a leading soyfood manufacturer and marketer in Singapore." Details on Unicurd's sales are given as are color photos of 8 of its products.

A five-year summary (2005 to 2009; p. 4) shows that, during this entire period, sales (turnover) increased 50.5% and annual profit increased 52.8%. Address: No. 1, Kin Wong Street, Tuen Mun, New Territories, Hong Kong. Phone: (852) 2466 0333.

3103. Shurtleff, William. 2009. Re: Research on soy sauce in the archives of the Dutch East India in the Hague, Netherlands. Letter (e-mail) to Dana Jacobi, food writer, New York City, Aug. 1. 1 p.

• ***Summary:*** "Did I tell you that I hired an expert in Dutch archival research for two years to send me documents showing how the Dutch brought 'soy' [sauce] from the Dutch East Indies to Amsterdam–when they were sent and sold everywhere by Dutch and British merchants with ships.

"Soy sauce was being sold in retail shops in New York City by 1750–the first form of soy to arrive in the British North America, even before the soybean itself. Of course nobody but Samuel Bowen realized that 'soy' was made from soybeans. Bowen was the first to actually make commercial soy sauce in the British North America.

"He had worked at the archives of the Dutch East India Co. for years and could read the handwritten Old Dutch that appears in the letters, logs, manifests, etc. He sent me both photocopies of the originals and his translations into English of the relevant parts.

"He made a breakthrough when we realized that by 1637 the Japanese were using the ancient word for soy sauce–Murasaki–which means 'deep purple.'

"The only Japanese food item that the Dutch loved more than soy was–guess what–sake! The more things change, the more they stay the same. The Dutch also ordered lots of miso, umeboshi, and pickled vegetables for their personal tables at Dutch trading posts in the East Indies

"That story is now ready to be published and filled with interesting and unexpected twists and turns. I hope to have a it published as part of the History of Soy Sauce on our

website within the next 12 months." Address: Founder and Director, Soyinfo Center, P.O. Box 234, Lafayette, California 94549. Phone: 925-283-2991.

3104. Shurtleff, William. 2009. Re: Research on and questions about the early history of ketchup. Letter (e-mail) to Dana Jacobi, food writer, New York City, Aug. 1. 1 p. • ***Summary:*** "I have been doing serious research on a soy-related food problem for the last 5 years: Ketchup.

"Andrew Smith has written a good book about it, but I feel he misses the key point concerning its origin.

"Ketchup–also spelled ketjap, ketchap, or kecap in Malay or Indonesian–means 'soy sauce.'

"Yet ketjap manis ('sweet soy sauce') is thick and sweet (with herbs and spices), rather like today's tomato ketchup, yet expensive (since it had to be imported by the Dutch from the Dutch East Indies) and made with an ingredient (the soybean) that was largely unknown in Europe at the time.

"Soon the British and Dutch were at work making less expensive imitations: Walnut ketchup, tomato ketchup, mushroom ketchup, oyster ketchup, etc.

"I have more than 30 ads from newspapers of the 1700s showing 'soy' (as soy sauce was then called) in ads from New York and other North American ports advertised right next to ketchup.

"And lots more–its an amazing story: 'How ketchup came to the West.' Kind of like your mustard blog story but much harder to work out its history. I wish I had a year to spend on only this esoteric puzzle. I'd go to the Hague, find an expert helper, and search the archives of the Dutch East India company. I'm quite sure I could make the link and rewrite the early history of ketchup." Address: Founder and Director, Soyinfo Center, P.O. Box 234, Lafayette, California 94549. Phone: 925-283-2991.

3105. Daller, Frank. 2009. Chronology of work with soy and Malnutrition Matters worldwide, especially soymilk and development of the VitaGoat (Interview). *SoyaScan Notes.* Aug. 31. Conducted by William Shurtleff of Soyinfo Center. • ***Summary:*** 1951–Born in Bavaria, Germany.

1956–Emigrated to Toronto, Canada.

1989–Began occasional volunteer work with Child Haven International, a Canadian charity active in India.

1991–Introduced to Raj Gupta by Child Haven, which was considering doing a trial with SoyaCows at their children's homes in India.

1991–Saw first prototype of SoyaCow at Raj Gupta's house. He was then working as a research scientist with the Canadian government and moonlighting on soymilk processing with Grant Wood, a technologist also with the Canadian government.

1992–Moved to Ottawa and invested some money in ProSoya Inc. and began working as vice-president to complete technology development and begin commercial phase of operations.

1993–First beta models of SoyaCow–made in Canada sent for field trials at Child Haven homes in India.

1993-94–Began to develop technology transfers with Indian company SSP and Russian company ASSOY. Gives equipment design and know-how to foreign partner to make equipment for ProSoya and for the partner to sell (in their own country) after paying a royalty to a local NGO (Child Haven in India).

1993–ProSoya continued development of larger systems including continuous process soymilk plants.

1994–Became President of ProSoya Inc.

1997–Resigned and sold my shares in ProSoya Inc.

2000–Founded non-profit organization Malnutrition Matters (MM) with partner Brian Harrigan. Objective was to develop small-scale food processing systems including soy, for developing countries. By this time, ProSoya had almost stopped promoting SoyaCow etc. since the business was too small compared to larger commercial systems.

2001-03–MM developed VitaGoat system for non-electric production of soymilk and other foods.

2003–First three "beta" models of VitaGoat, built in Canada, were delivered to Africare projects in Guinea, Chad, and Mozambique.

2005–Transferred VitaGoat technology to G.D. Machines in India.

2007–Brian Harrigan left MM to work with Africare in Zambia for two years.

2007–MM won a Laureate Award from the Tech Museum of Innovation in San Jose [Silicon Valley], California. It was an honor without money.

2007–Alpro, N.V. of Belgium began sponsoring the VitaGoat. [Philippe Vandemoortele introduced Frank to Alpro after Philippe had ceased to be active in Alpro].

2008–MM Won World Bank Development Marketplace competition [project design with local partner] for VitaGoat school feeding project in Orisssa, India. With the funds from winning, MM developed the project in India.

2008–Developed new lower-cost version of SoyaCow (named SoyCow) with separate electric grinder and pressure cooker and lower cost press, and with option of multi-fuel boiler used by all VitaGoat systems. [Note: Raj Gupta had not used the name SoyaCow for years].

2009 Aug.–Currently there are over 90 VitaGoats in operation worldwide. The greatest number [about 40] are in Africa, followed by South Asia and North Korea. Others in Thailand and Brazil, plus demo systems in–Europe, U.S. and Canada.

With each system that is installed, the cost of the equipment, shipping, installation and training fees are provided (as a commercial transaction) by a partner organization–typically a non-governmental organization

(NGO) or a government sponsored organization–but rarely an individual businessperson.

For more details see the very interesting Malnutrition Matters website at www.malnutrition.org Address: Founder, Malnutrition Matters, 498 Rivershore Crescent, Ottawa, ON K1J 7Y7, Canada. Phone: 613-742-6888.

3106. Tsai, Minh. 2009. Biography including work with tofu (Interview). *SoyaScan Notes.* Sept. 16 Conducted by William Shurtleff of Soyinfo Center.

• ***Summary:*** Minh was born on 10 Jan. 1971 in Saigon, the capital of South Vietnam (later renamed Ho Chi Minh City). His name at birth was Minh Thai and he was the first child in the family. A younger brother was born later, followed by a sister. His parents and grandparents were all of Chinese ancestry. At the time of his birth, his parents were both teachers. His father taught history and music at a private high school and elementary school. His mother taught 1st grade at a private elementary school.

The Vietnamese war, which had started in Aug. 1964 was raging and Richard M. Nixon was president in the USA.

His formal education began when he attended first grade at the school taught by his mother. She was a strict teacher–especially with her own son.

1975 April 30–The Vietnam war comes to an end as the Vietnamese National Liberation Front takes control of Saigon and the Saigon regime surrenders. The day before a helicopter had lifted the last fleeing people off the roof of the U.S. embassy in Saigon. North Vietnamese now begin transforming South Vietnam along Communist lines.

In 1977 he was pulled out of school by his parents, who stopped teaching at about the same time–before they were branded intellectuals and forced to stop. His parents took odd jobs to try and earn a living. Minh was sent to a tutoring system, but he escaped and thoroughly enjoyed himself from 1977 to 1980 doing what he wanted to and becoming a little entrepreneur to help the family earn money. He has fond memories shopping for food in the neighborhood with his grandparents.

In 1980 his family of five became one of the boat people who fled Vietnam. Their boat landed in Malaysia, where they lived on an island in a refugee camp run by the United Nations. They began to seek political asylum, which was finally granted to them by the U.S. government. They were put on an airplane and flown to the United States.

On 16 July 1981 the family of five landed at San Francisco International Airport. At immigration, the family surname was changed from Thai to Tsai (their correct Chinese surname). Minh was age 11 and spoke no English. They settled in San Francisco and were placed on the general welfare system of food stamps, etc. Minh entered 5th grade at the E.R. Taylor Elementary School, a public school near their home. With the help of an ESL (English as a Second Language) program, he was fluent in English within a year.

In 1985, after graduating from elementary school, he entered a private high school in San Francisco–University High School in Pacific Heights. Taking college preparatory courses, he graduated in June 1989.

In the fall of 1989 he enrolled in Columbia University with a scholarship. Studying economics and Asian studies, he graduated in 1993 with a BA in econ.

He then entered graduate school at Columbia Univ. in School of International and Public Affairs (SIPA). He graduated in 1994 in an accelerated course with an MA.

He went to Hong Kong and went to work for J.P. Morgan as an investment banker. There, in 195, he met the young lady who would later become his wife. Hong Kong was not transferred by the British to Chinese control until 1 July 1997.

In 1996 he left J.P. Morgan to live in Costa Rica for 3 months; he worked as a chef in a vegetarian restaurant, read and wrote. Then he returned to San Francisco where he worked for the management consulting form of Arthur D. Little.

In 1998 he left the world of high finance and worked for one year for a small Web software company named Phoenix Pop. He was paid well in both real money and stock options.

In 1999 he returned to the word of finance, starting work at Charles Schwab Corp., the brokerage firm. Both his parents were still living. Also in 1999 he reconnected with his wife-to-be when she enrolled in the University of California at Berkeley as a graduate student. They began dating and soon became close.

In 2002 he left Schwab and decided to take some time off; he worked part time as an independent contractor / consultant for Wells Fargo.

In 2003 Minh decided to drop out. He and his girlfriend enjoyed fine food and traveled the world, to Vietnam, China, Burma, France, Italy, etc.

After a year or so, he and his girlfriend returned to San Francisco. With four cousins on her side (all entrepreneurs and all very interested in food) they decided to meet once a week or so to cook and enjoy the meal together. Right from the beginning they began talk about how it would be interesting for them to start a food business. Their first idea was a high end / upscale Asian supermarket, but they concluded it was an idea ahead of its time.

They also chose a theme for each meal–Chinese, Italian,... and tofu. But they had a problem finding good, fresh tofu. So they decided to try making fresh tofu themselves. They found a place in San Jose (Sogo Tofu, 1600 S. De Anza Blvd., San Jose, CA 95106) that would let them use its facilities on weekends. Since everyone but Minh worked during the week, the six met there on weekends and learned to make tofu.

In the fall of 2003 they were ready to go. They called their company "Basic Soy Beanery." They began to sell their unique line of tofu and related products (all made from soymilk) at a farmers' market in Palo Alto on Saturdays. Their first day, sales were $120. So for the next year they met Friday evening to make their soyfood products at Sogo Tofu, sold the food on Saturday at the same farmers' market, then met in San Francisco each Sunday to have a meal and "debrief."

By the fall of 2004 it had ceased to be fun for many. There may have been some viability in the business, but no one but Minh wanted to continue. The others told him to do what he wanted with the idea; there was no talk of ownership, a buyout, or anything like that.

So Minh and Sogo employees started to make tofu and related soy products once a week. Minh would sell the products at a farmers market, expanding to the one in San Francisco and then the one in Berkeley. The first article about Minh's enterprise appeared in the Bay Guardian He did that solo for one year. His girlfriend had a good job and she paid his way–proof to him that she was a solid, reliable person.

They were married on 15 Oct. 2005 at the Brazilian Room in Tilden Park.

That same fall, he decided that the time had arrived to look for financing to grow the business. It was already breaking even. He called the cousins together and told them they each owned one sixth of the company–but only if they were willing to invest in it would they be paid dividends. None of them wanted to invest and since none of them had done any work for the past year or ever before claimed any ownership, he felt that he owned them nothing. But now they decided to insist on owning one-sixth. And since they were close relatives, in the name of family harmony, he said he was willing to buy them out. They hired a lawyer and the negotiations went on for two months in the summer of 2005.

Now Minh would have to go looking for outside investors. But that's now how things worked out. A local man named John Notz had read the article in the Guardian. He phoned Minh and offered to invest money. Minh turned him down, in part because he was not interested in selling tofu at the farmers' markets. A few months later John called Minh again and said he would like to meet Minh at his space at the Berkeley farmers' market on Thursday. They got along well and soon John was selling the soyfoods at farmers markets, first with Minh and then by himself. Before long they hired a lawyer and formed a corporation.

On 7 Sept. 2005 the name of the business was officially changed to Hodo Soy Beanery. In Cantonese Ho means "good" and "do" (actually dow or dou) means "bean." Address: Founder, Hodo Soy Beanery, 2923 Adeline Street, Oakland, CA 94608. Phone: 510-735-4587.

3107. Yollin, Patricia. 2009. New factory to help unravel mystery that's tofu. *San Francisco Chronicle*. Nov. 12. p. E-1.

• ***Summary:*** When the subject is tofu, some people say things like: "To bland. Too rubbery. Too spongy. Too puzzling." Min Tsai, age 38 and a resident of Albany, as heard it all; he makes tofu and sells it directly to shoppers at 10 Bay Area farmers' markets., and to top restaurants such as Greens, Coi, and the Slanted Door. His goal is to educate people about tofu and demystify it.

In mid-October his soy company, Hodo Soy Beanery, began making tofu and yuba at a 12,000-square-foot state-of-the-art factory in West Oakland–almost five times the size of the old plant in San Jose. Next month, he hopes to start public tours and tastings.

Min Tsai grew up in Vietnam and arrived in the United States at age 11. Dean Ku is Hodo co-founder and John Notz is the company's co-founder. Address: Special to the Chronicle.

3108. Lyddon, Chris. 2009. Global grain trade review: Despite soaring demand, record grain production puts surplus at highest point ever. *World Grain* 27(11):28-32, 34-36. Nov.

• ***Summary:*** A table titled "Global grain trade activity: Marketing years as indicated (in 1,000 tonnes)" gives the following statistics for soybeans: 2008-09 Top exporters: 1. United States 34,836. 2. Brazil 29,350. 3. Argentina 5,965. 4. Paraguay 2,300. 5. Canada 1,975. World total 76,324 (-4% from last year).

Top soybean importers: China 39,800. E.U.-27 12,800. 3. Japan 3,450. 4. Mexico 3,100. 5. Taiwan 1,830.

Top soybean meal exporters: 1. Argentina 25,000. Brazil 12,772. 3. United States 7,983. 4. India 3,150. 5. Paraguay 1,167. World total 52,988 (-5%). Top soybean meal importers: 1. E.U.-27 22,150. 2. Indonesia 2,450. 3. Vietnam 2,300. 4. Thailand 2,100. 5. South Korea 1,850.

A two-page color spread shows (for major importing countries or regions, for *all* grains) "Grain imports and exports by major seaports" (in tonnes, calendar year 2008) (plus the increase or decrease compared with last year). A world map shows where each port is located. The tables of exporting ports have a blue background whereas the tables of importing ports gave a green background.

The main exporting ports for the USA are (in descending order of volume): 1. South Louisiana 22,828,781. 2. Tacoma, Washington 6,785,247. 3. Corpus Christi, Texas 5,423,867. 4. Houston, Texas 5,194,172. 5. Portland, Oregon 4,410,476. 6. Brunswick, Georgia 819.790. 7. Duluth, Minnesota 612,149. No importing ports are shown for the USA.

The main exporting ports for Brazil are: 1. Santos 10,101,975. 2. Parana 4,172,447. The main importing port for Brazil is: Santos 1,339,593.

The main exporting ports for Argentina are: 1. San Martin / San Lorenzo 34,636,170. 2. Rosario 14,847,183. 3. Bahia Blanca 7,350,005. 4. Quequen 3,202,964. 5. Ramallo 1,172,462. 6. Lima (Argentina; just northwest of Buenos Aires) 814,746.

The main importing ports for Europe (E.U.-27, which does NOT include Norway, Switzerland, Russia; Candidate countries are Croatia, Macedonia, Turkey) are: 1. Rouen, France 6,349,742. 2. Hamburg, Germany 3,690,955. 3. Rotterdam, Netherlands 2,457,000. 4. Rostok, Germany 2,361,000. 5. Amsterdam, Netherlands 1,393,000. 6. Ghent, Belgium 671,929. 7. Antwerp, Belgium 506,185.

Note: The main importing port for Russia is Novorossiysk 6,317,000, located on the Black Sea in southern Russia in Krasnodar Krai. To get there a ship must pass through the Mediterranean Sea, the Bosporus, then the entire Black Sea. Address: European editor; chris.lyddon@ntlworld.com.

3109. Chico. 2009. Testing different tempeh starters. Letter (e-mail) to William Shurtleff at Soyinfo Center, Dec. 3. 2 p. • ***Summary:*** In September 2009 I got hold of some samples of different commercial tempeh starters.

One sample was given by the Belgian company that holds the website tempeh.info. It consists of a Rhizopus oryzae (rather than oligosporus) culture. This starter is being sold as not developing black spots during "regular" incubation time (i.e. up to 48h). Another sample was obtained from GEM Cultures in the USA.

A fellow member of the yahoo discussion group on tempeh provided me with a sample of the famous Indonesian Raprima starter that is produced by The Indonesian Institute of Sciences (LIPI–Lembaga Ilmu Pengetahuan Indonesia). Actually, he provided 2 samples: one was pure Raprima out of the bag and the other, he had cut with rice flour. Of course Raprima is already originally cut with some extender, so this person only further extended it, as he claimed that Raprima was already too strong.

Finally, the fourth sample was sold by the friendly person that runs the blog Kedai Perantauan (Overseas Store) http://kedaiperantau.blogspot.com/. He did not provide any details on the origin of starter, but he assured it was not Raprima.

The conditions of the trial do not, by any means, comply to any rigorous scientific experiment. The information I'm providing is to be taken at best with a pinch of salt. On top of that, the different starter providers all specify different procedures to making tempeh (temperature and incubation time differ greatly), and most important of all, specify different quantities of starter. I did my best to adjust accordingly, and since all the batches were incubated for the same time, results might not be fair and not a standard "apples with apples" comparison.

The previously cracked and dehulled and rehydrated organic soyabeans were cooked for approximately 1hour. They were split into 5 different pots and inoculated with the different starters. They were incubated on a custom-built, dedicated cabinet incubator using a thermostat.

After approximately 24h at 32ºC, the tempeh that created the most mycelium was definitely the one from GEM Cultures. But, it was the only one that created a lot of black spots. As we all probably know, black spots are the result of the mould having reached maturity and having reproduced sexually. There is a downside to this. I personally don't find eating the result of fungal sexual activity "yucky," but some people that do not know what this is, think that this tempeh is gone off and that the black spots are the presence of mould. Of course they are right, to some extent, but those people think that those moulds are external to tempeh and that they are pathogenic, and ignore the fact that tempeh in itself is a mould! Anyway, some commercial sellers avoid producing tempeh with black spots and this is the reason why Tempeh.info sell their special starter with a slower metabolism never creating black spots. And it didn't, in our experiment. This starter also created a rich, dense mycelium. The tempeh incubated with Raprima also didn't create black spots. The starter provided by Kedai Perantau only created very little black spots. The starter from Kedai Perantau and from Raprima created a not so dense, compact mycelium but this was, I suspect, due to the not enough starter being used. I noticed very little difference between the batches using custom-extended Raprima starter and out-of-the-bag Raprima. The further extended one produced slightly more mycelium than the other.

Having said this, let's move to the organoleptic results.

There was a "panel" of 4 people that tasted tempeh slices marinated with garlic and tamari, toasted on a skillet with olive oil. Because we wanted to be able to identify the different tempeh batches we cooked them all one after another, so this ended up being another variable that might have affected the results. But anyway. We all seemed to agree that the best tempeh was the one inoculated with the Raprima starter. This tempeh had a more dense flavour, much richer and with different, subtle, tones. Compared to it, the tempeh made with the GEM Cultures starter seemed more bitter, and with a poorer flavour. It was nonetheless quite good, but definitely not as good as the Raprima. The tempeh made with the Belgium tempeh.info starter tasted a bit of "chicken" but that might have been due to the fact that some slices were slightly overtoasted, mimicking a roasted chicken skin. (For the record, I haven't eaten any meat of fish for over 12 years, but others had the same impression too.) Apart from the chicken flavour, this tempeh was pretty bland, which on the good side means it was less bitter than the one from GEM Cultures. On the end of the spectrum we all seemed to agree that the tempeh made with starter provided by Kedai Perantauan was the less interesting one.

It would be great to find out the exact details of each starter: strains of Rhizopus spp, extender dilution, if pure or mixed cultures, etc. Unfortunately this information is very hard to obtain.

Best Wishes, Chico Address: Lisbon, Portugal.

3110. Nguyen, Andrea Quynhgiao. 2009. Asian dumplings: Mastering gyôza, spring rolls, samosas, and more. Berkeley, California: Ten Speed Press. 234 p. Illust. (color photos by Penny De Los Santos). Index. 28 x 19 cm. [38 ref]

• ***Summary:*** Another very attractive book and well-written book by Andrea Nguyen. In the Introduction, the section titled "Ingredients" (p. 8+) discusses soy sauce (p. 16) and tofu (p. 16-17).

Soy related recipes include: Steamed vegetable dumplings [vegetarian] (Zhengjiao, Chinese, with 3 oz. brown pressed tofu filling, and light (regular) soy sauce, p. 35-36). Kimchi dumplings (Kimchi mandu, Korean, with 10 oz firm tofu, p. 44-45). Korean meat and vegetable dumplings (Gun mandu, with 6 oz firm tofu, p. 46-47). Steamed filled buns (Zheng bao, Chinese, with Vegetable and tofu bun filling {p. 101}, p. 95-96). Baked filled buns (Ju bao, or Guk bao in Cantonese, Chinese, with Vegetable and tofu bun filling {p. 101}, p. 97-99). Vegetable and tofu bun filling (Cai bao, Chinese, p. 101).

Chapter 9, "Sauces, Seasonings,..." contains several soy dipping sauces: Tangy soy dipping sauce (great with Chinese jiaozi or Japanese gyôza, p. 215). Korean dipping sauce (for Korean Mandu, p. 215). Sweet soy sauce (good with Cantonese steamed rice rolls {p. 156-60}, p. 217). Address: Food writer, Santa Cruz, California.

3111. Shurtleff, William. 2010. Do the English words "ketchup," "catchup," and "catsup" trace their origin back to Chinese (Cantonese) or to Malay? (Editorial). *SoyaScan Notes.* Jan. 15.

• ***Summary:*** If the English words for "ketchup" trace their origin back to Chinese, then they probably trace their origin back to the Cantonese, because Cantonese speakers (from Canton / Guangzhou in southern China) made up the great majority of emigrants from China starting during and after the Mongol Dynasty (also called Yuan Dynasty; 1279-1368) when the Mongols ruled China.

In Cantonese, there is a word that sounds very similar to the English word "ketchup." Written with two characters, it is pronounced "ke-tsup." The first character means "tomato," and the second character means "sauce," "juice," or "liquid."

Thus, the Cantonese word seems in both sound and meaning to be very similar to the English word "ketchup."

Written Cantonese is used primarily in Hong Kong and in overseas Chinese communities. It uses characters not found in the Standard Mandarin, and is not easily intelligible to Mandarin speakers

Romanization: Cantonese romanization systems are based on the accent of Canton and Hong Kong, and have helped define the concept of Standard Cantonese. The major systems are Barnett-Chao, Meyer-Wempe, the Chinese government's Guangdong Romanization, Yale and Jyutping. While they do not differ greatly, Yale is the one most commonly seen in the West today. The Hong Kong linguist Sidney Lau modified the Yale system for his popular Cantonese-as-a-second-language course, so that is another system used today by contemporary Cantonese learners. And there is the International Phonetic Alphabet (IPA).

In Malay–the language of today's Indonesia (which includes Java)–the word for soy sauce was written *ketjap* and is today written *kecap.* The sound is very similar to the Cantonese sound but the meaning is very different.

By the way, none of the three English words for "ketchup" (nor any words with similar sounds) is found in the book *Hobson-Jobson: a glossary of colloquial Anglo-Indian words and phrases,...,* by Sir Henry Yule, and Arthur Coke Burnell.

As the Contonese left China, they almost surely took soybeans and soy sauce technology with them.

Since Java and Indonesia are closer to Canton than are Australia or New Zealand, it seems likely that more Cantonese settled there. More important, Java and Indonesia have much longer cultural and economic ties to Asia than do Australia or New Zealand, so it is more likely that Cantonese foodways would take root in Java.

A product named "Ketchup" (spelled in various ways) had arrived in Europe by the late 1600s and early 1700s. It was probably imported from Southeast Asia. Yet when ketchup arrived in Australia and New Zealand, a century later, it was imported not from nearby Southeast Asia, but from far-away Europe. Address: Founder and owner, Soyfoods Center, Lafayette, California. Phone: 925-283-2991.

3112. American Soybean Association. 2010. History of the American Soybean Association, 1964-1989 (Website printout–part). http://www.soygrowers.com/history/default.htm. Printed April 22.

• ***Summary:*** "1964: States began forming soybean associations affiliated with ASA to involve more farmers. ASA began funding research to find new uses for soybeans and reduce production costs.

"1968: States affiliated with ASA resolved to initiate work on state-by-state passage of legislation to enable first point of sale deduction of one-half to one cent per bushel. Farmer elected boards of soybean farmers would control funds for market development and research.

"1975: The American Soybean Association Market Development Foundation was created from the American Soybean Institute and a funding agency called the American Association Market Development Fund. The Fund's purpose

was to receive farmer checkoff funds, review market development programs and budgets, authorize ASA to conduct these activities and pay for services provided by ASA.

"1978: ASA established World Headquarters in St. Louis, Missouri.

"1980: The American Soybean Association Market Development Foundation and the American Soybean Research Foundation were merged to become the American Soybean Development Foundation.

"1984: ASA opened an office in Caracas to serve the South American market. This brought the number of ASA international offices to 11 including Brussels, Hamburg, Madrid, Mexico City, Peking, Seoul, Singapore, Taipei, Tokyo and Vienna.

"1987: ASA launched a truth-in-labeling campaign to stop hidden use of highly saturated tropical fats in foods and increase market share for soybean oil. ASA asked the Food and Drug Administration to require food manufacturers to stop calling tropical fats "vegetable oils" and to put an end to "and/or" wording on food labels. The truth-in-labeling campaign was part of a new checkoff-funded initiative to expand domestic use of soybeans and soybean products.

"1988: Exports to the Soviet Union increased from 2.5 million to 91 million bushels. Palm oil imports declined as U.S. consumers became more concerned about saturated fats in their diets, and soybean oil use increased. ASA promotions for soybean oil for dust control and for newspaper printing inks helped boost demand.

"ASA launched major Targeted Export Assistance (TEA) promotions in Europe that greatly increased consumer awareness of soybean oil.

"1989: Bold new actions by ASA farmer-leaders set the organization on a new course. After more than a year of study and discussion, Delegates approved a resolution to work toward a national soybean checkoff. Legislation to create the one-half of one percent checkoff for market promotion, research and industry education was introduced.

"ASA introduced a new SoyMark developed with funding provided by CIBA-GEIGY Corporation. Earlier in the year, ASA introduced a SoySeal developed by Monsanto Agricultural Company to mark industrial products such as soy-based inks and agricultural chemical carriers made with soybean oil." Address: 12125 Woodcrest Executive Drive, Suite 100, St. Louis, Missouri.

3113. American Soybean Association. 2010. History of the American Soybean Association, 1990-1997 (Website printout–part). http://www.soygrowers.com/history/default.htm. Printed April 22.

• ***Summary:*** 1990: Years of ASA market promotion in Eastern Europe and continuing efforts in the Soviet Union gave US soybeans an advantage. With the collapse of Communism, Romania turned to ASA for help in ordering US soybeans. In Western Europe, ASA used checkoff funds and TEA funds to implement a major consumer education campaign. European purchases of US soybeans increased 22 percent. A GATT Dispute Settlement Panel ruled in favor of US soybean farmers stating that European oilseed subsidies are unfair competition and illegal under GATT rules. ASA initiated the complaint in 1987. ASA reached an all-time high of 34,000 members.

"1991: The national soybean checkoff started. The ASA Board authorized, and state checkoff boards funded, expanded promotion in the Soviet Union including the opening of an office in Moscow. As authorized in the 1990 Farm Bill, the $5.02 non-recourse soybean marketing loan began.

"1992: Activities were funded by the national soybean checkoff through the United Soybean Board (USB), and flourished under the direction of ASA farmer-leaders and staff. ASA created a strategic plan to tackle changes brought about by the checkoff. ASA opened a new office in Cyprus. Market Promotion Program (MPP) funds (formerly TEA) were invested to increase demand for US soybeans and products in Spain, Portugal, Greece, Germany, Venezuela and Mexico.

"1993: ASA contracted with Gordley Associates to provide Washington representation. ASA was successful in securing elimination of the two percent loan origination fee as a part of the FY 1994 budget reconciliation process.

"ASA worked with the United Soybean Board to structure and carry out national soybean checkoff-supported programs in the US and around the world. ASA became heavily involved with SoyDiesel on the legislative, research and development levels.

"ASA continued as the primary contractor with the United Soybean Board and a major cooperator with FAS on international programs. The ASA Board of Directors voted to offer health insurance to members in participating states. ASA unveiled a new logo at Soybean EXPO '93 in Denver.

"ASA expressed concern and disappointment over the resolution of the oilseed subsidy dispute with the European Community (301 case). The resulting Blair House Agreement limited the maximum area on which payments will be made to stimulate surplus oilseed production in the EC. ASA subsequently helped develop and rally support for a 'zero-to-zero' proposal to eliminate global tariffs and government export incentives for oilseeds and products.

"1994: ASA was instrumental in forming the American Oilseed Coalition (AOC). ASA withheld endorsement of the Uruguay Round agreement of the General Agreement on Tariffs and Trade, because the agreement, failed to correct conditions that have proven detrimental to interests of US soybean growers and allows continuation of unfair practices of other countries in oilseed trade. ASA commended the Administration for identifying elimination of trade

distorting practice in the oilseeds sector as a priority in future multilateral and bilateral trade negotiations.

"The referendum to continue the national checkoff was held in February and passed–with 54% of the farmers who cast their ballots voting in favor of continuation.

"Congress approved the Vegetable Ink Printing Act that requires the federal government to use vegetable-based inks in its printing operations where technically feasible and cost-competitive with petroleum-based inks. This comes on the heels of the USDA announcement last year that required all printing ordered by USDA to employ ink derived from agricultural products.

"1995: ASA and USB leaders went to Europe to ensure compliance with the Blair House Agreement. ASA and the National Oilseed Processors Association continued to work closely with the US Trade Ambassador throughout the year. ASA and USB leaders went to China to meet with senior government and trade officials to provide encouragement to import US soybeans and soybean meal.

"+ASA leaders conveyed their support for inclusion of biodiesel in the Energy Policy Act of 1992. ASA leaders urged lawmakers to enact Farm Bill legislation designed to make soybeans more competitive and soybean producers more profitable. ASA also led successful efforts to restore funding for the Foreign Market Development (FMD) cooperator program, and to enact legislation that differentiated agricultural oils from petroleum oils.

"+Reversing several years of declining membership, the ASA recruitment campaign delivered a net membership increase of four percent. In December, the ASA Board adopted a new committee structure to more closely align itself with the structure of USB's committees.

"+ The Stephen M. Yoder Foundation 'Leadership for LIFE' program was established to promote farm safety. ASA celebrated its 75th Anniversary at the Soybean EXPO in Saint Louis.

"+ASA, USB and many other soybean industry stakeholders participated in the development and distribution of the Soybean Industry Vision. ASA was instrumental in launching the American Soybean Industry Council. 1996: ASA maintained a consistent and reasoned position on its policy objectives for the Farm Bill that included full two-way planting flexibility, an equitable soybean loan rate and an adequate safety net. ASA also continued its efforts to reform the estate tax code and obtain conservation provisions that reflect a common sense balance of producer interests and protection of natural resources and wildlife.

"+ ASA prevented an amendment to require a producer referendum on the soybean checkoff program in 1999 from being included in the Farm Bill.

"+ ASA joined the National Biodiesel Board and other interested organizations in filing a petition with the Department of Energy (DOE) requesting approval of B20 as an alternative fuel.

"+ At year-end ASA membership count was 29,799–an increase of more than 5% over 1995.

"+ The first-ever Commodity Classic was hosted by ASA and the National Corn Growers Association in Phoenix, Arizona. Nearly $20,000 was raised to benefit The Stephen M. Yoder Foundation's Leadership for LIFE program.

"+ ASA and the U.S. Feed Grains Council jointly contracted for representation in Vietnam. ASA also opened its Asia Subcontinent Office in New Delhi, India.

"+ The American Soybean Industry Council (ASIC), issued statements on the global acceptance of biotechnology and on the protection of intellectual properties.

+ ASA issued Grower Advisories pertaining to import clearances for soybeans grown from genetically modified seedstock in major export markets.

"1997: ASA was successful in gaining expansion of the Crop Revenue Coverage (CRC) program into 12 additional states for the 1998 crop year, which doubled the number of states eligible for CRC. ASA worked behind the scenes on enactment of tax legislation that included elimination of the alternative minimum tax; incoming averaging provisions; a reduction in the capital gains tax rates; new estate tax exclusions; and an increase in the percentage of health insurance costs deductible by self-employed persons.

"+ ASA and the National Biodiesel Board (NBB) obtained Department of Energy agreement to consider B-20 (a blend of 20 percent biodiesel made from vegetable oil and 80 percent petroleum diesel) as an approved alternative fuel.

"+ ASA implemented an aggressive international marketing program for US soybean producers. ASA wisely leveraged the almost $16 million in soybean checkoff funds to obtain another $9.4 million from USDA. ASA increased the size of its membership for the third year in a row. The final total was 31,525, an increase of 5.6 percent from the previous year. The ASA Today membership newsletter was redesigned into a full-color format.

"+ ASA ended FY 97 with a financial gain from operations that exceeded the forecast. This was a reversal of the losses experienced by the Association in recent years, and was the result of a coordinated effort by ASA leaders, ASA staff, state affiliates, and other stakeholders." Address: 12125 Woodcrest Executive Drive, Suite 100, St. Louis, Missouri.

3114. American Soybean Association. 2010. History of the American Soybean Association, 1998-1999 (Website printout–part). http://www.soygrowers.com/history/default.htm. Printed April 22.

• ***Summary:*** "1998: ASA opened a new chapter for soybean producers this year when Congress enacted legislation that

allows vehicle fleets regulated under the Energy Policy Act of 1992 to earn credits toward meeting EPACT requirements by operating on B-20. This legislation is significant because it provides credits for the use of biodiesel fuel that can be made from soybean oil, and it provides biodiesel blends that offer consumers the economics necessary to make B-20 the "low cost leader" in the EPACT market. Biodiesel has been one of ASA's top priorities for several years.

"+ ASA issued Grower Advisories pertaining to import clearances for soybeans grown from genetically modified seedstock in major export markets.

"+ A $6 billion ag assistance package was enacted that included $2.575 billion in total funding to address crop disaster losses, and another $3.15 billion in market loss payments to producers eligible for Freedom to Farm contracts. Also, ASA successfully urged Congress to approve income averaging, increased deductibility of health insurance for farmers, and a 5-year carryback for operating losses. The approved tax cuts are estimated to save producers more than $1 billion over the next five years.

"+ ASA worked diligently to ensure that Ag appropriators approved funding for the Foreign Market Development Cooperator Program at the current operating level of $32 million and $90 million for the Market Access Program. ASA utilizes funding from the FMD and MAP, along with producer checkoff dollars, to promote U.S. soybean exports in more than 80 counties.

"+ Funding was secured for the International Monetary Fund at $17.9 billion. IMF funding is vital to ensuring stability in U.S. Soybean export markets in both the short and long-term. ASA also succeeded in convincing USDA to include half a million tons of soy in a Russian Food Aid Program and another $61 million of soybeans and soy products in other P.L. 480 Title 1 programs.

"+ Early this year, ASA participated in the White House Rose Garden ceremony, during which President Bill Clinton signed into law the Agricultural Research, Extension, and Education Reform Act. This legislation was one of ASA's top priorities because it approved funding for increased agricultural research funds, as well as crop insurance. Agricultural research is slated to receive $600 million over five years, and it authorized $485 million over five years to pay insurance agents and companies for expenses to write crop insurance policies.

"+ On Nov. 10, the Food and Drug Administration gave initial approval to allow health claim labels on products containing soybean protein based on data contained in a petition presented by Protein Technologies International, Inc., and a follow-up petition filed by ASA in October. Approval by FDA of evidence that including soy protein in a healthy diet reduces serum cholesterol and may reduce the chance of heart disease will have consumers around the world seeking foods labeled to contain soy protein. A final rule was expected in 1999.

"+ In November, ASA formally opened its 14th international marketing office in Istanbul, Turkey, to increase demand for U.S. soybeans and products in the Middle East.

"+ ASA took the lead in working with biotechnology and seed companies to ensure that U.S. growers didn't lose $9 billion of U.S. Soybean export markets due to the presence of unapproved biotechnology-derived soybean varieties.

"+ To help maintain U.S. soy exports despite Asia's economic crisis, ASA worked to obtain and increase credit guarantees from USDA for the purchase of soybeans and soy products. In part due to ASA's aggressive initiative, USDA approved additional GSM-102 export credit guarantees for Asia including increases from $250 million to $400 million for Indonesia, $100 million to $300 million for Thailand, and zero to $100 million for Malaysia. In addition, Korea received an estimated $1.1 billion, an increase from $154 million from the previous year.

"+ The Loan Deficiency Payment (LDP) rate was increased by 34 cents as result of ASA's policy efforts during the 1996 Farm Bill process. LDPs were based on a $5.26 per bushel loan rate.

"+ ASA increased its membership for the fourth consecutive year, ending the year at 31,737 members. Even more was added to the value of an ASA membership with the launch of the first issue of the Washington Insider Report. This new publication, distributed quarterly to all ASA members, focuses on key policy issues facing soybean farmers. To help ensure continuation of the national soybean checkoff, ASA created a special Vote YES committee to develop funding and prepare for the possibility of a producer referendum.

"+ There was a record attendance of producers and exhibitors at Commodity Classic in Long Beach, making the third annual event a huge success. Show attendance reached 3,676 and more than 500 trade show booths were sold. More than $23,000 was raised for safety education through the 1998 Stephen M. Yoder Foundation Auction and from associated raffles."

"1999: The American Soybean Association applauded approval by the U.S. Food and Drug Administration (FDA) of a new soy health claim based on a petition filed by ASA in 1998. FDA published its final rule on October 25, that soy protein included in a diet low in saturated fat and cholesterol may reduce the risk of coronary heart disease by lowering blood cholesterol levels. As a result, food labels may now contain messages, such as "25 grams of soy protein a day, as part of a diet low in saturated fat and cholesterol, may reduce the risk of heart disease." Research funded by the soybean checkoff shows that the use of soybeans in food products will increase at a rate of 10% a

year for the next five years, up from about 37 million bushels to more than 60 million bushels.

"+ Biodiesel implementation moved a big step forward with the release of the Department of Energy's interim final rule to allow public vehicle fleets to earn EPACT credits. ASA also was pleased with USDA's August 13, announcement that the agency planned to purchase an unprecedented level of 20,000 gallons of biodiesel during the year, and with pro-biodiesel legislation that was introduced in the Senate on November 17. That legislation, entitled the "Biofuels Air Quality Act" would allow biodiesel to compete for funds in the Congestion Mitigation Air Quality Improvement (CMAQ) program. Similar legislation was introduced in the House on August 6. The Senate and House bills expand the CMAQ program's authority to allow funding of alternative fuel projects that include purchases of biodiesel, which is a proven cleaner-burning fuel made from natural, renewable sources, such as soybean oil. ASA also asked that the government introduce biodiesel-blended fuels in at least 50% of the government's diesel-powered vehicles by 2002.

"+ While drought and flood conditions in several areas of the country prevented another record-breaking U.S. soybean harvest, producers continued to face the lowest prices paid for their soybeans since the early 1970s. Three ideal growing seasons, one right after the other, in the majority of soybean production areas in both the United States and in South America, caused soybean stocks to grow, while at the same time, export growth stalled as a result of depressed economies in key Asian markets. These factors were primarily responsible for drifting soybean prices paid to farmer down from an average per bushel price of $7.35 in 1996, to $4.35 in 1999.

"+ Fortunately, ASA's soybean safety net policy work during the 1996 Farm Bill process helped see many producers through a tough year. ASA's success in raising the soybean loan rate $.34 would provide growers with nearly $1 billion of additional farm revenue from the loan deficiency payment program.

"+ Even with ASA's earlier policy efforts and successes, it was clear that stronger and more comprehensive efforts would be needed to improve the outlook for soybean producers. In February, ASA farmer leaders made public a comprehensive list of farm income and market demand policy initiatives for the Administration and Congress to act upon. ASA's proposal included economic loss assistance, farm income protection, food assistance and export initiatives, biodiesel, and trade policy initiatives. Also included were key domestic policy initiatives concerning the Food Quality Protection Act implementation, the environment and conservation, research, transportation and tax initiatives. ASA also outlined major issues for changes in Federal crop insurance programs.

"+ ASA urged Congress to provide economic loss payments to producers, similar to payments provided to farmers in 1998, and also advanced with congressional leaders inclusion of soybean-specific payments and provisions in any farm aid package. Subsequently, Congress did approve an $8.7 billion emergency farm spending plan that also included an authorization of $475 million in direct payments to oilseed producers to help partially offset low prices. It was estimated that this oilseed payment would provide producers with 15 additional cents per bushel of soybeans.

"+ In April, ASA and the National Oilseed Processors Association (NOPA) provided Secretary of Agriculture Dan Glickman with a comprehensive list of recipient countries, quantities, and products for a proposed $1 billion concessional sale and donation program for soybeans, soybean meal, soybean oil, and soy protein products. Secretary Glickman requested this list during a March 16 meeting with ASA leaders in Washington when ASA urged him to utilize Commodity Credit Corporation (CCC) funds for a purchase and donation program that could help alleviate a disastrous decline in prices and soybean producer income.

"+ ASA also initiated, for the first time, discussions with a group of international food aid groups who were interested in programming soy into their USDA requests. These private voluntary organizations (PVOs) provided concrete proposals to USDA for the implementation of food aid. This combination of ASA's "pushing" and the PVOs "pulling" helped convince USDA of the merits of assisting people in the most needy countries in the world while bolstering demand and improving prices paid to farmers.

"+ To urge further action on ASA's request for a $1 billion soy donation, 72 House members cosigned a letter to Secretary of Agriculture Dan Glickman in November, calling for USDA to move quickly to mitigate the downward pressure on soybean prices during harvest. ASA also met with several Senators and Representatives to urge them to place calls to the White House, Agriculture Department, and Office of Management and Budget to "dislodge" this and other food aid programs which have been held up pending reviews.

"+ At year's end, ASA was still waiting for a major food aid announcement, which was being delayed by bureaucratic red tape. Meanwhile, some significant amounts of soy were already being included in major food aid programs, such as the purchase by Russia of an additional 117,000 metric tons of soymeal under the P.L. 480, Title I program for shipment December 17, 1999 to January 7, 2000.

"+ On November 15, U.S. and Chinese negotiators completed bilateral talks on China's accession to the World Trade Organization (WTO). The agreement that U.S. trade negotiators reached with China included significant

opportunities to expand market access that ASA has worked toward for years. According to U.S. government sources, the ongoing WTO accession negotiations include assurances that will formalize access to the Chinese market–the largest growth market for soy in the 21st century–and includes commitments to expand access over the next few years.

"+ Based on the announced WTO Accession Terms for Agriculture, there will be no tariff rate quota (TRQ) for soybeans, and the duty is bound at the current applied level of 3%. The agreement stated that soybean oil will be subject to a 9% duty and the TRQ quantity will be based on average 1995-97 calendar year imports calculated on the basis of data from Oil World. Soybean oil also will be designated a "most-favored-oil"–meaning that any permanent or temporary duty reduction provided to other oils also will be extended to soy oil. ASA also began an extension policy effort in 1999 to promote approval of Permanent Normal Trade Relations (PNTR) with China, which the U.S. Congress was scheduled to debate in 2000.

"+ ASA counted among its accomplishments the lifting of sanctions on the sale of U.S. food to Iran, Sudan and Libya. ASA continued to work to expand sanctions relief to Iraq, North Korea, and Cuba to help improve soybean producer profitability.

"+ Confusion about the marketability of biotech-derived crops was at the forefront of many producers' thoughts. During these challenging times, ASA called upon all of its resources to actively communicate with growers, customers and other stakeholders about the safety of biotech soybeans to minimize the negative effects of activities and efforts to undermine public confidence in agricultural biotechnology.

"+ In November and December, ASA implemented a series of "Planting Decision 2000" Town Hall meetings around the country to help producers make well-informed planting decisions for 2000. ASA also produced "Planting Decision Guide" that provided producers accurate information on the factors affecting the demand for both biotech and non-biotech soybeans. ASA distributed the Planting Decision Guide to more than a quarter million soybean producers." Address: 12125 Woodcrest Executive Drive, Suite 100, St. Louis, Missouri.

3115. Bunge Ltd. 2010. Annual report 2009: Bridging local and global. 50 Main St., White Plains, NY 10606. 12 + 57 + 54 p. April. 28 cm.

• ***Summary:*** Consolidated net sales for 2009 (year ended Dec. 31) were $41,926 million, down 20.2% from 2008 ($52,574 million). Net income in 2009 was $335 million, down 74.8% from 2008 ($1,326 million). Bunge was hurt financially by a collapse in the international price of phosphate from $1,200 on 14 Aug. 2008 to less than $400 after 14 Dec. 2008. In 2009 Bunge "began construction of a state-of-the-art export grain terminal at the Port of Longview in Washington state–the first export terminal built in the United States in more than two decades. The Pacific Northwest is already the second largest export corridor in North America. This will be Bunge's fourth major export terminal in North America, along with New Orleans, Quebec City, and Brunswick, Georgia.

"Across the Pacific in Vietnam, we broke ground on an integrated soybean processing plant within the Phu My port complex. Despite the global economic slowdown, Vietnam's demand for vegetable oil for consumers and protein for livestock has continued to grow steadily (Figure 3),..." (p. 8).

Most of the annual report consists of the dull Form 10-K submitted to the U.S. Securities and Exchange Commission.

Accompanying the annual report is a "Notice of Annual General Meeting of Shareholders" (80 p.). Information is given about the amount of money paid to individual company officers. Address: White Plains, New York. Phone: 914-684-2800.

3116. Nguyen, Andrea. 2010. Re: Types of tofu and yuba in Vietnam. Letter (e-mail) to William Shurtleff at Soyinfo Center, May 1. 1 p.

• ***Summary:*** If you go to a Lo Dau Hu (Viet tofu shop) in the United States, the most common types of tofu you'd find are: (1) Dau hu/dau phu: block/regular tofu (2) Dau hu chien: fried regular tofu (in pieces). (3) Fried tofu with stuff suspended in it (e.g., wood ear mushroom and glass noodles) that's similar to the Japanese approach to making gomoku dofu. (4) Che dau hu: Soft tofu to be served with sugar and ginger syrup.

Yuba (tofu skin): At Vietnamese restaurants, you sometimes get a side dish of tofu skin rolls made from Tau hu ky [pronounced tau hu kay], the Vietnamese name of yuba.

In Vietnam, fermented tofu is named "chao."

Note: One popular Vietnamese yuba recipe is Com tam tau hu ky suon bi (Broken rice with yuba wrapped shrimp, pork chop, and pork skin). A detailed recipe can be found on the Web under its Vietnamese name. "Even though this dish originally arose from a culture of poverty–the Vietnamese rice farmers couldn't sell the broken grains of rice so they used it for themselves–today, you can find this dish served in almost every Vietnamese restaurant due to the simplicity as well as the variety of toppings available,..."

Other Vietnamese yuba recipes on the Web include: (1) Tom tau hu ky (Vietnamese shrimp paste wrapped in yuba). Fresh yuba is wrapped around a spoonful of shrimp paste, then the packet is deep fried. (2) Com tam suong nuong tau hu ky (Broken rice with pork and shrimp cake wrapped in yuba). Address: vietworldkitchen.com, California.

3117. Nguyen, Hoang Quoc. 2010. Re: Soyfoods and soybeans in Vietnam. Letters (e-mails) to William Shurtleff at Soyinfo Center, May 4-12. 1 p. each.

• ***Summary:*** Mr. Nguyen is the father of Andrea Nguyen, author of *Into the Vietnamese Kitchen* (2006, Ten Speed Press) and was kindly introduced to Soyinfo Center by Andrea, who is now writing a book about tofu in Asia.

Mr. Nguyen was born and raised in Vietnam, and lived there with his wife and family until April 1975 when he fled to the USA just before the fall of Saigon and the American defeat in what Vietnamese call the "American War."

He was governor and military sector commander of two provinces in the Mekong Delta of Vietnam (Vinh Binh {now called Tra Vinh} from 1956, and Kien Phong {now called Dong Thap Muoi} from 1956-1960), and of Binh Thuan, in the south of central Vietnam, from 1960-1963. While he is not a specialist in Vietnamese food, he knows as much about it (or more) as the typical person born and raised in that country.

Question: Do Vietnamese eat soybeans as a green vegetable (green vegetable soybeans, edamamé)? Ans: No, and there is no specific name for them.

Question: Please tell me about soymilk in Vietnam. Ans: Its name in Vietnamese is *sua dau nanh* (with diacritical marks). It was very popular, but mostly in the cities (as we were in Viet Nam before 1975). Don't know exactly at the present time. Use it at breakfast or at any time during the day as a beverage. It is sold in a plastic container, at tofu shops or at marketplaces. Nobody made it at home at our time in Viet Nam (before 1975). But soybean milk machines are now on the market at non-expensive prices. Probably some people are making it at home for freshness. It is typically served sweetened or plain; not salty. It has a fairly long history. Its popularity is increasing with the propagation of the soybean's benefits.

Question: Please tell me about yuba (the film that forms atop soymilk when it is heated) in Vietnam. It is often called beancurd skin or (when dried) beancurd sticks in Vietnamese cookbooks. Ans: It is called *phu chuc* (dried rolled yuba; dried rolled yuba sticks; fuchu or fu zu in Chinese) in north Viet Nam, and *tau hu ky* in south Viet Nam. Fresh dry yuba is *tau hu ky tuoi* (it needs to be frozen or refrigerated and thawed before using) and regular dry yuba is *tau hu ky kho.*

All Vietnamese (north, center, and south) use only one language but there are differences in tone and accent in pronunciation, and also in the naming of some things and objects. The phonetic adaptation from Chinese or French words are also different, it may be the reason of Tau Hu Ky for Fu Pi and Phu Chuc for Fu Zu.

Yuba is very popular, used in households, market stalls, and restaurants–especially in place of meat in vegetarian dishes and diets (influenced by Buddhism). It is sold in dry form, either unfried or fried, in a package at any market place. It is made only by special factories of Chinese origin. It is served as a wrapper for shrimp or meat, then fried. Also in soup–fried and served with broken steamed rice, and many other dishes at home and restaurants from selected to street corners. It is especially useful in the preparation of vegetarian dishes as a substitute for real meat. In one popular dish (called *Chan Thien Ky), tau hu ky* [yuba] is wrapped around minced shrimp to make a little packet, which is deep-fried; it is somewhat like the Cantonese dim sum item of shrimp in "tofu skin" but Viet people commonly serve it as a side dish on rice plates. Another popular yuba recipe in Vietnam is *Com Tam Tau Hu Ky Suon Bi* (Broken rice with yuba wrapped around shrimp, pork chop, and pork skin). Note: A Google search for "tau hu ky" will bring up many other recipes, images, and videos in Vietnamese and English. Yuba has a long history in Viet Nam, being introduced along with Chinese cuisine. Today its use is increasing along with the demand for new recipes and awareness of the benefits of consuming foods made from soybeans. Yet it is still not an item in everyday meals, but is reserved for special occasions, whether at home, in a restaurant, or at parties.

Question: When the French divided today's Vietnam into Tonkin (north), Annam (middle) and Cochinchina (south), were there any cultural or language differences between the three? Were the divisions based on these cultural and language differences or not? Ans: No major difference in culture or language existed between the three regions at that time. The French made the division just for more efficiency and convenience in their colonization of Viet Nam. The French split Viet Nam up into many areas with different administrative systems so as to maintain the division, in order to make their occupation more efficient [and to try to prevent or limit the growth of nationalist or resistance movements].

Question: Please tell me about soybean cultivation in Vietnam. Ans: At this present time, because of the huge demand of soybean for edible oil and meal or cake for animal feeds, milk for human consumption, large areas in the South (east and west parts) are being used for cultivation of soybean. Production in the North and Central regions, due to limitation of available lands, may be sufficient only for regional production of Tuong and Tofu. Five different kinds of seeds are being introduced and tested and yield/ha are much better. Areas in the south-west (Mekong delta) will produce 3 crops per year.

For centuries soybeans have been cultivated in Viet Nam. Before the vegetable oil from soybean was introduced, each region produced what people need for daily consumption. This has been changed completely because of the demand for soybean oil, milk, sub-products for animal feeds.

Soybeans are cultivated along the hillsides or high level areas not submerged by water, or in between the rice crops

seasons. In the south western region (Mekong delta) where the field is submerged under the water every year for 4 months, farmers can now plant soybean after the rice crop harvest. They burn the hay, make holes and put the seeds down, cover with hay, let it grow, fertilize (chemical), use pesticides and herbicides. After 75-82 days they can harvest (still by hand), or use a machine to pull out the beans, then dry them. Viet Nam is presently divided into 62 provinces and towns; soybean is planted in 43 of them. At the present time, no information is available about large size farms using complete machinery like in the USA, but an area like the Mekong Delta may open up and introduce this kind of large farming process. The highlands in Viet Nam offer tremendous opportunities for development of modern farming (mechanized) but require enormous investments in knowledge, experience, and quick flexibility of action and funds. A state economy system cannot afford to let that happen, I would say.

Viet Nam still has to import 400,000 to 500,000 tons of soybean every year from China, Kampuchea [Cambodia], Thailand, Canada and the USA.

Today, soybeans are most widely used as a food in the south of Vietnam. My estimate of the amount of soybeans used in traditional foods (in descending order of popularity) is: Tofu, soy milk, tuong (a thick fermented soy sauce), chao (fermented tofu), soy sauce (liquid), tau hu ky (yuba).

Additional remarks: Tuong should be considered in this study, as tuong is a sauce made and used only in Viet Nam. It is made from rice and soybean, plus salt, in a very delicate way, serving as sauce for eating and cooking. Long ago the northern Viet term for soybeans was "dou," as in Chinese. But soybeans were also called "dou tuong" because they were so widely used in Vietnam to produce the popular fermented sauce "tuong." That's why today the Vietnamese term for soy sauce is either "nuoc tuong" [sauce + tuong; a lingering reference] or "xi dau," from the Cantonese phonetic.

All the Vietnamese (old generation, of north and center origin) living in the US, miss "tuong" very much as the Tuong Cu Da being sold in the market places here is not the real thing–in terms of composition, taste and flavor. The three best kinds of Tuong are: (1) Tuong Cu Da. (2) Tuong Ban, in north Viet Nam, and (3) Tuong Nam Dan, in Nghe An (central Viet Nam).

Note: Andrea adds: "These are really cool tuong sauces!" Address: San Clemente, California.

3118. Peters, Erica J. 2010. Re: The long view of Vietnamese history, language, and culture. Letters (e-mails) to William Shurtleff at Soyinfo Center, May 4-8–in reply to questions. 1 p.

• ***Summary:*** "The long view of Vietnamese history represents a conquest of the southern regions by ethnic Viet people coming from the Red River valley in the north. The Viet effort to control these regions was long, messy, and uneven, from about the tenth century CE until the twentieth century. From at least around 1800, Vietnam existed as a country that covered roughly the area we now think of as Vietnam.

"In the 1860s, the French conquered the far-south, what they called Lower-Cochinchina. The French gradually expanded their control eastward, until they controlled all of what they called Cochinchina. Wanting access to China, in the 1880s the French took over the northern and central regions as well, the regions they called Tonkin and Annam. Tonkin, Annam and Cochinchina were treated as three separate regions by the French, but less for linguistic or cultural reasons than for administrative convenience and to defuse any emerging Vietnamese nationalism.

"During the Vietnam War, the country was divided in two at the 17th parallel (then known as the DMZ, the Demilitarized Zone). Since reunification in 1976, the country has been administered again as three regions, where the division between North & Central is roughly the 19th parallel north, and the division between Central & South is roughly the 11th parallel. Historically and up to the present day, the northern part of the country has had a higher concentration of ethnic Viet than the southern part, although the Viet, who are also called Kinh, are the majority ethnic group throughout the country.

"In Vietnam, the ethnic Viet people all speak dialects of Vietnamese. There are differences between the Vietnamese dialects spoken in the north and in the south, but it is the same language. There are, however, many other languages spoken in Vietnam. The various minorities living in Vietnam have historically spoken their own languages, often in addition to Vietnamese or Chinese.

"Modern Vietnamese is written in romanized letters. Tofu is primarily 'dau phu' in Vietnamese (with diacritical marks: -dâ.u ph.u). Historically one also sees the use of dau-hu (-dâ.u hu~) and tau-hu (tàu hu~), sometimes alongside dau phu. The terms may have referred to slightly different textures, or simply marked a difference of pronunciation. A large Chinese minority community lived in southern Vietnam, so Cantonese may also have influenced the pronunciation of the word for tofu in Vietnamese."

About the author: Ph.D. thesis: Peters, Erica J. 2000. "Negotiating Power Through Everyday Practices in French Vietnam, 1880-1924." University of Chicago dissertation, 373 pages, Accepted in December, 2000.

Academic Credentials: Ph.D. in Modern European History, University of Chicago, December 2000.

M.A. in Modern European History, University of Chicago, August 1994.

A.B. magna cum laude in French History and Literature, Harvard University, June 1991.

Academic Experience:

Stanford University Lecturer: Winter 1998, Spring 2003, Spring 2005.

University of Maryland University College Adjunct Assistant Professor: 2001-2004

Portland State University Lecturer: Spring 2004.

Santa Clara University Lecturer: Winter 2004.

San Francisco State University Lecturer: Fall 2001.

Experience living and studying in Vietnam:

"I traveled to Hanoi, Vietnam for three weeks in March 1997. In January 2006 I spent another three weeks traveling across Vietnam from Ho Chi Minh City to the Mekong Delta, up to Dalat and then to Hanoi and Ha Long Bay. I spent a year (1996-1997) doing dissertation research in France, based primarily in Aix-en-Provence where the archives from colonial Indochina (Vietnam) now reside. I learned basic Vietnamese at the SEASSI program in Madison, Wisconsin, in the summer of 1994.

Food history experience:

"Research in Paris and at Stanford University has provided more information about Vietnamese food. Together with the research I did for my dissertation, this enabled me to write my manuscript. This manuscript, entitled 'Food and Drink, Appetites and Aspirations in Nineteenth-Century Vietnam,' is currently under consideration by University of California Press. As Director of the Culinary Historians of Northern California I have welcomed many speakers on various topics in food history around the world." Address: Ph.D., Director of the Culinary Historians of Northern California, ejpeters@chonc.com.

3119. *SoyaScan Notes.*2010. The Jakarta Post: The best source of current English-language information on soybeans and soyfoods in Indonesia (Overview). May 16. Compiled by William Shurtleff of Soyfoods Center.

• ***Summary:*** Indonesia is the largest producer and user of soybeans in Southeast Asia. *The Jakarta Post* has digital archives of its daily issues going back to 1999. A search for soybeans or soybean gets hundreds of hits, as do searches for tempe, tempeh, tahu, tofu, kecap, soy sauce, kecap manis, etc.

The Jakarta Post, an English-language daily, is Indonesia's largest English-circulation, with an average circulation of about 50,000 copies. Launched on 25 April 1983, its head office is in Jakarta. The Jakarta Post is a small but influential newspaper oriented towards local English-speaking expatriates and the diplomatic community. In many ways, it acts as an unofficial mouthpiece of the Indonesian government into the international community. Go to: www.thejakartapost.com.

3120. Astuti, Mary. 2010. Re: When did the term "ketjap manis" first appear in Indonesia? Letter (e-mail) to William Shurtleff at Soyinfo Center, May 31. [Eng]

• ***Summary:*** "... according to me, ketjap manis has been used for centuries. I was born in 1948 and when I was a kid I used to eat rice gruel with ketjap manis. Bango soy sauce factory in West Java has been producing ketjap manis since 1932 and another factory in East Java has been making it for more than 100 years. The word 'ketjap' is now spelled 'kecap.' Best regards." Address: Indonesia.

3121. History of the International Soybean Processing and Utilization Conferences (ISPUC) (Overview). 2010. [Eng]

• ***Summary:*** (1) 1990 June 26 to July 4–International Soybean Processing and Utilization Conference (ISPUC-I) held in Jilin, China.

(2) 1996 Jan. 8-13–International Soybean Processing and Utilization Conference (ISPUC-II) held in Bangkok, Thailand. Proceedings published.

(3) 2000 Oct 15-20–International Soybean Processing and Utilization Conference (ISPUC-III) held Tsukuba, Japan. Proceedings published. Theme: Dawn of the innovative era for soybeans.

(4) 2004 Feb. 29 to March 5–International Soybean Processing and Utilization Conference (ISPUC-IV) held in Foz do Igussa, Brazil.

(5) 2008 Dec. 10-14–International Soybean Processing and Utilization Conference (ISPUC-V) held in Bhopal, India.

3122. History of the International Symposium on the Role of Soy in Preventing and Treating Chronic Disease and the subsequent International Soy Symposium (Overview). 2010. [Eng]

• ***Summary:*** (1) 1994 Feb. 20-23–First International Symposium on the Role of Soy in Preventing and Treating Chronic Disease, held in Mesa, Arizona. Proceedings published in the *J. of Nutrition,* March 1995 Supplement (p. 567S-808S).

(2) 1996 Sept. 15-18–Second International Symposium on the Role of Soy in Preventing and Treating Chronic Disease, held in Brussels, Belgium. Proceedings published in the *American J. of Clinical Nutrition*, Dec. 1998 Supplement (p. 1329S-1544S).

(3) 1999 Oct. 31 to Nov. 3–Third International Symposium on the Role of Soy in Preventing and Treating Chronic Disease, held in Washington, DC. Proceedings published in the *J. of Nutrition*, (4) 2001 Nov. 4-7–"Fourth International Symposium on the Role of Soy in Preventing and Treating Chronic Disease, held in San Diego, California. Proceedings published in *J. of Nutrition,* March 2002 Supplement (p. 545S-619S).

(5) 2003 Sept. 21-24–Fifth International Symposium on the Role of Soy in Preventing and Treating Chronic Disease, held in Orlando, Florida. Proceedings published in *J. of Nutrition*, 2004 May Supplement (p. 1205S-1293S).

(6) 2005 Oct. 30 to Nov. 2–Sixth International Symposium on the Role of Soy in Preventing and Treating Chronic Disease, held in Chicago, Illinois. This is the first year that no conference proceedings were published. However a 52-page symposium program was published in Nov. 2005 by the American Oil Chemists' Society (Champaign, Illinois). (7) 2007 March 7-9–7th International Soy Symposium: Role of Soy in Health and Disease Prevention, held in Bangkok, Thailand. No proceedings were published, but a 100-page bound color booklet contains the program, long abstracts, organizational and sponsor information. The conference in Bangkok lasted only 2 days versus 4 for all the others and it consisted mostly of review presentations. The most important presentations were summarized in the *Soy Connection* (summer 2007, Vol. 15, No. 3). (8) 2008 Nov. 9-12–International Soy Symposium held in Tokyo, Japan.

3123. *SoyaScan Notes.*2010. Soyfoods historical research and writing wish list (Overview). Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** 1. Early history of Chinese soyfoods companies and products in America and Europe. Especially Chinese tofu manufacturers in San Francisco and Los Angeles from 1850 to 1910. 2. Statistics on soyfoods in China during the 1980s. 3. The Swedish trading mission in Canton during the 1700s and 1800s and its work with soy sauce. 4. A lengthy, scholarly history (with an extensive bibliography) of soybeans and soyfoods in China written by a Chinese. 5. A lengthy, scholarly history (with an extensive bibliography) of soybeans and soyfoods in Japan written by a Japanese. 6. A lengthy, scholarly history (with an extensive bibliography) of soybeans and soyfoods in Korea written by a Korean. 7. A history of the health foods industry in America, 1930-1980. 8. A book on mochi or how mochi came to the West, with a clear chronology of commercial mochi manufacturers in the western world.

9. A scholarly history (with an extensive bibliography) of each of the following soyfoods in Japan, written by a Japanese with a long-term involvement in the field: natto, miso, shoyu, tofu. 10. Explain why Linnaeus stated in *Hortus Cliffortianus* (1737, p. 499) that the soy bean was grown in the colony of Virginia in North America. 11. A lengthy, scholarly history (with a good bibliography) of Chinese growing and processing soybeans in California. They must have grown them between 1849 and 1899! (13 Sept. 1991)

12. Visit the best libraries and centers in Germany for doing research on soybeans and soyfoods (See #37465) and try to get missing old documents.

13. Try to document the statement that the soybean was used as a coffee substitute during the Civil War in the USA (1861-1865).

14. Use the Coker family archives in South Carolina to write a history of the company's pioneering work with the soybean.

15. A history of early experimental gardens such as those that the Portuguese developed on the Cape Verde Islands, the British at Kew, Nairobi, Singapore, and the colony of Georgia (the Trustees' Garden of Georgia, a government experimental farm at Savannah, laid out in 1733), the Spanish (under Cortez / Cortés) in today's Mexico, etc. Did soybeans appear in any of them? When did they first appear in each?

3124. *SoyaScan Notes.*2010. Soyfoods success stories in developing countries (Overview). Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** Public sector with outside funding: 1. Sri Lanka, Thriposha program (Cereal-soy blends, started 1976). 2. Mexico (Chihuahua) program selling PADSA, Soyaven/Soyavena, Albachisa, and Almesa (Cereal-soy blends, 1978-80). 3. Thailand, ASEAN full-fat soy flour project (1978). 4. Guatemala, Plenty Soy Dairy (Tofu, soymilk, soy ice cream, 1980)

Private sector, largely self sufficient: 1. Uganda, Africa Basic Foods (Dr. D.W. Harrison. Roasted whole soy flour, cereal soy blends, 1966-69). 2. India. Ruchi's Products (TVP, 1980).

3125. *SoyaScan Notes.*2010. Chronology of The Philippines since 1965. Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** A Spanish colony for 350 years, the Philippines come under the domination of the USA in 1898 and gained its independence in 1946.

1965–Ferdinand Marcos elected president of the Philippines, whose economy was rated 2nd in Asia behind that of Japan.

1969–Birth of the Communist rebel movement in the Philippines.

1972 Sept. 21–Marcos, barred from the Philippine constitution by running for a third term, declares martial law, citing the Communist threat. He promotes himself as a staunch anti-communist at a time when the U.S. was reeling from defeats in Vietnam.

1981 Jan. 17–Marcos lifts martial law, but by now state corruption and repression have been institutionalized.

1983 Aug. 21–Benigno S. Aquino Jr., prominent opposition leader, is assassinated, marking the beginning of the end for Marcos.

1986 Feb. 7–Bitter presidential election campaign between Marcos and Corazon Aquino ends amid allegations for widespread fraud. Both candidates announce themselves to be the victor.

1986 Feb. 26–Marcos flees the country, following a popular uprising, ending up in Hawaii. The Philippine

economy is now in shambles and Marcos is known worldwide as a brutal dictator. By projecting an image of stability and vitality, and by courting the West, Marcos was able to attract a great deal of foreign money to the Philippines. But by 1989 the country has a $29,000 million foreign debt, one of the highest per capita of any country in the world. It was incurred almost entirely during the Marcos administration.

1989 Sept. 28–Marcos dies in exile in Hawaii.

3126. *SoyaScan Notes.* 2010. The languages and writing systems of East Asia, including Korea, China, and Japan (Overview). Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** According to *East Asia: The Great Tradition*, by Reischauer and Fairbank (1960, p. 15-18), the two main language groups of East Asia are the Sinitic (or Sino-Tibetan, the largest group) and the Altaic. Within the Sinitic group, Chinese is by far the largest and historically the most important subdivision. The main Sinitic languages inside China are Mandarin, Wu (near Shanghai), Kan, Min (near Fukien / Fujian), Hsiang, Cantonese, Miao-Yao (southwest China), and Tibetan. Note that these are different enough from Mandarin to be considered virtually independent languages rather than dialects. Sinitic languages outside China include Burmese, Thai, Vietnamese.

The three major Altaic languages (named after the Altai Mountains in Mongolia) are Mongolian, Turkish (in the west), and Tungusic (in the far northeast). Peoples speaking Altaic languages, unlike the agriculturist Chinese, were nomads. "Korean and Japanese show close structural resemblances to the definitely Altaic languages, and the Koreans and Japanese may, therefore, be two eastern extensions of Altaic-speaking people into predominantly agricultural areas."

Concerning the Korean writing system, in the late 600s (7th century), a system called idu, using Chinese characters for phonetic purposes was developed as an aid to rendering Chinese texts into Korean. Though never extensively used, it was the beginning of Korea's native writing system. In the mid-1400s an excellent phonetic system for writing the Korean language was developed by the ruler named Sejong. Originally known as onmun ("vernacular writing") but known today as han'gul ("Korean letters") it was officially adopted by royal decree in 1446. "Han'gul is perhaps the most scientific system of writing in any country... Finally, the advantages of an alphabetic script and a syllabary (in which each symbol represents a whole syllable) are combined by bunching the individual letters into syllabic groups" (p. 435-36). [Note: the bunching makes use of a word processor more difficult than the linear alphabetic Indo-European languages]. Although han'gul was simple, it was little used during the next 5 centuries; scholars emphasized the Chinese written language. "It was not until after the liberation of Korea from Japanese rule in 1945 that han'gul came into its own as the primary method of writing in Korea."

In Japan, the development of purely phonetic scripts (called the Kana Syllabaries, hiragana and katakana) arrived in the early 800s and were attributed to Kôbô Daishi (Kûkai), Japan's most beloved and best known Buddhist saint, who founded the Shingon sect in Japan in about 806 and built his monastic headquarters atop Mt. Koya in 816. "The development of the kana was no doubt influenced by the Sanskrit studies of Buddhist monks and their knowledge of the alphabets of India. The kana, however, did not constitute alphabets but were syllabaries, in which the symbols represented whole Japanese syllables., which at that time invariably consisted of one of the five vowels (a, i, u, e, o) usually preceded but never followed by a consonant. Thus they required a minimum of 47 different symbols, instead of the 14 that would have sufficed to write 10th century Japanese with an alphabet... Thus hiragana and katakana constituted a less simple and flexible system than an alphabet would have provided."

3127. *SoyaScan Notes.* 2010. Chronology of Soyfoods Center: The work of William Shurtleff and Akiko Aoyagi. Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** 1. Introducing soyfoods to the West: Popular books (1972 Oct.–1979 July).

*The Book of Tofu:*

1972 Oct. 22–First visit to San-gen-ya tofu shop in Tokyo. Mr. Toshio Arai begins to teach William Shurtleff the traditional art of making tofu.

1972 Dec. 22–Meet Nahum Stiskin of Autumn Press. Start to write tofu booklet.

1973 Jan. 13–Sign contract for *Book of Tofu* with Autumn Press.

1973 March 2–Visit Sasa-no-yuki tofu restaurant in Tokyo.

1975 Dec. 12–*The Book of Tofu** published by Autumn Press.

* = Book illustrated by Akiko Aoyagi.

1978 Dec. 22–*The Book of Tofu** published by Ballantine Books in a mass-market pocketbook edition that retails for $2.95.

*The Book of Miso*

1974 Feb/March–Study miso and shoyu in Japan on trip with Bob Gerner, head of Westbrae Natural Foods.

1974 May 7–Start to write *The Book of Miso*, table of contents.

1975 April–Autumn Press accepts idea of publishing *The Book of Miso.* Contract signed Aug. 18.

1976 Sept. 23–*The Book of Miso** published by Autumn Press.

1976 Sept. 29–1977 Feb. 3–Tofu & Miso America Tour. We do 70 public programs, many TV and radio interviews,

drive our van 15,000 miles in 17 weeks.

*The Book of Tempeh*

1977 May–To Indonesia for one month of tempeh research.

1978 Feb. 27–Sign contract with Harper & Row.

1979 July 14–*The Book of Tempeh** published by Harper & Row.

2. Working to build a soyfoods industry in the Western world (1977 April–present)

1977 April 5–Establish Takai Tofu and Soymilk Equipment Co.

1977 Aug. 16–First Takai catalog of tofu and soymilk equipment published.

1977 Aug. 16–*Miso Production** published by Soyfoods Center–the first book we self-published.

1978 July 28-30–The Soycrafters' Association of North America is founded in Ann Arbor, Michigan. William Shurtleff helps to organize the inaugural meeting, is a founding member, and a member of the first board of directors.

1978–Soyfoods Center starts to develop a mailing list (typed so as to fit on pressure sensitive labels) of all people who have purchased books or contacted us.

1979 July 15–*Tofu and Soymilk Production** published by Soyfoods Center.

1979 July–The first issue of *Soycraft* magazine is published by Richard Leviton, director of Soycrafters' Association in Massachusetts. Each mailing is based on the use of Soyfood Center's mailing list–free of charge.

1980 March 10–*Tempeh Production** published by Soyfoods Center.

1980 Sept.-Dec.–Our mailing list of about 5,000 names and addresses, divided into 70 coded categories, is computerized by Parallel Procedures in San Francisco. This was done primarily to help Richard Leviton of *Soycraft* magazine.

1981 Dec.–There are now 10,900 names on our computerized Soyfoods mailing list, rising to 13,800 names by May 1982.

3. Documenting the history of soybeans and soyfoods (1980 Oct.–present)

1980 Sept. 10–Start to build what we hope will become a large library at Soyfoods Center with regular trips to the University of California at Berkeley library system.

1980 Oct. 22–Start writing *History of Soybeans and Soyfoods*.

1984 June 1–History book manuscript is now completely in our word processor: 2,500+ pages, 70+ chapters.

1984 June 21–Soyfood Center's annual summer intern program begins. Irene Yen, a Stanford student starting he senior year, is our first summer intern.

1984 July 17–*History of Tempeh published*–our first history book.

4. Studying the burgeoning soyfoods industry and market (1982 Sept.–1985 Feb.)

1982 May 16–*Soyfoods Directory and Databook* (1st edition) published. Renamed *Soyfoods Industry and Market: Directory and Databook* on 26 Feb. 1983. 3rd edition.

1982 Sept. 10–*Soyfoods Labels, Posters, and Other Graphics* published.

1984 Feb. 25–*Soymilk Industry and Market* published.

1985 Feb. 22–*Tofutti and Other Soy Ice Creams* published.

1990 May 8–*Tofu Industry and Market in Europe* published.

1990 July 17–*Soymilk Industry and Market in Europe* published.

1994 Jan.–*Soyfoods Industry and Market: Bibliography and Sourcebook* published.

5. Foreign language editions of our books are published (1980 -)

1980 July–*Das Miso Buch** (hardcover and paperback) published by Ahorn Verlag (Wolfgang and Gabriella Furth-Kuby) in Germany.

1981 Aug.–*Das Tofu Buch** (hardcover) published by Ahorn Verlag in Germany.

1988 Nov.–*Das Tempeh Buch** (hardcover) published by Ahorn Verlag in Germany–6 years after the project started.

1988 Nov.–New German pocketbook editions of *Das Tofu Buch* and *Das Miso Buch* (paperback) published by Goldmann Verlag.

6. Developing a computerized information center (1980 Dec.–present).

1980 Dec. 12–Mailing lists of Soyfoods Center and Soyfoods magazine merged and computerized by Parallel Procedures in San Francisco. 5,500 names in 50 categories.

1983 Sept. 28–Install first computer at Soyfoods Center, IBM-PC with 20 MB hard disk and word processing software to use for writing our book on *History of Soybeans and Soyfoods.*

1985 May 9–Install Revelation database manager software for developing a computerized bibliographic database on soya.

1985 July 31–Finish keying all 6,677 file cards (3x5 inch) into our computerized database. Our library is now computerized.

1985 Aug. 30–Our computerized database, containing 9,500 bibliographic records, is now available for use by the public.

1986 Sept. 1-16–The first of many trips to do library research at the USDA National Agricultural Library, Library of Congress, and National Library of Medicine–America's three national libraries, all located in and about Washington, DC.

1987 July 6–Start entering Commercial Soy Products into our database.

1987 Oct. 11–*Bibliography of Soymilk, from 1578 to 1987: With 1,584 References* published–our first bibliography.

1987 Oct. 19–Coin the name SoyaScan, start using it to refer to our computerized database, and apply for a registered trademark, which we are issued on 19 July 1988.

1993 Feb.–Install a Novell 5-user network to link our various computers.

1995 Feb. 11–We enter the 50,000th record into our SoyaScan database.

1997 Nov. 24–We enter the 55,000th record into our SoyaScan database.

7. Current status of computerized information–2000 January 1

SoyaScan database now contains 59,440 records from 1100 B.C. to the present, including 48,318 published documents, 12,683 commercial soy products, 4,628 original interviews and overviews, and 41,584 unpublished archival documents.

More than 75% of all SoyaScan records have a summary/abstract averaging 143 words in length.

More than 26,000 records (44% of the total) are for documents published before 1970.

Thirty five major books in the series Bibliographies and Sourcebooks on Soya, produced from the SoyaScan database, are now available, published by Soyfoods Center.

Soyfoods Center Library owns about 54,000 documents, almost all of which have a record in the SoyaScan database.

SoyaScan Directory now contains the name, address, and phone number of 17,300 people and organizations worldwide actively involved with soyfoods and soybeans. Each entry is coded to show the type of activity, e.g. 2A = Tofu manufacturers.

8. Collecting and Publishing Information on Vegetarianism and Other Non-Soy Food Products that can Replace Animal Products.

1984 Oct. 31–Create our first vegetarian keyword (subject heading) VegeAnim = Vegetarian Diets and Animal Rights.

1988 Feb. 21–*Amazake and Amazake Frozen Desserts: Industry and Market in North America* published. Updated bibliographic supplement published in March 1995.

1992 Oct.–Start actively collecting information specifically on vegetarianism and veganism, and entering it into our new VegeScan database.

1992 March 4–*Bibliography of Vegetarianism: 1,755 References from A.D. 1170 to 1992, Extensively Annotated* published (360 p. large format, preliminary edition).

1992 June 12–*Sourcebook on Wheat Gluten Foods and Seitan* published. Expanded edition published in Jan. 1994.

2000 Jan. 1–VegeScan database now contains 5,500 bibliographic records on vegetarianism and veganism from 238 B.C. to the present.

Best selling books from Soyfoods Center (English-language editions only, as of Jan. 2000).

The Book of Tofu–557,000 copies sold.

The Book of Miso–115,900 copies sold.

The Book of Tempeh–47,950 copies sold.

Tofu & Soymilk Production–5,020 copies sold.

Other–9,200 copies sold.

Total–775,070 copies sold. Address: Lafayette, California. Phone: 925-283-2991.

3128. *SoyaScan Notes.* 2010. The best libraries and centers in Indonesia for doing research on soybeans and soyfoods (Overview). Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** The biggest library in Indonesia is Pusat Dokumentasi Ilmiah Nasional (PDIN, the National Center for Documentation and Science). For old documents, the best library is the Buitenzorg de Bibliotheek in Bogor; it belongs to the Dept. of Industry. The best Indonesian university for science and technology is Institut Technologie Bandung (ITB).

Other excellent libraries are: National Library for Agricultural Science (Pustaka, Bogor), Bogor Agricultural University (Dep. of Agriculture Library, and Dep. of Social-Economic Library), CGPRT Centre Library (Bogor), Central Research Inst. for Food Crops Library (CRIFC, Bogor), Malang Research Inst. for Food Crops Library (MARIF, Malang, East Java), Bogor Research Inst. for Food Crops Library (BORIF, Bogor), and the National Library of Indonesia (Jakarta).

3129. *SoyaScan Notes.* 2010. Chronology of soymilk worldwide–220 A.D. to 1949. Part I. Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** 220 A.D.–Archaeological evidence: An interesting kitchen scene was discovered (during the 1980s) on a mural incised on a stone slab in Han Tomb No. 1, at Da-hu-ting (Ta-hu-t'ing), Mixian (Mi-hsien), Henan Province, in northern China. Part of the scene clearly depicts the preparation of soymilk and tofu, suggesting that they were being made in northern China during the Eastern/ Later Han period (A.D. 25-220).

1500 A.D.–The earliest known written reference to soymilk appears in China in a poem titled "Ode to Tofu," written by Su Ping

1665–Soymilk is first mentioned by a Westerner, Domingo Fernández de Navarrete, in his book *A Collection of Voyages and Travels.* Navarrete served as a Dominican missionary in China.

1790–Soymilk is mentioned by Juan de Loureiro in his book *The Flora of Cochin China.* Loureiro was a Portuguese Jesuit missionary who lived in what is now Vietnam. Note that each of these and many other early

references mentioned soymilk as part of the process for making tofu.

1866–Soymilk is first discussed as a drink in its own right by the Frenchman Paul Champion, who traveled in China. In a French-language article he stated that the Chinese had taken their cups to tofu shops to get hot soymilk, which they drank for breakfast.

1896 June–Soymilk is first referred to in the United States by Henry Trimble in the *American Journal of Pharmacy.*

1909–The first soy-based infant formulas and soymilk made from full-fat soy flour are developed in the United States by John Ruhräh, a pediatrician. He reports his results in the *Archives of Pediatrics* (July 1909).

1910–The world's first soy dairy, named *Caséo-Sojaïne,* is founded by Li Yu-ying, a Chinese citizen, biologist and engineer, at 46-48 Rue Denis Papin, Les Valées, Colombes (near Asnières), a few miles northwest of Paris. In December 1910 he applies for the world's first soymilk patents (British Patents No. 30,275 and 30,351). The first patent is titled "Vegetable milk and its derivatives." He is issued both patents in Feb. 1912.

1913 June 13 Li Yu-ying is issued the first U.S. soymilk patent (No. 1,064,841), titled "Method of manufacturing products from soja." He filed the application on 10 Oct. 1911.

1917–Soymilk is being produced commercially in the U.S. by J.A. Chard Soy Products in New York City.

1929 Nov.–T.A. Van Gundy, founder of La Sierra Industries in Arlington, California, launches La Sierra Soy Milk, and becomes the first Seventh-day Adventist worldwide to make soymilk commercially. The product was canned and the beany flavor removed by live steam processing.

1931–Madison Foods of Madison, Tennessee, introduces Madison Soy Milk–the world's earliest known soymilk to be fortified with calcium and the second commercial soymilk product made by Seventh-day Adventists in the USA. Madison Foods is a company run by students and faculty within Madison College, a pioneering work/study school.

1936 Jan.–Dr. Harry W. Miller and his son, Willis, start making Vetose Soya Milk, sold in natural or chocolate flavors in sterilized half pint or quart bottles at their Vetose Nutritional Laboratories in Shanghai, China. Dr. Miller is a Seventh-day Adventist physician, a student of Dr. John Harvey Kellogg, and a medical missionary living in China. The world's first "soy dairy," this company also made soy ice cream and Acidophilus Vetose (a cultured soya milk)–both launched in Jan. 1936. But Japan was invading China. Within months after the soy-milk business began booming, a Japanese bomb blew up the soy dairy.

1939 autumn–Dr. Harry W. Miller, forced by the war in China to return to the USA, starts making soymilk at Mt. Vernon, Ohio, in a large brick plant which he and coworkers built from the ground up. The first two products were canned liquid soymilk (made in a pressure cooker and fortified with vitamins and minerals) and malted soymilk (Soy-A-Malt). Pressure from the powerful U.S. dairy industry and the USDA convinced Miller not to call his product 'soymilk,' so he latinized the name to Soya Lac. This term was first used in late 1939 for Miller's first American soymilk.

1940 March–K.S. Lo, founder and managing director of the Hong Kong Soya Bean Products Co. Ltd. starts to make soymilk in Hong Kong. His product, originally named Vita Milk, was fortified with calcium, cod-liver oil, and vitamins, and sold in milk bottles, primarily as a nutritious, affordable beverage for refugees. In June 1940 the product was renamed Sunspot, and in 1953 it was renamed Vitasoy. Continued.

3130. *SoyaScan Notes.*2010. Chronology of soymilk worldwide–1950 to present. Part II. Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** 1950's–Soymilk enters the modern era as it begins to be marketed in bottles like soft drinks, largely due to work by K.S. Lo of Vitasoy in Hong Kong and Yeo Hiap Seng in Singapore.

1954–Japan's first commercial soymilk, sold in bottles, is introduced by the Ueda Tofu Shop in Hachioji, Tokyo. Dr. Harry Miller was the inspiration for and helped to establish the shop.

1960s–In Japan, soymilk slowly increases in popularity. New manufacturers are: Nihon Tanpaku Kogyo (1962). College Health Foods (later renamed San-iku Foods) in Chiba prefecture with its Soyalac (1969, also inspired and aided by Dr. Harry Miller). Luppy Tanpaku (House Shokuhin) in Saitama prefecture with its Luppy soymilk (1969).

1966–The enzyme lipoxygenase is discovered by scientists at Cornell University [Ithaca, New York] to be responsible for the "beany" flavor in soymilk. A process is developed which could be used to help eliminate this flavor.

1967–Soymilk begins to be packaged aseptically in Tetra Pak cartons. This allows it to be sold without refrigeration for six months or more. The first such product was Beanvit, made by Yeo Hiap Seng Ltd. in Singapore and packaged in a disposable tetrahedron-shaped container.

1970's and 1980's–Soymilk becomes a popular beverage throughout Asia, spreading to Europe, Australia and the United States.

1979–Hong Kong Soya Bean Products Co. Ltd. starts to export Vitasoy, packed in Tetra Brik cartons, to selected countries throughout the world. By the early 1980s exports were going to over 20 countries, both developed and developing. Exports to the USA began in 1980. 1980 Jan.–DE-VAU-GE Gesundkostwerk, a Seventh-day Adventist

food company near Hamburg, Germany, launches GranoVita Soja Drink in 500 ml Tetra Brik cartons; this soymilk product is made by N.V. Vandemoortele (one of Europe's largest oilseed crushers, founded in 1934) in Izegem, Belgium.

1980 June–N.V. Alpro is founded by Vandemoortele to take over production of this soymilk. Inspired and headed by Philippe Vandemoortele, Alpro purchased the land on which it was located from Vandemoortele, and became an independent manufacturer. Alpro quickly became Europe's leading producer of soymilk, making private-label brands for scores of companies.

1983 July–Edensoy brand soymilk is launched by Eden Foods of Clinton, Michigan. Imported from Japan (where it is made by Marusan-Ai Co.), it is sold in plain and carob flavors in stand-up foil retort pouches.

1984 Feb.–The first comprehensive study of the soymilk market in the U.S. is published by Soyfoods Center of Lafayette, California. It estimates that total soymilk consumption in the U.S. in 1983 (not including soy-based infant formulas) was 2.68 million gallons (26% of this was imported), and total production of soy-based infant formulas was 32 million gallons.

1984 Aug.–Westsoy Natural brand soymilk is launched by Westbrae Natural Foods of Emeryville, California. Imported from Japan (where it is made by San-Iku Foods), it is sold in one flavor in standup foil retort pouches.

1984 Oct.–Westbrae Natural Malted's, a thick soymilk resembling a milk shake, are launched in many flavors by Westbrae Natural Foods, imported from Japan.

1986 Nov.–Edensoy starts to be made in America by American Soy Products (ASP) at a large, modern plant in Saline, Michigan, and sold in Tetra Brik aseptic cartons. ASP is a joint venture of 4 Japanese companies and Eden Foods.

1988 Nov.–Pacific Foods of Oregon, launches its first soymilk product, Naturally Northwest Soy Beverage [Plain], in a 1-quart Tetra Brik Aseptic carton. The company's new factory is in Tualatin, Oregon.

1990 April–WestSoy Lite, America's first "lite" soymilk, with a low fat content, is introduced in plain, vanilla, and cocoa flavors by Westbrae Natural Foods. Made by adding water to regular soymilk, the product is less expensive to make, but also contains less nutrients. and soon

1990 June–Alpro opens a new soymilk plant at Wevelgem, Belgium. Costing about US$15 million and having a capacity of 45 million liters a year, it is reputed to be the largest in the world. Alpro now makes about 70% of the soymilk in Europe.

1990 Sept. 24–The company name is changed to Vitasoy International Holdings Ltd. from Hong Kong Soya Bean Products Co. Ltd.

1991–There are at least 35 processors or marketers of soymilk in the U.S., increasing production to approximately 9.8 million gallons. Consumption is estimated to be growing at between 15 and 20% per year since 1984.

1993–More than 200 scientific journal articles about soymilk have been published in English, and at least 80 English-language patents on soymilk have been issued between 1912 and 1993.

1994 Jan.–Soy-Um, a low-priced and attractively packaged soymilk, is launched by J&G Inc., a product developer and distributor in Chicago, Illinois. The product is made in Oregon by Pacific Foods.

1995–A market study is published, estimating that $108 million of soymilk was sold in the U.S. in 1994. This equates to approximately 13.5 gallons of soymilk. Sales are projected to have risen to over $130 million, or approximately 16.3 million gallons.

3131. *SoyaScan Notes.*2010. Chronology of tofu worldwide–220 A.D. to 1929. Part I. Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** 220 A.D.–Archaeological evidence: An interesting kitchen scene was discovered (in 1959-60) on a mural incised on a stone slab in Han Tomb No. 1, at Da-hu-ting (Ta-hu-t'ing), Mixian (Mi-hsien), Henan Province, in northern China. Part of the scene clearly depicts the preparation of soymilk and tofu, suggesting that they were being made in northern China during the Eastern/Later Han period (A.D. 25-220). For an excellent English-language discussion of this discovery (with a photograph of the mural and illustrations), see: H.T. Huang. 2000. *Science and Civilisation in China. Vol. 6, Biology and Biological Technology. Part V: Fermentations and Food Science. Joseph Needham Series.* Cambridge University Press. xxviii + 741 p. See p. 302-314.

965 A.D.–Tofu is first mentioned in China in a document, the *Ch'ing I Lu* [Anecdotes, simple and exotic], by T'ao Ku. It states: "In the daily market were several catties of doufu. People of the region called doufu the 'vice mayor's mutton.'" It goes on to tell the story of a vice mayor named Jishu, who was so poor that he couldn't afford to buy mutton. Instead he bought a few pieces of tofu every day and ate them as a side dish with rice. Soon people in the area came to call tofu the "vice mayor's mutton." The story implies that tofu was widely consumed in China in those days and that it was less expensive than mutton.

1183 A.D.–Tofu is first mentioned in Japan in the diary of Hiroshige NAKAOMI, a Shinto priest of the shrine at Nara; the tofu was used as an offering at the shrine's altar.

1489–The word "tofu" is first written in Japan with the characters used today.

1603–The word "tofu" is first mentioned in a European-language (Portuguese) document, *Vocabulario da lingoa de Iapam... [Vocabulary of the language of Japan],*

the earliest dictionary of the Japanese language compiled by Europeans (Jesuits living in Nagasaki, Japan). Tofu is referred to as *Cabe, Tôfu,* or *Taufu.*

1613–The word tofu is first referred to (though indirectly) for the second time by a Westerner, Captain John Saris, in the log of his trip to Japan. He wrote "Of Cheese [probably tofu] they haue plentie. Butter they make none, neither will they eate any Milke, because they hold it to bee as bloud [blood], nor tame beasts." This is the earliest English-language document that mentions tofu in connection with Japan.

1665–Tofu is first mentioned specifically by a Westerner, Domingo Fernández de Navarrete, in his book *A Collection of Voyages and Travels.* Navarrete, who served as a Dominican missionary in China, wrote: "Before I proceed to the next chapter, because I forgot it in the first book, I will here briefly mention the most usual, common and cheap sort of food all *China* abounds in, and which all men in that empire eat, from the emperor to the meanest *Chinese*, the emperor and great men as a dainty, the common sort as necessary sustenance. It is call'd *teu fu,* that is, paste of kidney-beans. I did not see how they made it. They draw the milk out of the kidney-beans, and turning it, make great cakes of it like cheeses, as big as a large sieve, and five or six fingers thick. All the mass is as white as the very snow, to look to nothing can be finer. It is eaten raw, but generally boil'd and dressed with herbs, fish, and other things. Alone it is insipid, but very good so dressed and excellent fry'd in butter. They have it also dry'd and smok'd, and mix'd with caraway-seeds, which is best of all. It is incredible what vast quantities of it are consum'd in *China,* and very hard to conceive there should be such abundance of kidney-beans. That *Chinese* who has *teu fu,* herbs and rice, needs no other sustenance to work; and I think there is no body but has it, because they may have a pound (which is above twenty ounces) of it any where for a half-penny. It is a great help in case of want, and is good for carriage. It has one good quality, which is, that it causes the different airs and seasons, which in that vast region vary much, to make no alteration in the body, and therefore they that travel from one province to another make use of it. *Teu fu* is one of the most remarkable things in *China,* there are many will leave pullets for it. If I am not deceiv'd, the *Chineses* of *Manila* [Philippines] make it, but no *European* eats it, which is perhaps because they have not tasted it, no more than they do fritters fry'd in oil of *Ajonjoli* ([sesame seed] a very small seed they have in *Spain* and *India,* which we have not) which the *Chineses* make in that city and is an extraordinary dainty."

1704–Friar Domingo Navarrete's book is published in English. This is the earliest English-language document that mentions tofu in connection with China.

1770 Jan. 3–James Flint in Capringe writes Benjamin Franklin in London (in response to an inquiry from Franklin) a detailed description of how the "Chinese convert Callivances into Towfu" (soybeans into tofu).

1770 Jan. 11–The earliest document seen in which an American mentions tofu is a letter written by the famous Benjamin Franklin (who was in London) to John Bartram in Philadelphia, Pennsylvania. He sent Bartram some soybeans (which he called "Chinese caravances") and with them he sent "Father Navarrete's account of the universal use of a cheese made of them in China, which so excited my curiosity, that I caused enquiry to be made of Mr. [James] Flint, who lived many years there, in what manner the cheese was made, and I send you his answer. I have since learned that some runnings of salt (I suppose runnet) is put into water, when the meal is in it, to turn it to curds."

1821–The second earliest reference seen to tofu in America, and the first to be published in the USA, appeared when A.F.M. Willich of Philadelphia mentioned it in *The Domestic Encyclopedia.* Speaking of soybeans (which he called "the seeds of the Chinese plant *Dolichos soja"),* he wrote: These *seeds* are used in China and Japan as food; they are made into a kind of jelly or curd, which is esteemed very nutritious, and which is rendered palatable by seasonings of different kinds."

1870 Dec.–The term "Bean curd" is first used by Emil V. Bretschneider, writing in English in the *Chinese Recorder and Missionary Journal* (Foochow, p. 173). He said: "Bean-curd is one of the most important articles of food in China." Then he gave an accurate description of how it was made.

1880–Tofu is first made in Europe by Paillieux, in France, for the Society for Acclimatization (but not on a commercial scale).

1878–The earliest tofu company in the USA, Wo Sing & Co., is in business at 708½ Dupont St. in San Francisco, making both fermented and regular tofu.

1895–Hirata & Co. in Sacramento, California, the earliest known Japanese-American company in the USA, starts making tofu.

1896 June–Tofu first appears in print in an American scientific journal *(American Journal of Pharmacy),* in an article by Henry Trimble, a pharmacist, titled "Recent Literature on the Soja Bean."

1906–Quong Hop & Co., the oldest existing tofu maker in America today, starts making tofu in San Francisco, California.

1910–Europe's first commercial soyfoods manufacturer, named *Caséo-Sojaïne,* is founded by Li Yu-ying, a Chinese citizen, biologist and engineer, at 46-48 Rue Denis Papin, Les Valées, Colombes (near Asnières), a few miles northwest of Paris. By May 1911 he was making and selling tofu, and by August 1911 he had added smoked tofu, pressed tofu sheets, fermented tofu cheese (in Gruyere, Roquefort, and Camembert flavors), and soymilk.

1923–The two oldest existing Japanese-American tofu companies (House Foods & Yamauchi Inc. of Los Angeles

and Aala Tofu Co. of Honolulu) are founded in Hawaii. They both began as H. Iwanaga Daufu at 1031 Aala St. in Honolulu. In 1926 the company was renamed Shoshiro Kanehori Tofu, and in 1937 Haruko Uyeda Tofu, still at the same address. In about 1939 the company was purchased by Mr. and Mrs. Shokin Yamauchi, who later renamed it Aala Tofu Co. Their son, Shoan Yamauchi, made tofu at the family company until 1946, when he went to Los Angeles, purchased the Hinode Tofu Co., and began making tofu there in 1947. After becoming Matsuda-Hinode Tofu Co. in 1963, the company was renamed House Foods & Yamauchi Inc. in 1983.

1929 Nov.–T.A. Van Gundy, a Seventh-day Adventist and founder of La Sierra Industries in Arlington, California (near Riverside), becomes the first Westerner to make tofu commercially when he introduces La Sierra Soya Cheese. This tofu was canned and pimiento was added to prevent graying after canning. Continued.

3132. *SoyaScan Notes.*2010. Chronology of Cambodia. Compiled by William Shurtleff of Soyinfo Center.
• ***Summary:*** France established a protectorate in 1863. Independence from France came in 1953. Prince Norodom Sihanouk, king 1941-1955 and head of state from 1960, tried to maintain neutrality. Relations with the U.S. were broken in 1965 after South Vietnam planes attacked Vietcong forces within Cambodia. 1969–Relations were restored after Sihanouk charged Vietnamese communists with arming Cambodian insurgents.

1970–Pro-U.S. premier Lon Nol seized power, demanding removal of 40,000 North Vietnamese troops. The monarchy was abolished. Sihanouk formed a government in exile in Peking, and open war began between the government and the Khmer Rouge. The U.S. provided heavy military and economic aid. 1975 April 17–The Khmer Rouge captured Pnom Penh and took power. The new government evacuated all cities and towns, sending virtually the entire population to clear jungle, forest, and scrub, which covered half the country. Over 1 million people were killed in executions and enforced hardships. 1978–Severe border fighting broke out with Vietnam, and developed into a full-fledged Vietnam invasion. 1979 Jan. 7–The Vietnamese captured Pnom Penh and the next day announced a new government. Thousands of refugees flowed into Thailand and widespread starvation was reported. From this time until the late 1980s the Vietnamese army fought to drive out the Khmer Rouge. Vietnam announced that it would withdraw all its troops by Sept. 1989.

Since 1990 efforts to create a new government have been hampered by fear both in Cambodia and internationally that the Khmer Rouge would return to power. Cambodia has been under authoritarian rule since 1975.

The term Kampuchea has been widely used since 1975, but many sources still use Cambodia, including World Almanac (1993), and National Geographic Atlas of the World (1992).

3133. *SoyaScan Notes.*2010. Chronology of Myanmar (named Burma until 1989). Compiled by William Shurtleff of Soyinfo Center.
• ***Summary:*** The present name is pronounced MAI-un-mar. Burma was ruled as a Chinese tributary until the 16th century. 1519–The Portuguese were the first Europeans to trade there. 1600s–Short-lived Dutch and English factories were founded. 1700s–Modern Burmese state founded by Alaungpaya and his successors, who conquered Arakan, Tenasserim coast, Manipur, Assam, and eventually came into conflict with the English East India Company. Britain subjugated Burma in 3 wars: First Burmese War (1824-26), as a result of which, by the treaty of Yandabu, the British acquired Assam, Arakan, Tenasserim, and Pegu. After the Second War (1852-53), Rangoon was retained by the British and Lower Burma was formed in 1862. As a result of the Third Burmese War (1885-86) Upper Burma was formed in 1866, incl. Mandalay, a kingdom founded by a native dynasty in the 19th century.

1885–Burma was annexed into British India, and remained a province of India, under a lieutenant governor, until 1923, when it was raised to a governor's province. 1937–Burma was separated from India and made a crown colony, which was self governing.

In World War II Burma was overcome by Japanese in 1942 (Rangoon was occupied March 8); the government was located in Simla. Re-conquered in 1945. Independence outside the commonwealth was achieved on 4 Jan. 1948. General Ne Win dominated politics from 1962 to 1988, when he abdicated power following waves of anti-government demonstrations. He led a Revolutionary Council set up in 1962, which drove Indians from the civil service and Chinese from commerce. Socialization of the economy was advanced, isolation from foreign countries was enforced. 1987–Burma, once the richest nation in southeast Asia, was granted least developed country status by the UN. 1989–The country's name was changed to Myanmar.

1990 May 27–The first free multiparty elections in 30 years took place, with the main opposition party winning a decisive victory. But the ruling military junta refused to hand over power. A key opposition leader, Daw Aung San Suu Kyi, who won the Nobel Peace Prize in Oct. 1991, was held under house arrest from 20 July 1989 to 10 July 1995; after her release, the military rulers continued to restrict her activities and to harass and imprison her supporters.

1997 May 21–New U.S. economic sanctions took effect. 1997 July 23–Myanmar was admitted to ASEAN.

3134. *SoyaScan Notes.*2010. Chronology of Vietnam (formerly divided by Colonial France into Tonkin and Annam in the north and Cochin-China in the south). Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** From its beginnings as a distinct nation, Vietnam, which shares its northern border with two provinces of southern China (Yunnan and Guangxi) has been strongly influenced by China. China ruled Vietnam for most of the period from 207 BC to AD 939. 111 BC–The Chinese Han dynasty conquered Nam Viet, a kingdom in what is now northern Vietnam. The northern part of Vietnam was made a province of China in the 1st century BC. During these ten centuries, China introduced such things as Confucianism, Buddhism (later; and its vegetarianism and vegetarian cuisine), architecture, writing, administrative methods–and probably soybeans and soyfoods (such as jiang *[tuong]*, soy sauce, tofu, yuba, etc.), chopsticks, the wok, the art of deep-frying, noodles, and the custom of communal meals at restaurants. Vietnam remained a tributary state to China for much of its history.

From this point until the 1700s, the history of Vietnam remains unclear and controversial–depending heavily on who is writing it.

From about the 7th century until 1832 the kingdom of Champa controlled much of what is today central and south Vietnam. To its north lay Dai Viet (today's north Vietnam), and to its west lay Angkor and the Khmer empire.

From AD 939 to 1407 there were six successive Vietnamese dynasties–Ngo, Dinh, Early Le, Ly, Tran, and Ho.

The fourth and final Chinese domination (during the Ming Dynasty in China) lasted from 1407 to 1427; in the latter year the Vietnamese handed the Ming occupying army a sound defeat. The Chinese conquered what is today north Vietnam; it was named Annam and its capital was Hanoi. South of Annam was Champa.

The next major dynasty in Vietnam was the Le dynasty (1428-1788), which lasted 360 years. Then came the Tay Son dynasty (1778-1802), and the Nguyen Dynasty (1802-1945, with its capital in Hue in central Vietnam).

In 1802 Nguyen Anh united the country and called it Vietnam.

The era of European colonialism began in the 1800s. The French, seeking recompense in empire after the loss of Alsace-Lorraine at the end of the Franco-Prussian War (1870-71), moved into Indochina and ruled with an iron hand–while also bringing French culture, food and cuisine (café au lait, French bread, milk, butter, yogurt, etc.) to Vietnamese elites. Conquest by France began in 1858 and ended in 1884 with the protectorates of Tonkin and Annam in the north and center, respectively, and the colony of Cochin-China in the south.

1940-1945–Japan controlled Vietnam during World War II. Occupied by Japan, nationalist aspirations grew stronger. A number of groups formed the Vietminh (Independence) League, headed by Ho Chi Minh, Communist guerilla leader, and his brilliant general Vo Nguen Giap.

The Empire of Vietnam was a short-lived puppet state of Imperial Japan governing the whole of Vietnam between March 11 and August 23, 1945; its capital was in Hue.

1945 Aug.–The Vietminh forced out Bao Dai, former emperor of Annam and head of a Japanese-sponsored regime. In 1945 Ho Chi Min proclaimed the establishment of the Democratic Republic of Vietnam in Hanoi 1946-1954–France, seeking to reestablish colonial control, battled communist and nationalist forces, but was finally defeated at Dienbienphu on 8 May 1954.

1954 June 4–North Vietnam declares independence from France. 1954 July 21–Cease fire signed in Geneva divided country into north and south along the 17th parallel. Some 900,000 North Vietnamese fled to South Vietnam. 1954 Dec. 29–South Vietnam declares independence from France.

1963–U.S. intervention in Vietnam begins under President John F. Kennedy. 1963 Nov. 2–Ngo Dinh Diem, the first president of South Vietnam, is assassinated in a Saigon suburb; he is replaced with a military junta. 1963 Nov. 22–President Kennedy is assassinated in Dallas, Texas; Lyndon Johnson becomes president. 1964 Aug.–The USA enters the war and begins air strikes against North Vietnam. 1965–First U.S. ground combat troops deployed in South Vietnam. 1969 April–U.S. troop strength peaks at 543,400, then gradual withdrawal of troops begins.

1973 Jan. 27–A cease-fire agreement is signed in Paris by the USA, North and South Vietnamese governments, and the Vietcong–but the agreement was never implemented. Also on Jan. 27 U.S. Secretary of Defense Melvin Laird announced the end of the military draft because no more U.S. troops would be needed since, he believed, the Vietnam War was now over. Note 1. The real end of the war did not come until April 1975, more than two years later! Note 2. The decision to end the U.S. military draft–and to change thereafter to an all-volunteer military–was made by one non-elected official, without public debate, and for the wrong reason. Note 3. The U.S. started withdrawing its troops from Vietnam soon after signing this cease-fire and finished two months later. In this way they extracted themselves from a terrible war and tried to save face without admitting defeat or surrendering; but they then left their allies, the South Vietnamese, to try to finish the war alone. Of course the U.S. knew they would lose–which they did in April 1975.

1973 March–The last U.S. forces leave Vietnam. 1975 early–Massive numbers of North Vietnamese troops, aided by tanks, launch attacks against the remaining South Vietnamese outposts in the Central Highlands. Government retreats turned into a rout. 1975 April 29–The fall of Saigon

and of South Vietnam. The South Vietnamese regime and military surrenders to the Vietcong. The last Americans flee Saigon in a helicopter from the top of the U.S. embassy. America lost the war, if not militarily, at least psychologically and culturally. U.S. combat deaths: 47,369.

1976 July 2–Vietnam is officially reunited by the Communists, with Hanoi as the capital. The first national assembly of both parts of the country meets. The North Vietnam flag, anthem, emblem, and currency are used in the newly unified nation.

1985–Vietnam starts to reduce central control of the economy and introduce some free-market economic reforms. By 1987 many of the old revolutionary followers of Ho Chi Minh were removed from office.

1994 Feb. 3–U.S. announces the end of a 19-year embargo on trade with Vietnam–citing Vietnamese cooperation in returning remains of U.S. soldiers killed in the Vietnam War. 1995 July 11–U.S. extends full diplomatic recognition to Vietnam. Also this year Vietnam joins the Association of Southeast Asian Nations (ASEAN). 1997 May–First U.S. ambassador since the war, Pete Peterson, arrives in Vietnam.

2006–The USA has become Vietnam's top export market, with annual trade over $6 billion. 2006 June 5–The two countries agreed to strengthen defense ties. 2006 June 27–Communists reputed to be economic reformers became president and prime minister.

3135. *SoyaScan Notes.*2010. Chronology of Kikkoman Corporation. Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** This chronology is based largely on the excellent chronologies near the back of Kikkoman annual reports, and dates in Fruin (1983). "Ideally situated close to soybean-growing regions as well as the Edo River, which provided a convenient transportation route for consumers in or near Edo, or present-day Tokyo, Noda has been well-known for its soy sauce (shoyu) production since the Edo period. Noda is located about 30 miles northeast of Tokyo in Chiba prefecture.

"Kikkoman Soy Sauce first went on the market in 1661 when the Takanashi and Mogi families constructed breweries and started the brewing of soy sauce."

1914–When World War I started, excessive competition arose between Japan's many shoyu producers because of the wartime economy, causing a very confused market situation. 1917 Dec.–With these conditions as a background, eight Mogi and Takanashi family companies, the leading shoyu producers in the Noda area, merged to form Noda Shoyu Co., Ltd., a company with capital of ¥7 million and the predecessor of Kikkoman Corporation."

"1925 April–Noda Shoyu Co., Ltd. absorbs Noda Shoyu Jozo Co., Ltd., Manjo Mirin Co., Ltd., and Nippon Shoyu Co., Ltd., through a merger. 1926–Kikkoman No. 7 shoyu brewing plant constructed.

30 August–The Takasago soy sauce production plant (formerly the Kansai Plant) is constructed near Osaka and completed in 1931. 1936–Kikkoman Worcestershire Sauce plant completed. 1939–With the start of World War II, government controls on the price of soy sauce are established.

1946–Kikkoman stock first becomes available to the public. 1949–Export of Kikkoman soy sauce is reestablished after the war.

1950–Wartime soy sauce controls end and free competition resumes. "1957 June–Kikkoman International Inc. (KII) is established in San Francisco, California, in the United States. 1958–The first KII branch is established in Los Angeles.

"1960–The second KII branch is established in New York.

"1961 July–Kikko Food Corporation is established (later renamed Kikko Food Industries Co., Ltd.) In July 1991, the company becomes Nippon Del Monte Corporation. 1961–Seishin Pharmaceutical Co., Ltd. established. 1962 February–Tone Beverage Co., Ltd., is established. In February 1963, the company becomes Tone Coca-Cola Bottling Co., Ltd. 1962 October–Katsunuma Yoshu Co., Ltd., is established. In March 1964, the company becomes Mann's Wine Co., Ltd. 1963–Japan Calpak Co., Ltd. established. 1964 October–Noda Shoyu Co., Ltd., is renamed Kikkoman Shoyu Co., Ltd. 1965–The third KII branch is established in Chicago, Illinois. 1966–Sales of Higeta brand products assumed by Kikkoman. 1968–Bottling of Kikkoman Soy Sauce for the American market begins at the Leslie Foods plant in Oakland, California.

1969 June–Kikkoman invests in and merges with Japan Food corporation, the biggest distributor of Oriental food in the United States. In June 1978 the company becomes JFC International Inc.

"1970 March–Kikkoman invests in and merges with Pacific Trading Co., Ltd., a sister company of Japan Food Corporation. 1972 March–Kikkoman Foods, Inc. (KFI), is established in Walworth, Wisconsin (USA) for the purpose of manufacturing soy sauce and teriyaki sauce. Shipping starts in early 1973. 1972 August–Kikkoman + Daitokai (Europe) GmbH is established in Düsseldorf, in Germany. 1974 February–Kikkoman Restaurant, Inc. is established. 1979 March–Kikkoman Trading Europe GmbH is established in Neuss, in Germany.

1980 October–Kikkoman Shoyu Co., Ltd. is renamed Kikkoman Corporation–the company's present name. 1983 January–Kikkoman Ajinomingei Co., Ltd., is established. 1983 June–Kikkoman (S) Pte. Ltd., a production facility, is established in Singapore. 1983 October–Kikkoman Business Development Inc. is established. 1986 August–

New *Shoyu* production facilities come on stream at Kikkoman's Chitose Plant, in Hokkaido.

"1990 January–Kikkoman buys perpetual marketing rights for the Del Monte brand in the Asian-Pacific region, excluding the Philippines. 1990 February–A joint venture company, President Kikkoman Inc. is established to produce soy sauce in Tainan, in Taiwan. 1996 April–Kikkoman invests in Kikkoman Foods Europe B.V., Europe's first soy sauce manufacturer, located in Hoogezand-Sappemeer, in the Netherlands. 1996 May–Production of *Shochu* a clear Japanese spirit, commences at a new facility of the Ojima Plant. 1997 March–Kikkoman holds a ground-breaking ceremony for its second U.S. soy sauce production plant, in Folsom, California, in the United States. 1997 October–Kikkoman Foods Europe B.V. begins operations at its plant [in Hoogezand-Sappemeer, the Netherlands]. 1998 October–The second manufacturing plant of Kikkoman Foods, Inc., in Folsom, California, begins shipments. 1999 July–Kikkoman opens its new headquarters in Noda, Chiba prefecture, to commemorate the Company's 80th anniversary. 1999 October–Kikkoman Institute for International Food Culture is opened at the Company's new headquarters. 1999 November–Kikkoman announces a joint venture with its partner in Taiwan [Uni-President Enterprises, Taiwan's largest food manufacturer] to build a soy sauce plant in China" [In Kunshan, near Shanghai].

2000 May–Kunshan President Kikkoman Biotechnology Co., Ltd. is established. 2000 Aug.–Construction starts on a soy sauce plant in China. The first shipments are slated for spring 2002.

2002 May–The China plant Kunshan President Kikkoman Biotechnology Co., Ltd., holds its grand opening.

2003 May–Kikkoman Foods, Inc. (with its plant at Walworth, Wisconsin) holds its 30th anniversary ceremony.

2004 March–Kikkoman invests in Higeta Shoyu Co., Ltd. and Kibun Food Chemifa Co., Ltd.

3136. *SoyaScan Notes.*2010. Chronology of David Fairchild (1869-1954), organizer and head of the USDA Section of Foreign Seed and Plant Introduction (FSPI). Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** 1869 April 7–David Fairchild is born at Michigan State College, one of five children, in a family deeply interested in ideas. 1879–When David was age 10, his father, George T. Fairchild, accepts the presidency of fledgling Kansas State College of Agriculture–a position he held until 1897. Thus David grew up on agricultural college campuses. He later attended that college and took a strong interest in the new science of plant pathology. 1888–Graduated from Kansas State College of Agriculture. 1889–Goes to Washington, DC, to work for the USDA in Dr. Beverly Galloway's new "Section of Vegetable Pathology.

1893–Resigns his position at the USDA to continue his studies in Europe. On this trip he meets Mr. Barbour Lathrop. Lathrop offers to pay Fairchild's way to Java to continue his studies. Later, the two men discussed a broad plan for systematic plant introduction under the auspices of the USDA.

1897 fall–The Section of Foreign Seed and Plant Introduction (FSPI) is organized within the Seed Division of USDA in Washington, DC, with Fairchild in charge. Fairchild detests the inclusion of the superfluous words "Seed and" in the name of the organization.

1898 March 22–Congress allocates $20,000 for the collection, purchase, testing, and preparation of foreign seeds, plants, bulbs, shrubs, and trees. Fairchild serves as "Explorer in Charge" for the next 27 years. He spends much of his time from 1898 to 1903 travelling in search of new plants. He temporarily resigned from Oct. 1898–Aug. 1900, and in the position of "Special Agent" plant explorer he made a "quick reconnaissance of the world."

1900–Bureau of Plant Industry is organized within the USDA. 1901 July 1–The Bureau of Plant Industry is formally established; it includes the former Division of Seed and Plant Introduction. It was the first official agricultural organization of its kind devoted exclusively to plant introduction. 1901 March 1–The Section of FSPI is placed under the Bureau of Plant Industry; it was referred to successively as the Office of Foreign Seed and Plant Introduction and then the Office of Foreign Plant Introduction. 1904 June to Oct.–Grand tour of the USA visiting experiment stations and people testing plants being introduced by the USDA, including Charles Sprague Sargent, director of Harvard's famous Arnold Arboretum [Cambridge, Massachusetts], and P.H. Dorsett at the new USDA plant introduction garden in Chico, California. Adrian J. Pieters directed the Foreign Seed and Plant Introduction Office during the last months of Fairchild's travels. 1904 Nov.–Fairchild meets Marian Bell, daughter of Alexander Graham Bell, whose sister had married into the Grosvenor family of *National Geographic* fame. He quickly falls in love. 1905 March–Fairchild learns of Frank N. Meyer from fellow Dutchman Adrian Peters and coworker Erwin F. Smith. Soon thereafter, on March 10 Fairchild asks Pieters to telegram Meyer in St. Louis, Missouri, to ask whether he would be interested in going to China as an agricultural explorer (Fairchild 1938, p. 315; Cunningham 1984, p. 21). The dream of Meyer's youth had come true. But 3 months would pass before Meyer left St. Louis for Washington, DC.

1905 April 25–Fairchild and Marion Bell are married at Twin Oaks in Maryland. Grosvenor becomes Fairchild's brother-in-law. Wanting to live as far out in the country as possible, they bought (that summer) a 40-acre tract of land in the woods near Kensington, Maryland, through which Rock Creek flowed. Beyond the suburbs of Maryland, it

was 10 miles northwest Washington, DC, and a mile beyond the end of the Chevy Chase. They soon build a home and plant many Japanese cherry trees and a garden; Barbour Lathrop named the place "In the Woods."

1905 July–Fairchild and Meyer first meet in Washington, DC, and instantly become mutual friends.

1916–David and Marian Fairchild purchase a piece of property located in Coconut Grove on Biscayne Bay, Florida; they name it The Kampong. On the property were many fine old tropical trees.

1934 Feb. 9–The Division of Plant Exploration and Introduction is established by the merging of the former Division of Foreign Plant Introduction and the former Division of Botany. 1935–Fairchild retires from active service, and spends and increasing amount of time at The Kampong in Florida. 1954 Aug. 5–Fairchild dies of a cerebral hemorrhage in Miami, Florida.

3137. *SoyaScan Questions.* 2010. Questions about the history of yuba. Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** How could the Chinese have chosen such an apparently meaningless word as *doufu pi* ("bean curd skin") to refer to yuba? Today, is yuba not part of the process for making tofu. Yuba would seem to be more accurately described as "soymilk skin" rather than as "tofu skin." But could there be some long-lost connection between making yuba and making tofu in ancient China? A number of documents describe this connection. However Dr. H.T. Huang (personal communication, 25 Feb. 2010), an expert on the history of food in China, says: "The names of these products were probably coined by illiterate artisans, so I wouldn't worry about their lack of logic or elegance."

Look in early indigenous language documents for the earliest reference to yuba in countries surrounding China where yuba is made or used today, such as Vietnam, Indonesia, Philippines, Cambodia, Thailand, etc.

3138. *SoyaScan Questions.* 2010. Questions about the history of soybeans and soyfoods in Southeast Asia. Further research needed. Compiled by William Shurtleff of Soyinfo Center.

• ***Summary:*** (1) The indigenous language of each country or cultural area in Southeast Asia is not widely read or spoken. How many people do you know who can read or write Bahasa Indonesia, Burmese, Filipino, Khmer, Lao, Malay, etc. Yet the earliest reference to soybeans and soyfoods in each country probably appears in this indigenous language. So there is a nice historical challenge here.

(2) Cambodia: Soybeans must have been cultivated in Cambodia at a much earlier date than we have been able to find–before Cambodia became a protectorate of France in 1863. Any early documents that mention soybeans may well have been written in Khmer. (3) Likewise with Laos, Malaysia, Myanmar, etc.

An asterisk (*) at the end of the record means that SOYFOODS CENTER does not own that document.
A plus after eng (eng+) means that SOYFOODS CENTER has done a partial or complete translation into English of that document.
An asterisk in a listing of number of references [23* ref] means that most of these references are not about soybeans or soyfoods.

## SUBJECT/GEOGRAPHICAL INDEX BY RECORD NUMBERS

APV Systems, Soya Technology Division. Named Danish Turnkey Dairies Ltd., Soya Technology Division until 1987 (Aarhus, Denmark; DTD / STS). 1855, 1911, 1912, 1913, 1944, 1955, 1956, 1966, 1981, 1982, 2006, 2010, 2013, 2015, 2069, 2138, 2159, 2211, 2316, 2355, 2356, 2363, 2364, 2367, 2368, 2369, 2379, 2387, 2411, 2433, 2434, 2436, 2515, 2745